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# ***Financing Choices of Firms in EU Accession Countries***

Eugene Nivorozhkin

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Eugene Nivorozhkin<sup>♠</sup>

Department of Economics, Gothenburg University<sup>♠</sup>

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<sup>♠</sup> Box 640 SE 405 30 Göteborg, Sweden, tel. +46 31 7731370, fax +46 31 773 1043,  
E-mail: [econneug@economics.gu.se](mailto:econneug@economics.gu.se)

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## **Abstract**

The paper presents evidence of actual and target capital structures of firms in five EU accession countries of Central and Eastern Europe and the former Soviet Union (Bulgaria, the Czech Republic, Poland, Romania and Estonia). We consider the financial constraints of private companies and compare the level of indebtedness and the determinants firms' choices of capital structure in selected EU accession countries and EU countries. A dynamic non-linear adjustment model is adopted to explicitly model the adjustment of a firm's leverage to a target leverage.

**JEL Classification Numbers:** G30, G32, O12, O52

**Keywords:** EU; transition countries; capital structure; leverage; dynamic adjustment model;

## **I. Introduction**

Enterprise restructuring and financial system reforms have been core issues for transition countries of Central and Eastern Europe and the Former Soviet Union (Djankov and Murrell, 2002). Indeed, creating appropriate incentive structures for firms and banks has proven to be one of the most challenging tasks of reform. The failures and shortcomings of these reforms during the first decade of economic transformation resulted in substantial fiscal costs and forgone economic growth for most of the economies in the region, and has thus made the “accession readiness” of enterprises in these countries a focal concern in the forthcoming expansion of the EU (Carlin et al., 1999).

Access of firms to finance in transition economies, a central discussion in reform of the enterprise and bank sectors, has had two aspects. On one hand, market reforms have been expected to impose hard-budget constraints on the loss-making state-owned enterprises (SOEs), and include such corrective measures as the elimination of “soft” credits from banks to firms and breaking up the collusion between banks and firms. On the other hand, most transition economies have continued to lack the medium- and long-term finance needed for restructuring and growth of most private companies. Corporate credit and capital markets remained thin, segmented and underdeveloped by western standards in the most transition countries throughout the 1990s. In general, measures to solve the problems of SOEs and banks did not include efforts at alleviating financial constraints on private firms.

This paper attempts to gain some insights into the financial constraints facing private companies in transition economies and hopefully shed light on how the characteristics of firms in accession countries compare with firms in EU countries. We present evidence about the relative importance of equity, debt, and inter-firm financing for a large and diverse set of enterprises from five transition economies using a panel of firms from Bulgaria, the Czech Republic, Estonia, Poland and Romania. These countries represent diverse geographical parts of Europe: Central and Eastern Europe, Southeastern Europe and the Baltic Region. More importantly, these countries have had different experiences and degrees of success with market reforms. In addition to covering the representative cross-section of firms, our dataset spans a reasonably long period from 1997 to 2001.

The novelty of the paper is an adoption of a dynamic modelling framework to analyze the determinants of the target capital structures for the companies. The model allows accounting for transaction costs that impede the adjustment of the capital structure of a firm towards its desired capital structure. The transaction costs of altering capital structure are often ignored in the existing finance literature, i.e. most papers accept Modigliani-Miller

Proposition I, which assumes that transaction costs are second order (Miller and Modigliani, 1958). One might expect, however, that transaction costs play a more important role in transition economies relative to industrialized ones due to less developed financial systems and persistent supply-side market imperfections.

We use a non-linear dynamic adjustment model and explicitly model the adjustment of a firm's leverage to a target leverage, assumed to be the desired one. This target leverage is explained by a set of factors. The introduction of an endogenous adjustment factor and target leverage, in turn, helps avoid the shortcomings of many capital structure studies. First, these studies explain the variation in observed leverage, while theoretical models relate to optimal (target) capital structure. Second, most studies do not attempt to capture the nature of dynamic capital structure adjustments.

The literature on choice of capital structure in transition economies was fairly limited until recently. Hussain and Nivorozhkin (1997) and Cornelli, Portes and Schaffer (1998) document surprisingly low levels of leverage for firms in Poland and Hungary in the first half of 1990s. Both papers examine the determinants of capital structure and conclude that the low levels of debt financing are most likely a supply-side phenomenon. Nivorozhkin (2002) studies developments in the Hungarian capital markets during 1992-1995 and investigates the determinants of the capital structures of companies listed on the Budapest Stock Exchange. The results support the earlier finding that Hungarian firms were financially constrained. This situation apparently was the result of the combination of the financial incentives of firms and credit rationing within the financial environment. Revoltella (2001) investigates the effects of firm specific variables on indebtedness in the Czech Republic during the first years of transition. Supply factors are found to significantly determine the financial choices of enterprises. The paper also suggests evidence of a transformation in credit allocation policies. Klapper et al (2002) analyze small and medium-size enterprise (SME) financing in Eastern Europe in 1999. The authors find that the SME sector comprises relatively young, highly leveraged, and relatively profitable firms. The financial constraints are found to impede the access of firms to long-term financing and their ability to grow.

The model similar to the one used in this paper was employed in Nivorozhkin (2003) to investigate the dynamics of capital structure of companies in the Czech Republic and Bulgaria during 1993-1997. Our paper extends the results of Nivorozhkin (2003) in several important dimensions. First, the paper looks at a larger set of countries, which allows more general conclusions. Second, the set of explanatory variables is extended to include the ownership information of companies. Third, the paper touches upon the determinants of cross-country variations in the capital structures of companies. Finally, our paper looks at a different time

period, i.e. 1997-2001. The greater macroeconomic stability and synchronization of policies for the purpose of EU accession during that period adds credibility to the cross-country comparison and makes the analysis somewhat policy oriented.

The remainder of the paper is organized as follows: In section 2, we provide some background information on the transition economies investigated in the paper. In section 3, we look at the relative indebtedness of firms in different countries and analyze the determinants of observed differences. In section 4, we describe the dynamic adjustment model of capital structure. In section 5, we proceed with the selection of dependent and explanatory variables of the model. Section 6 contains the discussion of the data set and estimation procedure. In section 7, we describe the results of the dynamic adjustment model estimation. Section 8 concludes.

## **II. Countries in transition: some background information**

### **Bulgaria**

Bulgaria made very slow progress in reforms throughout most of the 1990s. Weak financial discipline and poor corporate governance of Bulgarian firms and banks led to widespread asset stripping and insider lending in the first half of 1990s. General economic instability and ineffective recapitalization helped precipitate a major financial crisis in 1996-1997.

In the wake of the crisis and the post-crisis period, measures to promote financial discipline and create incentives for restructuring have been fairly ineffective due to weak bankruptcy law, insider ownership, underdeveloped markets for corporate control and the lack of new commercial credit (EBRD, 2000).

In 1996, the Bulgarian authorities launched a program of liquidation and rehabilitation of the largest loss-making state-owned enterprises, which were responsible for most of the losses. The program was largely completed by mid-2000. Bulgarian mass privatization started in late 1996, and 78 % of state-owned assets (excluding infrastructure) had been sold to the public by the end of 2000.

Since 1997, the Bulgarian banking sector has experienced consolidation and improvements in regulation and supervision. Privatization of banks encountered setbacks, but nevertheless was nearly complete by 2001, when only three banks remained in state ownership. Bank intermediation remained limited in the post-crisis period. As a result, the domestic credit to the private sector averaged only 13.62 % of GDP during 1997-2000. Banks

were unwilling to engage actively in commercial lending, despite the efforts of the Bulgarian authorities to strengthen creditors' rights and simplify collateral collection.

The role of the Bulgarian securities market has remained limited since its establishment. Despite a large number of listed companies on Bulgarian Stock Exchange, the trading volumes have been very low. The first corporate bond issues took place in 1999.

## **The Czech Republic**

Czech privatization occurred in two waves in 1992 and 1995. The second wave of the Czech Republic's voucher privatization program boosted the share of the domestic product generated by the private sector to 70 %. Large-scale privatization was revived in 2000 and increased the private sector share of GDP to 80 %.

While generally considered a successful transition economy, the Czech Republic has faced problems similar to less-advanced countries in the area of enterprise and banking sector reform. In 1999, inefficient bankruptcy law and poor enforcement resulted in over 3,000 bankruptcy cases pending in the courts, over 10,000 companies were technically insolvent and about one-third of Czech companies were estimated to have overdue debts (EBRD, 2000).

The government gained some traction on the problem of insolvency of large industrial conglomerates in the late 1990s, only to encounter fiscal pressure as the amount of state guarantees increased. Some of the government's liability arose from indirect guarantees on bad loans placed with the Consolidation Bank.

A small number of foreign-owned banks came to dominate the sector after privatization and consolidation of Czech banks. In mid-2001, after the government sold off the last state-owned bank, the share of foreign-owned banks exceeded 90 % of total banking assets. Despite attempts to clean up the portfolios of banks ahead of privatization, the share of bad loans in total loans of the banks remained around 20 % through the late 1990s.

The Czech Republic's healthy investment climate resulted in the highest cumulative flows of FDI per capita in the region. The share of industrial output produced by foreign-owned firms increased from 15 % in 1997 to about 40 % in 2001. Positive structural changes in the Czech economy in the late 1990s also resulted in strong investment-led growth and rising employment. This, in turn, led to a gradual recovery from the 1997 recession. Domestic credit to the private sector remained high and on average was 57 % of GDP during 1997-2000.

The role of the Czech securities market represented by the Prague Stock Exchange declined during the 1990s. There were no initial public offerings since the stock market was established in 1992 and the market did not serve a source of capital for listed companies. The market was illiquid with only six stocks actively traded in 2001.

## **Estonia**

Small-scale privatization began in Estonia immediately after the country gained independence from Soviet Union in 1991. The following year, large-scale privatization commenced, accompanied by liberalization of most consumer prices and introduction of a currency board arrangement. The privatization program was structured to attract foreign strategic investment. The private sector's share in GDP increased gradually and reached 70 % in 1996. Privatization of industrial companies was largely completed by 1999.

Successful enterprise reform made Estonia the most competitive transition country by 1999 (EBRD, 2001).

The privatization of Estonian banks proceeded briskly after the first state-owned bank was privatized in 1995. The share of state bank assets went from zero to 7.8 % in 1998 after the re-nationalization of insolvent Optiva bank. State bank assets returned to zero in 2000. During 1990s, the banking sector was characterized by active consolidation through mergers and by entry of foreign banks. The share of non-performing loans on banks' books averaged just 2.6 % during 1997-2000. The domestic credit to the private sector remained stable and averaged at 26 % of GDP during 1997-2000.

The legal environment for companies constantly improved, and included measures to strengthen corporate governance and promote competition.

The Tallinn stock exchange was established in 1996. By 2000, the stock market capitalization had reached 35 % of GDP. The example of a successful floatation was the public offering of Eesti Telekom in the beginning of 1999.

## **Poland**

Small-scale privatization in Poland began in 1990 and was followed by a mass privatization in 1993. Despite a fast pace of privatization, there were still 2,863 state-owned enterprises in 1998, the assets of which had a book value of 30-35 % of GDP (EBRD, 1998). Indeed, about three-quarters of the top Polish companies by turnover were state-owned. Many of state-



owned firms were in such critical sectors as defence, coal mining, steel and chemicals. They required constant infusion of public funds. Stiff union resistance, demands for redundancy compensation and limited interest of strategic investors also impeded privatization and restructuring of enterprises until the end of the 1990s.

Poland's strong growth during the second part of the 1990s was primarily driven by the rapid expansion of the new private sector (mainly SMEs) and large FDI inflows.

The privatization of Polish banks began in 1993. Bank privatization proceeded rather slowly. Restrictions on the entry of foreign banks also limited competition in the banking sector. The state-owned banks held over 50 % of total bank assets up to 1998. By 2000, the Polish government controlled only two banks and only intervened in the governance of privatized banks through its remaining direct or indirect ownership stakes. The banking sector consolidated in the late end of 1990s with foreign strategic investors obtaining control of about 50 % of banks' assets. The share of bad loans in total loans of banks decreased from around 30 % in the first half of the 1990s to around 13.5 % in the late 1990s. The change reflected the policy of the authorities to rehabilitate and recapitalize banks prior to privatization. Domestic credit to private sector rose in the second part of 1990s, and averaged 21.5 % of GDP.

The Warsaw Stock Exchange was the largest central European bourse at the end of 1990s. By the end of the 1990s', its market capitalization approached levels of small EU exchanges. The number of listed companies increased to 200 by the end of 2000. Stock market liquidity was adversely affected by the Russian crisis, but improved thereafter.

## **Romania**

Despite a mass voucher privatization in 1991, Romania's progress with privatization was much slower than in most other CEE countries. At the end of 1996, over 75 % of assets allocated to the State Ownership Fund (SOF) were still owned by the state. The privatization of both small and large-scale companies accelerated in 1998 with the sale of 1,015 small and medium-sized companies and the sale of telecommunications provider Romtelecom. In general, the restructuring and liquidation of loss-making state enterprises has moved at a snail's pace. By the middle of 1998, inter-enterprise and tax arrears amounted to 13 % and 8 % of GDP, respectively. The government's problems with enterprise arrears grew over the years after several unsuccessful state attempts to deal with them.

Bank privatization did not begin until 1998 and proceeded slowly with the share of state-owned bank assets exceeding 50 % through the late 1990s. The largest state-owned banks were overburdened with non-performing loans, which reached 70 % of total loans for some banks. Some 2 % of GDP was allocated for bank restructuring in 1999. Government support for banks substantially increased domestic debt.

Foreign direct investment in Romania remained low relative to other countries of Central and Southeastern Europe. The major obstacles were taxes, regulations, policy instability and corruption.

Domestic credit to private sector remained low, averaging 12 % of GDP during 1996-2000.

### **III. Indebtedness of firms in transition economies**

We first look at the average levels of indebtedness of companies in our sample. Leverage, measured by the ratio of total debt to the sum of debt and shareholders' equity, remained quite low by western standards throughout the entire period. The cross-country average remained stable every year at around 23 %, although the dispersion remained high. The leverage ratios ranged from 9 % in Bulgaria in 1997 to 34 % in Estonia in 1998. The lowest mean values of leverage for the period were observed in Bulgaria and Romania (average ratios of 12 % and 19 %, respectively). Estonia, Poland, and the Czech Republic were at the top of the range with the average indebtedness of 24-31 %. Between 1997 and 2001, the leverage increased in three countries with the lowest leverage (Bulgaria, Romania, and Poland) and decreased in two countries with the highest leverage (Estonia and the Czech Republic), ranging from a 255 % relative increase in Bulgaria to a 20 % decrease in the Czech Republic. The absolute changes in leverage between 1997 and 2001 were in the range of 5-8 %.

Distribution of the leverage of firms remained skewed to the left for all countries during the entire period. Indeed, most Bulgarian firms in the sample had no debt in 1997 and 1998. Nevertheless, the proportion of companies with no debt decreased over time for all countries except the Czech Republic. The largest decreases in the proportion of "debt-free" companies were in Bulgaria and Romania, countries with the lowest leverage. Figure 1 illustrates a seeming tendency during the observed period for the convergence in capital structures across countries: the average indebtedness of firms in the countries with highest leverage decrease, while the average indebtedness of firms in the countries with the lower leverage increases.

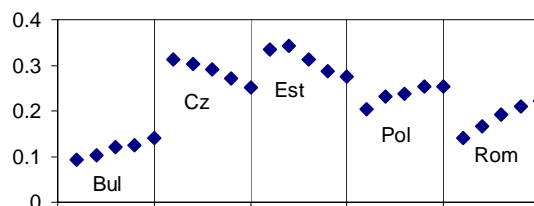
Clearly, the differences in capital structures of firms in the various countries we consider (except Bulgaria) had become miniscule by the end of 2001 (see Figure 1).

None of the evidence presented so far contradicts what has been found for transition countries in the first half of 1990s. On average, the leverage of companies in the transition countries remained low during the period 1997-2001 and a large proportion of companies were not leveraged at all. Nevertheless, the average level of indebtedness of companies in advanced transition economies of Estonia, Poland and the Czech Republic approached the average level of indebtedness of 40 % reported for companies in Germany, France, Italy and the UK (Rajan and Zingales, 1995).

Firm indebtedness seems to change substantially in Poland during the 1990s. Cornelli, Portes and Schaffer (1998) report 6 % ratios of total bank debt to assets for Poland and Hungary in 1992. The ratio corresponding to the one used in this paper was not reported, but we must infer it was somewhat greater.<sup>1</sup> Our results indicate that corporate indebtedness substantially increased in Poland during 1990s. The leverage of Czech firms we find is quite similar to that reported in Revoltella (2001) for 1995 and Nivorozhkin (2003) for the period 1994-1997.

The countries we investigate are characterized by varying degrees of success with reforms. Poland, the Czech Republic and Estonia can be described as advanced transition economies (which is manifested in their EU accession status) while Bulgaria and Romania have had less success with reform and lagged behind the other countries in our group. The relative magnitude of leverage across countries suggests that the relative success with macroeconomic and institutional reforms is reflected in the availability of debt financing.

**Figure 1. Mean leverage ratios across companies (1997-2001)**



An interesting question related to our study is whether the variation in the leverage of firms across countries varied in line with the capital market development and macroeconomic aggregates. We run several panel regressions of the mean leverage across countries and time

<sup>1</sup> The denominator of the ratio would decrease if we use debt to shareholders' equity. The nominator of the ratio can also increase, because total debt can exceed bank debt.

against a number of different variables that serve as proxies for capital market developments and general economic conditions in the countries considered.<sup>2</sup>

The results in Table 1 indicate that the magnitude of leverage in our sample is positively related to the domestic credit to private sector as a proportion of GDP and the ratio of domestic credit provided by banking sector as a proportion of GDP. The results can be interpreted as indicators that the samples of firms we investigate are likely to be representative for the general population of firms. Leverage is positively related to the solvency of the banking sector proxied by the ratio of bank liquid reserves to total assets and the proportion of non-performing loans in total loans. Firm leverage also responds positively to the size of the banking sector privatization, which is captured by the proportion of state-owned bank assets in total banking assets. The higher economic growth of a country reflected in higher investments to GDP and the GDP per capita growth positively affects the leverage of firms. Inflation negatively affects the degree of leverage of firms. The greater inflow of foreign direct investments decreases the degree of leverage, which can be attributed to the reliance of companies on equity financing represented by FDI. The latter fact is supported by the negative relationship between leverage and equity market capitalization as a proportion of GDP.

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<sup>2</sup> The explanatory variables are taken from the 2002 World Development Indicators CD-ROM provided by the World Bank and EBRD Transition Report 2002.

**Table 1. Panel regressions of mean values of leverage**

	<i>Model I</i>	<i>Model II</i>	<i>Model III</i>	<i>Model IV</i>	<i>Model V</i>
<i>Variable</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coeff</i> <i>t-value</i>	<i>Coeff</i> <i>t-value</i>
<b>CRTPS</b>	0.0029*** (5.96)		0.003*** (16.2)		0.003*** (10.7)
<b>INFL</b>	-0.0022*** (-7.58)				
<b>BankLR</b>	0.0022*** (26.6)				
<b>NPL</b>		-0.0011*** (-7.42)	-0.0010*** -7.92		
<b>DCBS</b>		0.0014*** (3.38)			
<b>INVGDP</b>		0.0069*** (8.34)			
<b>ASSOB</b>			-0.0004** (-2.77)	-0.0010*** (-3.08)	
<b>FDI</b>				-0.0025*** (-2.72)	
<b>GDPPCG</b>					0.003* (1.79)
<b>MCAP</b>					-0.001* (-1.82)
	R <sup>2</sup> = 0.66	R <sup>2</sup> = 0.61	R <sup>2</sup> = 0.65	R <sup>2</sup> = 0.32	R <sup>2</sup> = 0.50

**Note:** The dependent variable is the average ratio of debt to the sum of debt and shareholders' equity (LEV). The explanatory variables are: domestic credit to private sector, % of GDP (CRTPS), bank liquid reserves to bank assets ratio (BankLR), the proportion of non-performing loans in total loans of banks (NPL), the share of state-owned bank assets in total assets of banks (ASSOB), domestic credit of banking sector (DCBS), the ratio of investments to GDP (INVGDP), inflation, GDP deflator, annual % (INFL), foreign direct investment, net inflows, % of GDP (FDI), Market capitalization of listed companies, % of GDP (MCAP), and GDP per capita growth, annual % (GDPPCG).

The models are estimated using within groups transformation (deviation from individual means). The data is a balanced panel. There are five cross-sectional groups and the time-series length is five years (1997-2001).

#### **IV. Dynamic adjustment model of capital structure**

The dynamic adjustment model of capital structure of firms presented below is adopted from Banerjee, Heshmati and Wihlborg (1999) and Heshmati (2002). Firms in the model have endogenous leverage targets. Therefore, the actual financial leverage of firms can be inter-temporally sub-optimal due to costly adjustments to the target leverage.

Let the target leverage ratio of a company  $i$  at time  $t$ ,  $L^*_{it}$ , be determined by the following function:

$$L^*_{it} = F(Y_{it}, t), \quad (1)$$

where  $Y_{it}$  is a vector of firm specific variables, and  $t$  is the time trend.

This specification insures that target leverage may vary across firms and over time due to variations in underlying factors. The fact that the target debt ratio of a particular firm can change over time stresses the dynamic aspect of the capital structure problem.

A process of costly adjustment in a firm's leverage is modelled by the following relationship:

$$L_{it} - L_{i,t-1} = \delta_{it}(L^*_{it} - L_{i,t-1}), \quad (2)$$

where  $\delta_{it}$  is an adjustment parameter lying between zero and one. The parameter  $\delta_{it}$  can be a function of several variables, including the previous year's leverage.  $L_{it}$  and  $L_{i,t-1}$  are observed leverage in year  $t$  and  $t-1$ , respectively.

In the absence of capital market imperfections, the parameter  $\delta_{it}$  would equal 1, implying that the change in actual leverage between two consecutive periods should be equal to the desired leverage. The imperfections mentioned above basically mean that it is costly for a firm to adjust to a target capital structure in the presence of market imperfections.

We can rewrite equation (2) as:

$$L_{it} = (1 - \delta_{it})L_{i,t-1} + \delta_{it}L^*_{it} \quad (3)$$

$L^*_{it}$  and  $\delta_{it}$  can be assumed to have the following functional form:

$$L^*_{it} = b_0 + \sum_j b_j Y_{jit} + \sum_t b_t t \quad (4)$$

$$\delta_{it} = c_0 + \sum_k c_k Z_{kit} + \sum_t c_t t, \quad (5)$$

where  $Y_{jit}$  is a  $j^{\text{th}}$  factor at time  $t$  explaining the target leverage of firm  $i$  at time  $t$ , and  $Z_{kit}$  is a  $k^{\text{th}}$  factor at time  $t$  explaining a speed of adjustment to the target leverage of firm  $i$  at time  $t$ .

Under our specification, a firm's manager uses information at the end of period  $t$  to set the target leverage for the period, implying "perfect forecast" abilities of the manager. Alternatively, we may use information at time  $t-1$ , and assume that the manager is not forward-looking at all. The empirical results appear to be robust for either approach.

## V. Dependent and explanatory variables of the model

We now consider factors influencing availability and level of debt financing, and factors affecting adjustment of companies to their target leverage. An appropriate measure of

financial leverage, given the scope of our study, the available data and the previous research on the issue (e.g. Rajan and Zingales, 1995) is the ratio of total debt to the sum of total debt and shareholders' equity (*LEV*).

Based on the alternative theories of capital structure and previous empirical work in the area, we select the explanatory variables with a likely affect on target leverage of firms.

The first explanatory variable is *tangibility* (*TANG*) proxied by the proportion of tangible fixed assets in total assets. The higher proportion of tangible assets should be positively related to the availability of collateral. Greater collateral may alleviate the agency costs of debt.<sup>3</sup> The importance of collateral is greater for newly established businesses with no close ties to creditors. These arguments suggest a positive relationship between tangibility and target leverage.<sup>4</sup> Indeed, the results for developed countries (Rajan and Zingales, 1995; Titman and Wessels, 1988) uniformly confirm this. On the other hand, there are a number of factors limiting the importance of tangible assets as collateral in transition economies. First, underdeveloped and inefficient legal systems may hinder the creation of enforceable debt contracts. In case of default, the recovery of collateral may be costly and lengthy. Second, thin and illiquid secondary markets for firms' assets create uncertainty about their "recoverable" market value.

Another factor influencing the relationship of leverage and tangibility is the lack of long-term debt on the balance sheets of the companies in transition economies. If companies with a relatively more fixed tangible assets demand more long-term debt, and short-term debt is an imperfect substitute for long-term debt, the companies may end up with less total debt due to the shortage of long-term debt financing.

This negative relationship between leverage and tangibility has been found in a number of previous studies of transition economies (e.g. Cornelli, Portes, Schaffer, 1998; Nivorozhkin, 2002). Based on the presented arguments, we expect to find a negative or neutral relationship between leverage and tangibility.

Most capital structure studies argue that a firm's *size* is a determinant of the optimal debt capacity (Warner, 1977; Titman and Wessels, 1988). Fixed direct bankruptcy costs would constitute a smaller proportion of a larger (more valuable) firm, and thus increase the firm's target leverage. Moreover, a larger firm is likely to be better diversified, which would

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<sup>3</sup> This cost is related to the incentive of stockholders of leveraged firms to invest sub-optimally to expropriate wealth from the firm's bondholders (Jensen and Meckling, 1976; Myers, 1977).

<sup>4</sup> The alternative theory [Grossman and Hart (1982)] explains the negative relationship based on the argument that an increased amount of uncollateralized (more risky) debt would increase monitoring by lenders. That would alleviate the conflict of interests between firm's shareholders and self-interested managers. Given well-publicized evidence of poor corporate governance structures in transition economies, we rule out this explanation of the relationship between tangibility and leverage.

reduce the probability of insolvency (and therefore the probability of incurring bankruptcy costs). The predicted relationship between target leverage and the firm's size is again positive.

The positive relationship between the size of a company and its leverage may be reinforced in transition economies. Larger firms may get a favourable treatment from the creditors and set up the higher leverage targets because of implicit (or explicit) "too-big-to-fail" type guarantees from the authorities. Relatively higher "social" importance of a larger company would likely increase its chances of participating in a government-sponsored restructuring program and securing some form of "target financing." There is also some evidence that the banks in most of the transition countries prefer to deal with larger clients due to the high fixed costs of monitoring and information collection.

We use the logarithm of total assets as a proxy for company's size (*SIZE*) and anticipate a positive relationship between size and debt targets.

A firm's age is usually chosen to proxy the exposure of its capital structure to the asymmetric information problem. Reputation formation takes time and reduces the risk-shifting incentives of borrowers. The longer a firm survives in business, the more profits it can accumulate and subsequently use it to replace debt financing (Diamond, 1989). The above-mentioned factors would tend to decrease the firm's target leverage. On the other hand, a firm's age may proxy the firm's experience in a particular business, and thus reflect its maturity. Greater business experience would tend to negatively affect the probability of bankruptcy and therefore result in higher leverage targets for older firms. The latter prediction is unlikely to apply to firms in transition economies, since experience before economic reforms is likely to be of limited value for such companies.

We construct the variable *AGE* as the difference between the observation year and the year in which the firm was established. The expected relationship between firm's age and its leverage targets is negative.

In addition to using debt financing, firms may be financed by their suppliers. The literature (e.g. Petersen and Rajan, 1996) suggests that firms may rely more on trade credit when debt financing is unavailable. We control for the effect of trade credit on the target levels of debt by including the ratios of net trade credit to total assets (*NTC*). The evidence found for the industrial countries should be reinforced by the larger market imperfections in the credit markets of the transition countries.

The theories of capital structure argue that market imperfections should lead to the relevance of a firm's *profitability* for its choice of leverage. Myers and Majluf (1984) present a simple version of a pecking-order theory, which predicts that, holding investments fixed, leverage is lower for more profitable firms, and given profitability, is higher for firms with



more investments. The prediction of the theory is a direct implication that the asymmetric information between the firm's owners and outside investors creates the pecking order of finance with internal financing preferred to external financing, and debt preferred to outside equity. In a more complex view of the pecking-order argument (Myers, 1984), firms are concerned with both future and current financing costs. Firms with large expected investments may want to maintain a low-risk debt capacity to avoid passing up future investments or finance such investments with new risky securities.

In contrast to the pecking-order theory, the static trade-off theory of capital structure views the choice of a firm's leverage as a trade-off of expected bankruptcy costs and tax shields of debt. The theory predicts a positive relationship between leverage and profitability, because higher profitability implies more income to shield. Since what matters for a firm is the expected realizable value of the tax shields on an extra dollar of promised future interest payments (Myers, 1999), tax shields have significant value only for companies with high and stable income. Given higher economic uncertainty in the transition countries, the latter argument may imply relatively low tax advantages of debt for firms.

We use the ratio of income before interest, tax and depreciation to total assets as a proxy for company profitability (*PROF*), and expect to find a negative relationship.

We calculate the standard deviation of operating income for each firm in the sample during the period 1997-2001 (*VROA*) to account for the effect of riskiness of the firm's cash flow on the target level of debt financing. This *income variability* proxy does not directly relate to any theoretical result, but has been used in several empirical papers (e.g. Titman and Wessels, 1988; Friend and Lang, 1988). On the supply side, the suppliers of funds are likely to control their credit risks by both a range of interest rates and prices and through credit rationing. Under these circumstances, higher income variability may lead to a lower level of indebtedness. On the demand side, the risk attitude of firms' managers may have an effect on the relationship between volatility of income and target leverage. The potential financial distress implied by a higher variability of a firm's income may lead a risk-averse manager to have relatively lower debt targets.<sup>5</sup> The weak insolvency laws and their enforcement in transition economies may result in a lower risk-aversion of the managers with the corresponding higher debt targets. Overall, the expected relationship between income variability and leverage targets is more likely to be negative in advanced transition countries.

The firms in our sample represent a wide array of industries. Based on the first digit of their primary US SIC code we created dummy variables to control for the effect of *industrial*

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<sup>5</sup> The degree of a risk-aversion would be influenced by the personal wealth diversification of the manager, as well as the labor market conditions of the manager.

*classification* on the level of target debt ratio. The literature points to both the nature of the business of firms in various industries and the differences in regulation as responsible for “the industry effect” (Titman, 1984, Guedes and Opler, 1996).

The degree of a financial leverage of companies is likely to be influenced by the extent of ownership concentration. Evidence from transition economies (see Hussain and Nivorozhkin, 1997, Kočenda and Svejnar, 2003) suggests higher ownership concentration tends to reduce financial leverage. One explanation for this phenomenon is that, given the supply-side imperfections in the credit markets of transition economies and virtual non-existence of market for long-term debt, company demand for long-term financing is likely to be satisfied through an increase in equity capital. Taking into account the poor corporate governance structures of transition economies, large contributions to equity were more likely to be made by strategic investors using their large ownership stakes for control purposes.

The degree of ownership concentration is accounted for with dummy variables.<sup>6</sup> Variable *OWN\_A* takes a value of 1 when the company has no recorded shareholder with an ownership over 24.9 % (either direct or total). It is 0 otherwise. Variable *OWN\_B* takes a value of 1 when the company has no recorded shareholder with an ownership percentage (direct or total) over 49.9 %, but has one or more shareholders with an ownership percentage above 24.9 %. It is 0 otherwise. Variable *OWN\_C* takes a value of 1 when the company has a recorded shareholder with an ownership (direct or total) over 49.9 %, and 0 otherwise. Variable *OWN\_U* takes a value of 1 when the ownership concentration is unknown, and 0 otherwise. The reference group for the ownership concentration dummies is *OWN\_A*.

Based on the presented arguments and empirical evidence, we expect to find a negative relationship between target leverage and ownership concentration.

Most of the countries studied here enjoyed significant inflows of FDI during the period of study. We control for the effect of foreign ownership on the leverage targets of companies in our sample by including in the regressions a dummy variable *FOR*, which takes a value of 1 if the ultimate owner of a company is foreign, and 0 otherwise. Because a foreign owner would likely be willing to exercise management and control over host country firms, we expect that the presence of strategic foreign investors would reduce the leverage targets of companies.

The model adopted in this paper takes into account the fact that the adjustments of capital structure are likely to be costly and the adjustment costs may vary across firms and time.

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<sup>6</sup> These variables are based on the “Independence Indicator” constructed by the providers of the data we use to signify the degree of independence of a company with regard to its shareholders.

If the fixed costs of changing capital structure are important for companies, the speed of adjustment toward target leverage should depend on how far the firm is from the target. We include a variable *DISTAN* equal to the absolute value of difference between contemporaneous target leverage and lagged observed leverage,  $|L_{it}^* - L_{it-1}|$ . The speed of adjustment is expected to be higher the further away the company is from its target capital structure.

The *size* of the firm would also likely to influence the speed of firms' adjustments to target leverage. This variable is supposed to test the presence of adjustment costs not captured by the variable *DISTAN*. The size of a firm could matter for the speed of adjustment, since fixed costs of changing capital structure are proportionally smaller for larger firms. The expected sign of this variable is positive.

## **VI. Data and estimation procedure**

The data used here are from the Amadeus database compiled by Bureau Van Dyck (as of August 2003). Amadeus is a pan-European database of about 5 million public and private companies. Among other things, the data contain information from corporate annual balance sheets and profit and loss accounts. Ownership information and industrial classification of companies are also provided. The data set tends to be highly representative for the largest companies in the countries. For the countries in this study, at least 95 % of companies satisfy one of the following criteria are included in the data set: (1) operating revenues greater than 10 million euros; (2) total assets greater than 20 million euros; and (3) over 100 employees.<sup>7</sup>

Given the dynamic nature of our model, we selected companies with five consecutive years of reports and no missing statements. In addition, firms classified as financial intermediaries were removed from the sample due to their inappropriateness for testing the predictions of optimal capital structure models. Utilities and public administration organizations were excluded from the sample because their financial decisions are likely to be influenced by regulation.

The final sample comprises 729 Bulgarian companies, 976 Czech companies, 311 Estonian companies, 1,219 Polish companies and 2,477 Romanian companies. The data form a balanced panel for the period 1997-2001.

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<sup>7</sup> This information is posted at <http://www.amadeus.bvdep.com>.

Table 3 (Panel A -F) in Appendix provides summary statistics for the explanatory variables of the model.

The model we estimate takes the following form:

$$L_{it} = (1 - \delta_{it}) L_{it-1} + \delta_{it} L^*_{it} + \eta_{it}, \quad (6)$$

where  $L_{it}$  is the ratio of debt to the sum of debt and equity (*LEV*), and  $\eta_{it}$  is an error term.

The target ratio of debt to shareholders' equity,  $L^*_{it}$ , and the speed of adjustment,  $\delta_{it}$ , are modelled by the following linear relationships:

$$L^*_{it} = b_0 + \sum_j b_j Y_{jit} + \sum_t b_t + \sum_s b_s \text{SIC} \quad (7)$$

$$\delta_{it} = c_0 + \sum_j c_j Z_{jit} + \sum_t c_t + \sum_s c_s \text{SIC}, \quad (8)$$

where the vectors of explanatory variables,  $Y_{jit}$  includes the following variables:

- income variability (VROA)
- profitability (PROF)
- tangibility (TANG)
- size (SIZE)
- age (AGE)
- net trade credits (NTCS)
- time dummies (T97-T01)
- industrial dummies (IND1, IND2, IND3, IND4, IND5, IND6, IND7, IND8, IND9)
- ownership concentration dummies (OWN\_B, OWN\_C, OWN\_U)
- Foreign ownership dummy (FOR).

The vector  $Z_{jit}$  includes:

- distance (*DISTAN*)
- size (*SIZE*)
- time dummies (*T97-T01*)
- US SIC dummies (*IND1, IND2, IND3, IND4, IND5, IND6, IND7, IND8, IND9*)

The dynamic model is estimated separately for each country using a non-linear regression procedure, specifically, the nonlinear regression procedure (PROC MODEL) of

SAS (Statistical Analysis System, release 8.02) to compute least squares estimates of the parameters of the nonlinear model. The modified Gauss-Newton method is used. Given equations (6), (7), and (8), the estimated equation is

$$L_{it} = (1 - (c_0 + \sum_j c_k Z_{jit} + \sum_t c_t t + \sum_s c_s \text{SIC})) L_{it-1} + (c_0 + \sum_j c_k Z_{jit} + \sum_t c_t t + \sum_s c_s \text{SIC})(b_0 + \sum_j b_j Y_{jit} + \sum_t b_t t + \sum_s b_s \text{SIC}) + \eta_{it}. \quad (9)$$

The model is flexible and allows possible negative estimates of the firms' target leverage. These negative values were replaced by 0 in each iteration before calculating the distance between the target leverage in period  $t$  and observed leverage in period  $t-1$ .

## VII. Results

Our results (see Table 4 in Appendix) indicate that higher operating profit variability has a positive or neutral effect on the debt targets of companies. The coefficient of variable *VROA* is positive for Poland and Romania and Estonia and insignificant for the Czech Republic and Bulgaria. The results for the Czech Republic and Bulgaria differ from the negative and positive relationship found for those countries in the period 1993-1997 in Nivorozhkin (2003). The empirical evidence on the relationship between operating profit variability and target leverage in EU countries is mixed. Banerjee, Hesmati and Wihlborg (1999) obtain negative coefficients for this variable in the sample of the UK companies, Wald (1999) reports a negative coefficient between the earnings variance and leverage for Germany, positive coefficients for UK, and a positive, but insignificant, result for France.

The tangibility of company fixed assets (*TANG*) appears to have mixed effects on the debt targets across countries. The relationship is negative for Bulgaria and Romania, which is in line with the evidence from previous studies on the transition economies (Cornelli, Portes, and Schaffer, 1996; Nivorozhkin, 2001, 2003). Nevertheless, the coefficient of variable *TANG* is positive for the Czech Republic and Hungary and insignificant for Poland. The results imply that although tangible assets remain a poor source of collateral in less advanced transition economies, the effect of tangibility on target leverage is moving towards the positive relationship observed in Germany, France, Italy and the UK (Rajan and Zingales, 1995).

The profitability of companies has a uniform effect on target leverage across all countries considered. The coefficient of variable *PROF* is negative and significant in all regressions. The results are in line with evidence for the EU (and other developed countries) and support the pecking-order theory of finance. Firms lacking internal funds would like to close the gap by setting higher debt targets. If the more profitable companies in our sample also have higher growth prospects, the observed relationship is consistent with a story that firms going public may issue increased equity in anticipation of future investments (Fama and French, 2002). This situation is especially appealing for the newly privatized enterprises in transition economies.

Firm size is positively and significantly related to target leverage in all countries, except Estonia and Poland, where the relationship is not significant. The effect of firm size on leverage tends to vary across EU countries. Rajan and Zingales (1995) and Wald (1999) report a negative relationship for Germany, a positive one for UK and an insignificant one for France and Italy.

In the countries considered, the positive effect of firm size on leverage target can likely be explained by the fact that size serves as a stability proxy for creditors. Larger companies are also the likely targets of government bailouts due to the higher and more visible social costs imposed by their distress. Larger companies are also often subject to some form of government-sponsored investment programs. The financing within these programs can take the form of guarantees and direct financing.

The age of a firm has a significant and negative effect on its target leverage in all countries under investigation. The results are in line with our expectations supporting the hypothesis of the reputation effect in alleviating the asymmetric information costs for firms' choice of financing.

The effect of net trade credits on a firm's leverage targets is negative as expected in all countries, except Bulgaria and Romania, where it is not significant. The results may indicate substitution between intermediated debt and trade credits in advanced transition economies.

The increase in ownership concentration (i.e. decrease in independence) had no significant effect on the target leverage in all countries, except Estonia and Bulgaria.<sup>8</sup> In Estonia and Bulgaria, the presence of a shareholder with the ownership stake over 49.9 % resulted in the lower leverage targets relative to companies where there the largest shareholders had stakes greater than 24.9 %, but less than 49.9 %.

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<sup>8</sup> Note the large number of companies with unknown degree of independence in the Estonian sample.

The foreign origin of the ultimate owner of a company decreased the leverage target of Bulgarian firms, and increased the leverage targets of Czech and Estonian firms.

As expected, the speed of adjustment of a firm's leverage tended to increase as the distance to the target leverage increased. The relationship between speed of adjustment and the variable *DISTAN* is significant in all countries, except Poland. The results indicate that the large adjustments of leverage tend to be less costly relative to smaller ones, which suggests the presence of fixed costs in changing the capital structure of a firm.

Contrary to our expectations, the effect of a company size on the speed of adjustment to the target leverage did not support our hypothesis of relatively smaller adjustment costs for larger companies. The effect was negative and significant for Bulgaria, Estonia and Romania. A positive significant relationship was only observed for Poland. One possible explanation for the obtained results is supply side imperfections in lending policies. Since lending to a larger firm usually implies a higher exposure for a bank, larger companies may be unable to adjust as fast as smaller companies.<sup>9</sup>

The speed of capital structure adjustment of the companies in the first quintile (smallest companies) is 5-8 % greater than the speed of adjustment of companies in the fifth quintile (largest companies) for Bulgaria, Estonia and Romania. The largest companies in Poland adjusted 8 % faster than the smallest companies (see Table 5, Panel A, B, and C in Appendix). The speed of adjustment tends to remain relatively stable over time in all countries, except Bulgaria, where we observe a three-fold decreased in average speed of adjustment. The difference between mean and median speed of adjustment indicates that the unconditional distribution of adjustment speed is approximately symmetric in every year of the observation period.

During all years, the observed mean levels of leverage exceeded the target mean levels of leverage in Bulgaria, Poland and Romania. The opposite was observed in the Czech Republic and Estonia (see Table 5, Panel A, B, and C in Appendix). The average gap between observed and target leverage ranges from -11 % in the Czech Republic in 2000 to 17 % in Poland in 1998. The gap also varies significantly across size groups, although we observe no consistent patterns.

Table 2 reports the results of regressions of mean target leverage across countries on the variables serving as proxies for credit market and general economic conditions in the countries. The explanatory variables are the same as in regressions of mean observed leverage reported in Table 1.

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<sup>9</sup> Syndicated lending is likely non-existent in the economies we consider.

The comparison of results in Table 1 and 2 reveals that the variation in actual leverage is better explained by the variation in explanatory variables relative to the variation in target leverage.

**Table 2. Panel regressions of mean target values of leverage**

	<i>Model I</i>	<i>Model II</i>	<i>Model III</i>	<i>Model IV</i>	<i>Model V</i>
<i>Variable</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coefficient</i> <i>(t-value)</i>	<i>Coeff</i> <i>t-value</i>	<i>Coeff</i> <i>t-value</i>
<b>CRTPS</b>	0.005*** (3.38)		0.005*** (9.80)		0.007*** (6.26)
<b>INFL</b>	-0.004*** (-4.93)				
<b>BankLR</b>	0.002*** (4.07)				
<b>NPL</b>		-0.001*** (-3.74)	-0.001** (-2.13)		
<b>DCBS</b>		0.003 (1.10)			
<b>INVGDP</b>		0.012*** (3.16)			
<b>ASSOB</b>			0.001 (-0.685)	-0.0003 (-0.296)	
<b>FDI</b>				-0.006 (-1.49)	
<b>GDPPCG</b>					0.005*** (3.87)
<b>MCAP</b>					-0.005*** (-10.00)
	R <sup>2</sup> = 0.34	R <sup>2</sup> = 0.34	R <sup>2</sup> = 0.33	R <sup>2</sup> = 0.053	R <sup>2</sup> = 0.54

**Note:** The dependent variable is the average ratio of debt to the sum of debt and shareholders' equity (LEV). The explanatory variables are: domestic credit to private sector, % of GDP (CRTPS), bank liquid reserves to bank assets ratio (BankLR), the proportion of non-performing loans in total loans of banks (NPL), the share of state-owned bank assets in total assets of banks (ASSOB), domestic credit of banking sector (DCBS), the ratio of investments to GDP (INVGDP), inflation, GDP deflator, annual % (INFL), foreign direct investment, net inflows, % of GDP (FDI), Market capitalization of listed companies, % of GDP (MCAP), and GDP per capita growth, annual % (GDPPCG).

The models are estimated using within groups transformation (deviation from individual means). The data is a balanced panel. There are five cross-sectional groups and the time-series length is five years (1997-2001).

The signs of the relationships are the same, although the significance is higher in the regressions with actual leverage. These results may indicate that supply-side imperfections play an important role in a firm's choice of capital structure. These supply-side variables were not explicitly included in the target leverage equation of our model and this could potentially contribute to the observed differences between actual and target leverage in the model. Notably, the results in Table 1 and 2 differ significantly for some variables serving as proxies



for the solvency of the banking sector. The changes in these variables are often hard to predict given the opaque nature of the banking business and the importance of government prudential regulation in the banking sector.

## **VIII. Conclusions**

We presented evidence on the actual and target capital structures of firms in five EU accession countries of Central and Eastern Europe and the former Soviet Union (Bulgaria, the Czech Republic, Poland, Romania and Estonia). We provided insights into the financial constraints facing private companies and compared the level of indebtedness and the determinants of firms' choice of capital structure in selected EU accession countries and EU countries.

On average, the leverage of companies in the transition countries remained lower than in EU countries. Nevertheless, the average levels of indebtedness of companies in advanced transition economies of Estonia, Poland and the Czech Republic were close to those observed in several EU countries.

Despite the remaining differences in the capital structures of firms across EU accession countries, there was a significant convergence in the average level of firms' leverage across countries studied. The average indebtedness of firms in the countries with highest leverage decreased, while the average indebtedness of firms in the countries with lower leverage increased.

At the aggregate level, developments in credit markets and the general economic environment in the countries studied explain the variation in firm indebtedness.

The determinants of target capital structure in the cross-section of firms also vary across countries. The only variables with a uniform effect on target leverage for all countries are the company's profitability and age. More profitable companies tend to borrow less, which supports the pecking-order theory of finance. The positive effect of the firm's age on the leverage targets provides the support for the hypothesis of the positive effect of reputation in firms' choice of financing.

The dynamic adjustment model adopted in this paper illustrates the importance of recognition of intertemporal sub-optimality in the firm's capital structure and the costly nature of adjustment to the target leverage. In line with our expectations, the large adjustments of leverage tend to be less costly relative to smaller ones, indicating the presence of fixed costs

in changing the capital structure of a firm. Contrary to our expectations, the speed of leverage adjustment tended to decrease with an increase in firm size, indicating potential supply-side imperfections from the exposure control of providers of debt financing.

Overall, the evidence showed that the capital structures of firms in EU accession countries have tended to converge and gradually approach the leverage levels observed in EU countries. Continuing progress in reform of corporate finance in transition economies will likely depend on whether these countries achieve macroeconomic stability and success in broad institutional reforms.

## Appendix

**Table 3. Summary statistics of the capital structure data set**

<b>A. Bulgaria</b>						
Variable	N	Mean	Std Dev	Minimum	Maximum	
LEV	3645	0.12	0.20	0.00	0.99	
TANG	3645	0.50	0.23	0.00	0.99	
PROF	3645	0.12	0.16	-0.75	1.42	
VROA	3645	0.11	0.08	0.00	0.51	
SIZE	3645	14.84	1.56	9.99	20.68	
NTC	3645	0.08	0.20	-0.81	0.93	
AGE	3645	27.29	24.61	1.00	167.00	
IND0	3645	0.06	0.23	0.00	1.00	
IND1	3645	0.28	0.45	0.00	1.00	
IND2	3645	0.23	0.42	0.00	1.00	
IND3	3645	0.07	0.26	0.00	1.00	
IND4	3645	0.12	0.32	0.00	1.00	
IND5	3645	0.14	0.35	0.00	1.00	
IND6	3645	0.05	0.21	0.00	1.00	
IND7	3645	0.05	0.21	0.00	1.00	
IND8	3645	0.00	0.04	0.00	1.00	
IND9	3645	0.01	0.12	0.00	1.00	
OWN_A	3645	0.14	0.35	0.00	1.00	
OWN_B	3645	0.17	0.37	0.00	1.00	
OWN_C	3645	0.65	0.48	0.00	1.00	
OWN_U	3645	0.04	0.20	0.00	1.00	
FOR	3645	0.03	0.17	0.00	1.00	

<b>B. Czech Republic</b>						
Variable	N	Mean	Std Dev	Minimum	Maximum	
LEV	4880	0.29	0.27	0.00	1.00	
TANG	4880	0.43	0.22	0.00	0.99	
PROF	4880	0.12	0.11	-0.60	0.90	
VROA	4880	0.05	0.05	0.00	0.35	
SIZE	4880	12.25	1.32	8.01	18.80	
NTC	4880	0.02	0.18	-0.99	0.90	
AGE	4880	7.47	4.85	0.00	51.00	
IND0	4880	0.10	0.30	0.00	1.00	
IND1	4880	0.12	0.32	0.00	1.00	
IND2	4880	0.30	0.46	0.00	1.00	
IND3	4880	0.12	0.32	0.00	1.00	
IND4	4880	0.09	0.28	0.00	1.00	
IND5	4880	0.15	0.36	0.00	1.00	
IND6	4880	0.06	0.23	0.00	1.00	
IND7	4880	0.00	0.00	0.00	0.00	
IND8	4880	0.07	0.26	0.00	1.00	
IND9	4880	0.01	0.07	0.00	1.00	
OWN_A	4880	0.02	0.13	0.00	1.00	
OWN_B	4880	0.18	0.39	0.00	1.00	
OWN_C	4880	0.50	0.50	0.00	1.00	
OWN_U	4880	0.30	0.46	0.00	1.00	
FOR	4880	0.13	0.34	0.00	1.00	

### C. Estonia

Variable	N	Mean	Std Dev	Minimum	Maximum
LEV	1555	0.31	0.27	0.00	0.99
TANG	1555	0.42	0.24	0.00	1.00
PROF	1555	0.16	0.15	-0.74	0.95
VROA	1555	0.09	0.07	0.01	0.53
SIZE	1555	17.36	1.43	9.46	20.60
NTC	1555	0.03	0.20	-0.79	0.86
AGE	1555	15.01	20.78	0.00	103.00
IND0	1555	0.05	0.23	0.00	1.00
IND1	1555	0.17	0.38	0.00	1.00
IND2	1555	0.13	0.33	0.00	1.00
IND3	1555	0.11	0.31	0.00	1.00
IND4	1555	0.06	0.23	0.00	1.00
IND5	1555	0.29	0.45	0.00	1.00
IND6	1555	0.11	0.31	0.00	1.00
IND7	1555	0.06	0.23	0.00	1.00
IND8	1555	0.00	0.00	0.00	0.00
IND9	1555	0.03	0.16	0.00	1.00
OWN_A	1555	0.00	0.00	0.00	0.00
OWN_B	1555	0.02	0.13	0.00	1.00
OWN_C	1555	0.09	0.28	0.00	1.00
OWN_U	1555	0.90	0.30	0.00	1.00
FOR	1555	0.06	0.23	0.00	1.00

### E. Poland

Variable	N	Mean	Std Dev	Minimum	Maximum
LEV	6095	0.24	0.25	0.00	0.99
TANG	6095	0.39	0.22	0.00	0.99
PROF	6095	0.10	0.15	-0.61	1.47
VROA	6095	0.09	0.06	0.00	0.56
SIZE	6095	10.13	1.10	6.98	16.97
NTC	6095	-0.06	0.17	-0.82	0.87
AGE	6095	29.71	43.96	0.00	760.00
IND0	6095	0.02	0.15	0.00	1.00
IND1	6095	0.19	0.39	0.00	1.00
IND2	6095	0.25	0.44	0.00	1.00
IND3	6095	0.08	0.28	0.00	1.00
IND4	6095	0.09	0.29	0.00	1.00
IND5	6095	0.21	0.41	0.00	1.00
IND6	6095	0.09	0.28	0.00	1.00
IND7	6095	0.05	0.22	0.00	1.00
IND8	6095	0.00	0.00	0.00	0.00
IND9	6095	0.01	0.10	0.00	1.00
OWN_A	6095	0.01	0.10	0.00	1.00
OWN_B	6095	0.06	0.24	0.00	1.00
OWN_C	6095	0.44	0.50	0.00	1.00
OWN_U	6095	0.49	0.50	0.00	1.00
FOR	6095	0.07	0.25	0.00	1.00

## F. Romania

Variable	N	Mean	Std Dev	Minimum	Maximum
LEV	12385	0.19	0.23	0.00	1.00
TANG	12385	0.42	0.21	0.00	1.00
PROF	12385	0.21	0.21	-0.84	2.88
VROA	12385	0.12	0.08	0.00	1.13
SIZE	12385	16.71	1.54	8.24	21.05
NTC	12385	-0.02	0.20	-0.84	0.93
AGE	12385	6.76	2.23	0.00	11.00
IND0	12385	0.04	0.19	0.00	1.00
IND1	12385	0.28	0.45	0.00	1.00
IND2	12385	0.19	0.39	0.00	1.00
IND3	12385	0.10	0.30	0.00	1.00
IND4	12385	0.16	0.37	0.00	1.00
IND5	12385	0.13	0.34	0.00	1.00
IND6	12385	0.05	0.22	0.00	1.00
IND7	12385	0.04	0.20	0.00	1.00
IND8	12385	0.00	0.00	0.00	0.00
IND9	12385	0.01	0.08	0.00	1.00
OWN_A	12385	0.13	0.34	0.00	1.00
OWN_B	12385	0.18	0.38	0.00	1.00
OWN_C	12385	0.67	0.47	0.00	1.00
OWN_U	12385	0.02	0.15	0.00	1.00
FOR	12385	0.09	0.29	0.00	1.00

**Table 4. Dynamic Adjustment Model****A. Bulgaria and the Czech Republic**

<b>Bulgaria</b>				<b>Czech Republic</b>			
<i>Parameter</i>	<i>Estimate</i>	<i>t Value</i>	<i>Pr&gt; t </i>	<i>Parameter</i>	<i>Estimate</i>	<i>t Value</i>	<i>Pr&gt; t </i>
Intercept	-0.39	-4.32	<.0001	Intercept	0.17	0.91	0.36
VROA	0.02	0.22	0.83	VROA	0.15	0.62	0.54
TANG	-0.21	-6.04	<.0001	TANG	0.19	3.19	0.00
PROF	-0.31	-5.44	<.0001	PROF	-1.72	-14.67	<.0001
SIZE	0.04	6.94	<.0001	SIZE	0.02	2.01	0.04
NTC	-0.03	-0.96	0.34	NTC	-0.50	-6.89	<.0001
AGE	0.00	-7.57	<.0001	AGE	-0.01	-4.33	<.0001
T99	0.05	2.24	0.03	T99	-0.04	-1.10	0.27
T00	0.00	0.11	0.92	T00	-0.14	-3.09	0.00
T01	0.07	2.97	0.00	T01	-0.14	-3.26	0.00
IND1	0.28	6.61	<.0001	IND1	0.01	0.10	0.92
IND2	0.17	4.02	<.0001	IND2	0.10	1.03	0.30
IND3	0.16	3.24	0.00	IND3	0.09	0.89	0.38
IND4	0.09	1.98	0.05	IND4	-0.09	-0.70	0.48
IND5	0.20	4.78	<.0001	IND5	0.13	1.29	0.20
IND6	0.28	5.45	<.0001	IND6	-0.05	-0.42	0.68
IND7	0.14	2.45	0.01	IND7	0.10	0.96	0.34
IND8	-0.03	-0.04	0.97	IND8	.	.	.
IND9	0.11	1.59	0.11	IND9	0.15	0.67	0.50
OWN_B	0.04	1.25	0.21	OWN_B	0.01	0.12	0.91
OWN_C	-0.02	-0.64	0.52	OWN_C	-0.06	-0.63	0.53
OWN_U	-0.04	-0.92	0.36	OWN_U	-0.04	-0.37	0.71
FOR	-0.07	-1.77	0.08	FOR	0.14	3.57	0.00
Intercept	0.51	3.37	0.00	Intercept	0.01	0.19	0.85
DISTAN	0.63	7.00	<.0001	DISTAN	0.16	7.04	<.0001
SIZE	-0.02	-2.10	0.04	SIZE	0.00	-0.94	0.35
T99	-0.12	-3.44	0.00	T99	0.01	1.00	0.32
T00	-0.08	-2.45	0.01	T00	0.01	0.30	0.76
T01	-0.18	-5.10	<.0001	T01	0.03	1.49	0.14
IND1	-0.19	-1.84	0.07	IND1	0.06	2.10	0.04
IND2	-0.04	-0.42	0.67	IND2	0.07	2.67	0.01
IND3	-0.08	-0.73	0.46	IND3	0.09	2.97	0.00
IND4	-0.05	-0.48	0.63	IND4	0.03	0.77	0.44
IND5	-0.04	-0.35	0.73	IND5	0.08	2.84	0.00
IND6	-0.17	-1.56	0.12	IND6	0.06	1.69	0.09
IND7	-0.21	-1.84	0.07	IND7	0.06	2.04	0.04
IND8	-0.17	-0.09	0.93	IND8	.	.	.
IND9	0.09	0.46	0.65	IND9	0.06	0.70	0.49

**Table 4. Dynamic Adjustment Model (cont.)**

**B. Estonia and Poland**

<u>Estonia</u>				<u>Poland</u>			
<i>Parameter</i>	<i>Estimate</i>	<i>t Value</i>	<i>Pr&gt; t </i>	<i>Parameter</i>	<i>Estimate</i>	<i>t Value</i>	<i>Pr&gt; t </i>
Intercept	-1.72	-2.66	0.01	Intercept	0.20	0.82	0.41
VROA	0.37	1.74	0.08	VROA	1.01	4.57	<.0001
TANG	0.38	5.24	<.0001	TANG	-0.04	-0.59	0.56
PROF	-1.35	-10.27	<.0001	PROF	-1.67	-12.38	<.0001
SIZE	0.01	0.84	0.40	SIZE	0.00	-0.05	0.96
NTC	-0.21	-2.32	0.02	NTC	-0.18	-2.33	0.02
AGE	0.00	-3.68	0.00	AGE	0.00	-3.32	0.00
T99	-0.11	-2.57	0.01	T99	-0.17	-4.34	<.0001
T00	-0.12	-2.53	0.01	T00	-0.12	-2.92	0.00
T01	-0.15	-2.84	0.00	T01	-0.24	-5.76	<.0001
IND1	1.90	3.18	0.00	IND1	0.27	1.68	0.09
IND2	1.91	3.17	0.00	IND2	0.23	1.39	0.17
IND3	1.86	3.10	0.00	IND3	0.10	0.58	0.56
IND4	1.87	3.11	0.00	IND4	0.20	1.18	0.24
IND5	1.93	3.22	0.00	IND5	0.32	1.94	0.05
IND6	1.89	3.15	0.00	IND6	0.08	0.49	0.62
IND7	1.92	3.19	0.00	IND7	0.22	1.07	0.29
IND9	2.02	3.31	0.00	IND9	0.22	0.98	0.33
OWN_B	.	.	.	OWN_B	0.16	1.06	0.29
OWN_C	-0.33	-1.93	0.05	OWN_C	0.11	0.80	0.42
OWN_U	0.07	0.48	0.63	OWN_U	0.16	1.16	0.25
FOR	0.37	3.12	0.00	FOR	-0.03	-0.72	0.47
Intercept	0.12	0.79	0.43	Intercept	-0.20	-2.88	0.00
DISTAN	0.13	3.20	0.00	DISTAN	0.00	-0.09	0.93
SIZE	-0.02	-2.65	0.01	SIZE	0.03	5.37	<.0001
T99	0.04	1.58	0.11	T99	0.01	0.55	0.58
T00	0.01	0.30	0.77	T00	-0.01	-0.34	0.73
T01	-0.04	-1.66	0.10	T01	-0.02	-1.06	0.29
IND1	0.49	7.59	<.0001	IND1	0.07	1.65	0.10
IND2	0.41	6.36	<.0001	IND2	0.03	0.69	0.49
IND3	0.49	6.88	<.0001	IND3	0.09	1.90	0.06
IND4	0.41	5.16	<.0001	IND4	0.06	1.29	0.20
IND5	0.40	6.69	<.0001	IND5	0.08	1.93	0.05
IND6	0.28	4.40	<.0001	IND6	0.07	1.47	0.14
IND7	0.47	5.77	<.0001	IND7	-0.01	-0.21	0.84
IND9	0.53	5.39	<.0001	IND9	0.06	0.76	0.44

**Table 4. Dynamic Adjustment Model (cont.)****C. Romania**

<b>Romania</b>			
<i>Parameter</i>	<i>Estimate</i>	<i>t Value</i>	<i>Pr&gt; t </i>
Intercept	0.30	3.76	0.00
VROA	0.18	2.65	0.01
TANG	-0.25	-8.56	<.0001
PROF	-0.32	-9.89	<.0001
SIZE	0.01	2.69	0.01
NTC	0.02	0.71	0.48
AGE	-0.01	-4.19	<.0001
T99	0.03	1.97	0.05
T00	0.06	2.98	0.00
T01	0.04	2.33	0.02
IND1	0.00	-0.13	0.90
IND2	-0.01	-0.23	0.82
IND3	-0.01	-0.36	0.72
IND4	-0.12	-3.66	0.00
IND5	0.03	0.78	0.43
IND6	0.09	1.58	0.11
IND7	-0.12	-2.97	0.00
IND9	-0.07	-0.43	0.66
OWN_B	0.01	0.25	0.80
OWN_C	0.02	1.27	0.20
OWN_U	-0.04	-0.96	0.34
FOR	0.02	1.21	0.23
Intercept	0.36	4.33	<.0001
DISTAN	0.23	4.58	<.0001
SIZE	-0.01	-2.28	0.02
T99	-0.01	-0.63	0.53
T00	-0.06	-2.89	0.00
T01	-0.01	-0.73	0.47
IND1	0.02	0.63	0.53
IND2	-0.05	-1.17	0.24
IND3	-0.03	-0.75	0.45
IND4	0.12	2.80	0.01
IND5	-0.02	-0.40	0.69
IND6	-0.09	-1.91	0.06
IND7	0.05	1.03	0.31
IND9	-0.07	-0.46	0.64



**Table 5. Mean and median of adjustment speed ( $\delta_{it}$ ), target leverage ratio ( $L^*_{it}$ ), observed leverage ratio ( $L_{it}$ ), and a gap between target and observed ratios ( $L^*_{it}-L_{it}$ )**

**A. Size Groups**

Country	Size Groups	Adjustment speed (mean)	Target ratio (mean)	Observed ratio (mean)	Average gap (mean)	Adjustment speed (median)	Target ratio (median)	Observed ratio (median)	Average gap (median)
BUL	Very small	0.22	0.12	0.07	0.05	0.21	0.12	0.00	0.08
BUL	Small	0.23	0.14	0.10	0.03	0.22	0.13	0.00	0.06
BUL	Medium	0.21	0.17	0.10	0.07	0.20	0.16	0.00	0.09
BUL	Large	0.20	0.19	0.13	0.06	0.19	0.18	0.02	0.09
BUL	Very Large	0.18	0.23	0.18	0.05	0.18	0.24	0.07	0.09
CZ	Very small	0.08	0.16	0.23	-0.07	0.08	0.12	0.10	0.00
CZ	Small	0.07	0.21	0.28	-0.07	0.07	0.19	0.20	-0.03
CZ	Medium	0.07	0.22	0.28	-0.06	0.07	0.21	0.24	-0.03
CZ	Large	0.07	0.27	0.34	-0.06	0.07	0.26	0.30	-0.03
CZ	Very Large	0.07	0.32	0.30	0.02	0.07	0.32	0.27	0.03
EST	Very small	0.24	0.26	0.27	-0.01	0.25	0.25	0.20	0.00
EST	Small	0.20	0.23	0.30	-0.06	0.23	0.22	0.23	-0.06
EST	Medium	0.20	0.26	0.35	-0.09	0.22	0.24	0.31	-0.10
EST	Large	0.17	0.28	0.33	-0.05	0.20	0.27	0.30	-0.07
EST	Very Large	0.16	0.29	0.31	-0.02	0.17	0.28	0.28	-0.02
POL	Very small	0.11	0.33	0.19	0.15	0.12	0.33	0.10	0.14
POL	Small	0.13	0.33	0.21	0.11	0.14	0.33	0.13	0.12
POL	Medium	0.14	0.35	0.24	0.11	0.15	0.35	0.17	0.13
POL	Large	0.16	0.35	0.25	0.10	0.17	0.36	0.18	0.11
POL	Very Large	0.20	0.35	0.28	0.07	0.20	0.34	0.21	0.08
ROM	Very small	0.29	0.23	0.16	0.07	0.28	0.23	0.00	0.12
ROM	Small	0.26	0.24	0.15	0.09	0.25	0.24	0.06	0.13
ROM	Medium	0.24	0.25	0.18	0.08	0.24	0.25	0.10	0.12
ROM	Large	0.22	0.28	0.20	0.08	0.22	0.27	0.13	0.13
ROM	Very Large	0.20	0.30	0.25	0.05	0.19	0.30	0.16	0.12

**Table 5. Mean and median of adjustment speed ( $\delta_{it}$ ), target leverage ratio ( $L^*_{it}$ ), observed leverage ratio ( $L_{it}$ ), and a gap between target and observed ratios ( $L^*_{it}-L_{it}$ ), (cont.)**

**C. Year of observation**

Country	Year	Adjustment speed (mean)	Target ratio (mean)	Observed ratio (mean)	Average gap (mean)	Adjustment speed (median)	Target ratio (median)	Observed ratio (median)	Average gap (median)
BUL	1997	0.31	0.12	0.09	0.03	0.28	0.10	0.00	0.05
BUL	1998	0.27	0.14	0.10	0.04	0.26	0.13	0.00	0.06
BUL	1999	0.17	0.20	0.12	0.08	0.17	0.19	0.00	0.11
BUL	2000	0.18	0.16	0.13	0.04	0.18	0.15	0.00	0.07
BUL	2001	0.11	0.23	0.14	0.09	0.11	0.23	0.02	0.13
CZ	1997	0.07	0.31	0.31	-0.01	0.07	0.32	0.25	0.01
CZ	1998	0.07	0.30	0.30	0.00	0.06	0.31	0.25	0.02
CZ	1999	0.08	0.26	0.29	-0.03	0.08	0.26	0.23	0.00
CZ	2000	0.07	0.16	0.27	-0.11	0.06	0.14	0.21	-0.05
CZ	2001	0.09	0.15	0.25	-0.10	0.08	0.13	0.20	-0.05
EST	1997	0.20	0.32	0.33	-0.01	0.23	0.33	0.30	-0.03
EST	1998	0.20	0.33	0.34	-0.01	0.22	0.34	0.31	-0.03
EST	1999	0.23	0.25	0.31	-0.07	0.25	0.25	0.27	-0.06
EST	2000	0.20	0.21	0.29	-0.07	0.22	0.20	0.22	-0.06
EST	2001	0.14	0.20	0.27	-0.08	0.16	0.19	0.22	-0.06
POL	1997	0.14	0.36	0.20	0.16	0.14	0.38	0.12	0.18
POL	1998	0.15	0.41	0.23	0.18	0.15	0.42	0.15	0.20
POL	1999	0.16	0.30	0.24	0.06	0.16	0.29	0.14	0.07
POL	2000	0.15	0.36	0.25	0.11	0.15	0.37	0.18	0.13
POL	2001	0.14	0.28	0.25	0.03	0.14	0.27	0.18	0.03
ROM	1997	0.27	0.23	0.14	0.09	0.26	0.23	0.04	0.13
ROM	1998	0.26	0.25	0.17	0.08	0.26	0.25	0.08	0.12
ROM	1999	0.25	0.27	0.19	0.08	0.24	0.27	0.10	0.13
ROM	2000	0.20	0.29	0.21	0.08	0.19	0.29	0.11	0.14
ROM	2001	0.24	0.27	0.22	0.05	0.23	0.27	0.14	0.10

## References

- Banerjee, S., A. Heshmati and C. Wihlborg (1999), "The Dynamics of Capital Structure," Working Paper No. 333, *SSE/EFI Working Paper series in Economics and Finance*, Stockholm School of Economics.
- Bonin, J. P. and M. E. Schaffer (2002), "Revisiting Hungary's Bankruptcy Episode," in Anna Meyendorff and Anjan V. Thakor (eds.), *Designing Financial Systems in Transition Economies: Strategies for Reform in Central and Eastern Europe*, MIT Press.
- Carlin, W., S. Estrin and M. Schaffer (1999), "Are Central and East European Firms Ready for EU Accession? A Comparison of Manufacturing Firms in Poland, Romania, and Spain," *Transition Newsletters* 10(3), 19-20.
- Cornelli, F., R. Portes and M. Schaffer (1998), "The Capital Structure of Firms in Central and Eastern Europe," in *Different Paths to a Market Economy: China and European Economies in Transition*, O. Bouin, F. Coricelli and F. Lemoine (eds.) CEPR/CEPII/OECD.
- Diamond, D. (1989), "Reputation Acquisition in Debt Markets," *Journal of Political Economy* 97(4), 828-62.
- Djankov, S. and P. Murrell (2002), "Enterprise Restructuring in Transition: A Quantitative Survey," *Journal of Economic Literature* 40(3), 739-92.
- EBRD (1998), "Transition Report 1997," *The European Bank for Reconstruction and Development*.
- EBRD (1999), "Transition Report 1997," *The European Bank for Reconstruction and Development*.
- EBRD (2000), "Transition Report 2000," *The European Bank for Reconstruction and Development*.
- EBRD (2001), "Transition Report 2001," *The European Bank for Reconstruction and Development*.
- Fama, E.F. and K.R. French, (2002), Testing Trade-off and Pecking Order Predictions about Dividends and Debt, *Review of Financial Studies* 15, 1-33.
- Friend, I. and L. Lang (1988), "An Empirical Test of the Impact of Managerial Self-Interest on Corporate Capital Structure," *Journal of Finance* 43, 271-281.
- Grossman, S. J. and O. Hart (1982), "Corporate Financial Structure and Managerial Incentives," in J. McCall (ed.), *The Economics of Information and Uncertainty*, University of Chicago Press, Chicago.
- Guedes, J., and T. Opler (1996), "The Determinants of the Maturity of Corporate Debt Issues," *Journal of Finance* 51(5), 1809-33.
- Gray, C., W., S. Schlorke and M. Szanyi (1996), "Hungary's Bankruptcy Experience, 1992-93," *The World Bank Economic Review* 10 (3).

- Heshmati, A. (2002), "The Dynamics of Capital Structure: Evidence from Swedish Micro and Small Firms," *Research in Banking and Finance*, Volume 2, 199-241.
- Hussain, Q. and E. Nivorozhkin (1997), "The Capital Structures of Listed Companies in Poland," *IMF Working Paper*, WP/97/175.
- Jensen M.C. and W.H. Meckling (1976), "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure", *Journal of Financial Economics* 3, 305-360
- Klapper, L., V. Sarria-Allende and V. Sulla (2002), "Small- and Medium-Size Enterprise Financing in Eastern Europe," *World Bank Policy Research Working Paper* 2933.
- Kočenda, E. and J. Svejnar (2003), "Ownership and Firm Performance after Large-Scale Privatization," *CERGE-EI Working Papers* wp209, The Center for Economic Research and Graduate Education - Economic Institute.
- Miller, M. H., and F. Modigliani (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment," *The American Economic Review* 48, 261-297.
- Myers S.C. (1977), "Determinants of Corporate Borrowing", *Journal of Financial Economics* 5, 147-175.
- Myers, S.C. (1984), "The Capital Structure Puzzle," *Journal of Finance* 39, 575-592.
- Myers S.C. (1999), "The Search for Optimal Capital Structure", in H. Chew, Jr., ed.: *The New Corporate Finance: Where Theory Meets Practice*, Second Edition, Irwin McGraw-Hill.
- Myers, S. C. and N. Majluf (1984), "Corporate Finance and Investment Decisions When Firms Have Information That Investors Do Not Have," *Journal of Financial Economics* 13, 187-221.
- Nivorozhkin, E. (2002), "Capital Structures in Emerging Stock Market: the Case of Hungary," *The Developing Economies* 40 (2).
- Nivorozhkin, E. (2003), "The Dynamics of Capital Structure in Transition Economies," *BOFIT Discussion Paper* 2, Bank of Finland, Institute for Economies in Transition, BOFIT.
- Petersen, M. A., and R. Rajan (1997), "Trade Credit: Theory and Evidence," *Review of Financial Studies* 10(3), 661-91.
- Rajan, R., and L. Zingales (1995), "What Do We Know About Capital Structure? Some Evidence from International Data," *Journal of Finance* 50(5), 1421-460.
- Revoltella, D. (2001), "Financing Enterprises in the Czech Republic: Debt and Firm-specific Variables," *Economics of Planning* 34, 231-246.
- Titman, S. (1984), "The Effect of Capital Structure on a Firm's Liquidation Decision," *Journal of Financial Economics* 13 (1), 137-51
- Titman, S. and R. Wessels (1988), "The Determinants Of Capital Structure Choice," *Journal of Finance* 43(1), 1-19

Wald, K. J. (1999), “ How Firm Characteristics Affect Capital Structure: An International Comparison”, *The Journal of Financial Research* 22 (2), 161-187.

Warner J. (1977), “Bankruptcy Costs: Some Evidence,” *Journal of Finance* 32, 337-47.