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The impact of corporate governance practices on dynamic adjustment of capital structure of companies in Ukraine*

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Managers are risk averse and less willing than risk neutral shareholders to take on debt. Therefore in firms with poor corporate governance practices, where manager's preferences dominate shareholders' objectives, we shall see less debt and slower rates of adjustment of the capital structure. A goal of the paper is to investigate the impact of corporate governance (shareholder rights, transparency and supervisory board arrangements) on the pace of capital structure adjustment. A dataset includes all open joint-stock companies in Ukraine for years 2000-2007. It is found that typical firm in Ukraine completed the required leverage adjustment in about two years. The paper documents evidence that firms that practice better corporate governance benefited from the improved liquidity in 2000-2007 the most as they adjusted their financial structures at higher rates. The coefficients for shareholder rights, supervisory board structure and supervisory board procedure are found to be significant. Transparency variable is not found to have significant impact on speed of adjustment.

Keywords: capital structure, dynamic adjustment, agency problems, corporate governance.

JEL Classification: C23, G32, G34, E44, P2

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Managers are risk averse and less willing than risk neutral shareholders to take on debt. Therefore in firms with poor corporate governance practices, where manager's preferences dominate shareholders' objectives, we shall see less debt and slower rates of adjustment of the capital structure. A goal of the paper is to investigate the impact of corporate governance (shareholder rights, transparency and supervisory board arrangements) on the pace of capital structure adjustment. A dataset includes all open joint-stock companies in Ukraine for years 2000-2007. It is found that typical firm in Ukraine completed the required leverage adjustment in about two years. The paper documents evidence that firms that practice better corporate governance benefited from the improved liquidity in 2000-2007 the most as they adjusted their financial structures at higher rates. The coefficients for shareholder rights, supervisory board structure and supervisory board procedure are found to be significant. Transparency variable is not found to have significant impact on speed of adjustment.

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1. Introduction

It is well documented that firms consider a target level or range of leverage when making the debt decisions by trading off the costs and benefits of leverage. The speed with which firms adjust their leverage from the observed to the desired level depends significantly on the effectiveness of their corporate governance systems. Firms should be able to create appropriate governance mechanisms that ensure that managers make decisions regarding financial structure in the best interests of all shareholders. Ukrainian firms experienced an economic revival and credit boom in 2000-2007 during which many firms actively corrected their financial structures from initial low debt ratios to some desired levels. This paper attempts to investigate the impact of firm's corporate governance on its speed of capital structure adjustment in Ukraine. There are at least several important channels through which agency relationships may impact capital structure choices: asset substitution problem, agency costs of free cash flow and monitoring problem.

The previous literature predicts that the shareholders prefer riskier projects and higher leverage because it may enrich them at the expense of creditors. While creditors bear part of the risk of failure, shareholders do not pay any of the gain from riskiness of projects to creditors. Since it is supposed that creditors understand this and control it in advance, shareholders prefer managers to go to the maximum possible limit set by contracts in imposing risks on creditors. While the investors are concerned only about non-diversifiable risk of firm's projects, managers will lose their jobs and any wealth tied up in their firms if the firms perform poorly or go bankrupt. Thus, managers are concerned with total risk, and their personal risk aversion magnifies this concern. The lower is the ratio of debt to equity the lower is the chance of bankruptcy of the firm. Thus, unless there is some form of ex post settling up with managers, which is difficult and costly to achieve, the leverage will be lower than optimum (Easterbrook, 1984) and upward adjustments of leverage will be slower than what shareholders would wish.

Jensen (1986) develops a theory that explains the benefits of debt in reducing agency costs of free cash flow, in particular, in situations when the firm generates substantial free cash flow making the conflict of interest among shareholders and managers especially severe. Hart (1995) discusses the company's choice of debt as even more important source of discipline on managers than incentive schemes. Debt serves as a bonding or commitment device by reducing the free cash flow available to managers. In this respect, debt limits inefficiency of management, at least if managers want to repay the debt. Berger et al. (1997) find that entrenched CEOs seek to avoid debt. When managers do not experience discipline from the corporate governance and control mechanisms, including monitoring by board, the threat of dismissal or takeover, and compensation-based performance incentives, managers may prefer less leverage or *adjusting it more slowly* since they dislike performance pressures associated with commitment to repay the debt and interests on it in the future.

The Ukrainian economy provides an interesting case to investigate. There is an array of complex agency problems stemming from method and speed of privatization, political privileges and oligarchy, ownership structures and the presence of minority shareholders and so on. Even though there is a trend that ownership becomes more concentrated, there are many companies with minority shareholders. Zhaka (2007) documented that about 20-30% of companies did not have a shareholder with at least 50%-shareholding in 2000-2002. On average, 10% of ownership rights of (open) joint stock companies were owned by state. Even if there is oligarch's tough control over a company there may be a problem of lack of management discretion to pursue effective decisions. Both dispersed and state ownership as well as separation of ownership and control provide grounds for potential mismanagement discussed above.

Another reason that makes Ukraine an interesting economy to study is the unprecedented low levels of leverage in the late 1990s (Demirguc-Kunt and Maksimovic, 1999; Myroshnichenko, 2004)) and the high speed of changes relative to the developed markets that are close to their steady states. Until 1991, under the Soviet Union (SU), Ukrainian economy had not been based on market principles and leverage levels were controlled by central planning and not by market forces. In the 1990s, after the collapse of SU, Ukraine experienced one of the most difficult transitions among the

fSU countries. Inflation in Ukraine was among the highest and the decline in output among the most severe during the 1990s. But it was also the time of deep social and economic transformations, though painful, from central planning to market-oriented economy. It was the time of mass privatization and often of building new channels of supply of resources and sale of products. At that time, long-term and overall leverage figures for Ukrainian firms were among the lowest in the world according to data collected by Demirguc-Kunt and Maksimovic (1999) and Myroshnichenko (2004). With the vast array of challenges in the early transition, firms rarely thought about capital structure adjustment—in fact, they were ‘busy’ with learning market principles and standards, and how to survive under the market conditions.

After the year 2000, the Ukrainian economy has undergone a significant and sustained recovering and demonstrated strong economic growth of about 7.5%¹ annually on average. As expected liquidity and level of credit in Ukrainian economy also started recovering. Our hypothesis is that namely firms with better corporate governance and mechanisms were able to tackle agency problems in advance that allowed them to adjust their capital structures faster than others during the economic growth. In our study we propose to use the whole period of economic revival (2000-2007) to investigate whether firms that practiced better corporate governance benefited from it in terms of their ability to faster adjust their capital structures.

The problem of using the western concepts of what is ‘good’ governance is not likely to be serious in this study because the governance data come from the local survey that was tailored to the specifics of Ukrainian firms. I tried to use not some country specific governance criteria but a common sense and basic internationally (not only US) accepted principles like fairness, accountability, transparency etc, when selecting individual corporate governance variables. In fact, it is not even possible to apply the USA experience to Ukraine since the corporate governance practices of two countries are completely on different stages and face very different and not comparable problems. Most governance indicators that we use for Ukrainian firms (e.g. whether firm had an annual general shareholder meeting, the content of annual report, etc) would not even be important for USA firms because they were resolved in the past. Similarly, many governance issues that USA firms face today are not important in Ukraine because Ukraine has first to resolve more basic governance problems and develop appropriate legal system before those problems that firms face in USA today could be relevant in Ukraine.

The paper proceeds as follows. Section 2 reviews the related literature and development of approaches to investigating capital structure choices. Section 3 lays the theoretical micro foundations and motivation of the study, presents hypotheses, and discusses it in the context of Ukraine. Section 4 presents a dynamic capital structure model and estimation methodology. Section 5 describes data, defines variables and presents summary statistics. Section 6 presents estimation results and Section 7 concludes.

2. Literature Review

A firm’s capital structure is among the major fields of both theoretical and empirical modern corporate finance. The seminal paper by Modigliani and Miller (1958) provides the conditions when capital structure is irrelevant. However, a subsequent empirical research has convincingly shown that firms can improve their value and growth rates as well as their future prospects by varying its optimal ratio between equity and debt (e.g. Mauer and Triantis, 1994).

Jensen and Meckling (1976) initiated research on models in which capital structure is determined by agency costs. There could be at least two types of agency conflicts: between shareholders and managers (or large shareholders), and between shareholders and debt holders. The conflicts between managers or large shareholders and (other) shareholders arise from separation of ownership and management. Shareholders are interested that managers run company in the most efficient way that would maximize the share value. However, when running the company efficiently and bearing the entire cost of it, managers or large shareholders do not enjoy the entire gain from it.

¹ Source: the World Development Indicators (WDI) database, World Bank.

Thus, managers and large shareholders may potentially be interested in either exercising less effort in managing a firm or in expropriating value from shareholders. Increase in the debt financing of the firm increases the manager's share of the equity and thus reduces the conflict of interest. Moreover, since the firm will have once to repay its debt, it reduces the free cash flow available to managers. Grossman and Hart (1982) point out that if bankruptcy is costly for managers (e.g. if they lose benefits of control or reputation) then debt can stimulate managers to work harder, make better investment decisions and consume less non-pecuniary benefits in order to avoid bankruptcy. The ability of debt to reduce the conflicts between managers and shareholders constitutes the benefit of debt financing.

Conflicts of interest between shareholders and debt holders arise since the shareholders capture most of the gain if investment yields large returns, however if the investment fails the consequences are born by debt holders because of limited liability. Thus, shareholders may benefit from investing in very risky projects despite that they decrease the value of the debt. Nevertheless, if the debt holders correctly anticipate future behavior of shareholders they would require higher interest payments and thus the shareholders receive less for the debt—bearing the cost of incentive to invest in value-decreasing projects. This is called the asset substitution problem and it constitutes an agency cost of debt financing.

According to Jensen and Meckling (1976), an optimal capital structure can be obtained by trading off the benefit of debt against the agency cost of debt. This implies that some industries (e.g. regulated public utilities, banks, and firms in mature industries without good growth opportunities) in which the asset substitution is less likely will tend to have higher debt levels on average. The higher debt would also be expected for firms for which small or negative growth is optimal and that have large cash flows from operations. By Jensen (1989) such industries include steel, chemicals, brewing, tobacco, television and radio broadcasting, and wood and paper products.

In their empirical study, Berger et al. (1997) find that entrenched CEOs seek to avoid debt. Using cross-sectional analysis, they find that leverage levels are lower when CEOs do not face pressure from either ownership and compensation incentives or active monitoring. This is consistent with the evidence of entrenched management of some firms we observe in Ukraine. If entrenched managers systematically make suboptimal decisions about capital structure, we should observe significant associations between leverage (and its speed of adjustment) and variables that indicate corporate governance practices. Thus, it is expected that better governed firms have higher speed of adjustment of leverage.

Drobtz and Wansensried (2004) noted that the empirical literature has lagged behind the theoretical developments in the field due to the problems associated with the reliability of company data and a static research framework. Even for developed European countries reliable company data has become available only recently. Moreover, most of the research employed a static framework to investigate debt-equity ratio of the firms (Titman and Wessels, 1988, Leland, 1994, and Rajan and Zingales, 1995). However, Heshmati (2002) criticized the static approach noting that the capital structure theory proposes to explain the differences in the *optimal* debt-equity ratios rather than the observed ones that are often investigated empirically. Using the later is particularly problematic if the adjustment to optimal capital structure is costly—since, then it might be more profitable for firms not to adjust fully to their targets even when they recognize that their current leverage ratios are not optimal.

The dynamic adjustments in debt-equity ratios cannot be captured by static capital structure models. Goldstein, Ju and Leland (1998) investigated an optimal dynamic capital structure strategy retaining the Modigliani and Miller (1958) assumption that the firm's cash flows are invariant to the choice of capital structure and ignoring that the firm's choice of risk may depend on capital structure (e.g. asset substitution problem)—the key idea of Jensen and Meckling (1976). Goldstein et al. (1998) found that the dynamic tax advantage to debt in contrast to the static tax advantage can be significantly larger for firms that restructure their debt optimally. Mauer and Triantis (1994) use a dynamic approach to investigate the interactions between corporate investment, operating and financing decisions in a model with operating adjustment and recapitalization costs. They find that

higher production flexibility or financial flexibility increases the firm's debt capacity, thus increasing the tax shield value of debt financing.

Fischer, Heinkel and Zechner (1989) studied the determinants of the difference between firm's minimum and maximum debt ratios over time. Their results support the importance of adjustment costs in firm's decision making regarding its capital structure. Two studies, Shyam-Sunder and Myers (1999) and Fama and French (2000), use the observed historical mean debt ratio of a firm over the available period as a proxy for target leverage. Graham and Harvey (2001) documented that firms are looking for target leverage. By setting a debt policy managers seek not to minimize the average cost of capital but to ensure financial flexibility under the framework of pecking order theory. Due to some random events firms may deviate from their optimal capital structure and only gradually move back to it. These stimulated more research that attempted to investigate the dynamics of capital structure.

De Miguel and Pindalo (2001) develop a target adjustment model to explain firm's debt in terms of its debt in the previous period and its target level of debt, which is a function of firm characteristics (profitability, growth and assets tangibility). Importantly, they '*endogenize*' the target leverage level that in fact allowed them to investigate the determinants of the *optimal* capital structure rather than the observed one. The authors specify a dynamic model of capital structure adjustment and use Arellano and Bond dynamic panel estimator to estimate a constant adjustment coefficient. They document that in Spain firms have lower adjustment costs than in USA. Gaud et al. (2004) and Drobetz and Fix (2005) estimate the same model for Switzerland.

Banerjee, Heshmati and Wihlborg (2004) do simultaneously '*endogenize*' both the adjustment factor and the target leverage ratio. They investigate the determinants of optimal capital structure as well as the determinants of the speed of adjustment. They investigate the impact of distance to the target leverage, growth prospects and firm size on the size of adjustment. They document that the speed of adjustment is negatively determined by growth opportunities and positively by firm size. They do not find a significant relationship between the distance to the optimal capital structure and the likelihood of adjustment. Lööf (2003) obtains significant and negative coefficient for distance variable for UK firms perhaps implying that firms prefer to adjust by smaller amounts.

Intuitively, business cycle is an important determinant of a firm's decision to adjust its capital structure. Business cycle plays a significant role in determining the default risk as well as the opportunity costs of adjusting. Usually, time dummies were used to account for such effects. More recently, Hackbarth et al. (2006) developed a contingent claims model where cash flows depend on both idiosyncratic shocks and aggregate shock, which reflects the state of the economy. Their model predicted that leverage levels are counter-cyclical and that macroeconomic characteristics determine both the speed and size of capital structure changes. They found that the restructuring threshold is lower when economy grows than when it declines implying that firms should generally choose to adjust their capital structure in good times. Kozajczyk and Levy (2003) address similar issues using 50-year-history of the USA aggregate non-financial corporate debt to asset ratio. They also find that the target leverage is countercyclical. Levy (2001) develops a model where recessions increase the agency problems between managers and shareholders. They show that levered wealth of managers is reduced relative to that of outside shareholders in bad times implying that the optimal level of debt increases (to better align the interests of managers and shareholders), thus creating counter-cyclicity of leverage. Importantly, Kozajczyk and Levy (2003) document the differences in behavior of financially constrained and unconstrained firms. Financially constrained firms tend to have pro-cyclical target leverage and they generally cannot time equity issue.

A goal of the paper is to investigate the effects of corporate governance practices on the speed of adjustment of leverage using a population of Ukrainian open joint-stock companies in 2000-2007. Other firm characteristics as well as time effects to capture the influence of macroeconomic factors such as, for example, changes in bank laws, securities regulation, property rights, etc. are included in the empirical model.

3. Theoretical Model, Hypotheses and the Context of Ukraine

After the collapse of Soviet Union, Ukrainian economy has been undergoing a transition from the purely planning economy to the market principles of business. The transition can be roughly divided into two periods. The first is up to 2000, the period of vast economic decline characterized by larger than 50%-contraction of GDP, mainly internal funds as the main source of firm's investment², predominantly short-term crediting and relatively small leverage levels. The second period, from 2000 to 2007, is characterized by a stable economic recovery and significant increase in average leverage (defined as the ratio of interest bearing debt to capital) level from about .03 in 2000 to about .13 in 2007 (see Table 4a) for open joint-stock companies. The share of bond financing in the total investment made by Ukrainian firms increased from 0.37% in 2002 to 3.64% in the first half of 2003³. Such significant increases in crediting, recapitalization (see also Table 1) and leverage levels indicate that Ukrainian companies actively adjusted their financial structures during the period under investigation.

Our main hypothesis is that companies with better corporate governance adjusted their capital structures faster in Ukraine in 2000-2007. Graham and Harvey (2001) show that 81% of firms consider a target debt ratio or target range when making their debt decisions. Flannery and Rangan (2006) find that firms do target a long-run capital structure and the typical firm converges to its long-run target at a rate of more than 30% per year. Altogether, previous literature documents evidence in support of trade-off theory of capital structure, in particular, that market imperfections make firm value dependent on capital structure and firms select target debt-equity ratios by trading off their costs (agency costs of debt, including bankruptcy costs) and benefits of leverage. The optimal leverage is the point where the marginal costs of debt just offset the marginal benefits, which is supposed to maximize the firm's value (Jensen, 1986).

The speed with which firms adjust their debt ratios depends on the cost of adjusting it. With no adjustment costs, the trade-off theory implies that firms should never deviate from their optimal leverage. If adjustment costs were infinite, we would not observe any movements towards a target. Given the initial low leverage of firms in Ukraine and that the transaction costs significantly increase with the number of adjustments, we expect that firms try to adjust their capital structures to some target (that they think maximize their productivity/value) in as few number of adjustments as possible minimizing the transaction costs, and, thus, increasing the size or speed of adjustment. This is consistent with the Ukrainian data. According to our estimations firms converge to their long-run target level of debt at a rate of at least 50% per year.

There are several reasons to believe that corporate governance helps firms adjust their capital structure faster. First, it is the agency story. Jensen (1986) develops a theory that explains the benefits of debt in reducing agency costs of free cash flow, in particular, in situations when the firm generates substantial free cash flow making the conflict of interest among shareholders and managers especially severe. Hart (1995) discusses the company's choice of debt as even more important source of discipline on managers than incentive schemes. Debt serves as a bonding or commitment device by reducing the free cash flow available to managers. In this respect debt limits potential inefficiency of management, at least if managers want to repay the debt. Berger et al. (1997) find that entrenched CEOs seek to avoid debt. When managers do not experience discipline from the corporate governance and control mechanisms, including monitoring by board, the threat of dismissal or takeover, and compensation-based performance incentives, managers may prefer less leverage or *adjusting it more slowly* since they dislike performance pressures associated with

² In 2002, 94.6% of firms' investments in Ukraine came from the after tax cash flow, 3.7% – from bank loans, 1.2% – from share issues and 0.5% – from state funds according to the poll conducted by Ukrainian Institute for Economic Research and Policy Consulting for Ukrainian firms as noted in Miroschnichenko (2004). Interestingly, this evidence is consistent with Donaldson's (1961) pecking order theory of capital structure that suggests that investments are financed first with internal funds (since due to the information asymmetries managers perceive that the market generally underprices their shares), and when the internal funds are insufficient the firm will issue safe debt, and equity is used only as a last resort.

³ Miroschnichenko (2004) provides the own calculations of Ukrsofsbank, Укрсоцбанк спеціальний обзор, Рынок корпоративных облигаций: аналитика для эмитента, 21 July, 2003.

commitment to repay the debt and interests on it in the future. The case of Ukraine seems to fit this story very well and we expect that firms with poor corporate governance avoid debt more often than well governed firms. This also implies that poorly governed firms adjust their capital structures less frequently and adjustment process takes more time.

Following Easterbrook (1984), the investors, with diversified portfolios of stocks, are concerned only about non-diversifiable risk of firm's projects. Managers have substantial part of their personal wealth tied up in their firms. If firms perform poorly or go bankrupt, managers will lose their jobs and any wealth tied up in their firms. Thus, managers are concerned with total risk, and their personal risk aversion magnifies this concern. The risk averse managers may choose projects that are safe but have a lower expected return than riskier projects. Managers can change the firm's risk not only by selecting its mix of projects but also by changing its debt-equity ratio. The lower is the ratio of debt to equity the lower is the chance of bankruptcy of the firm. Shareholders would prefer riskier projects and higher leverage as that enriches them at the expense of creditors (shareholders do not pay any of the gains from the riskiness to creditors; however creditors bear part of the risk of failure). Creditors recognize this and try to control it in advance through bond indentures and other instruments, and adjusting the rate of interest they demand. Debt holders assume that given the limits set by their contracts, shareholders prefer to take the maximum advantage. The shareholders would prefer that managers go to the limit set by contract in imposing risks on the firm's creditors. However, unless there is some form of ex post settling up with managers, which is difficult and costly to achieve, the leverage will be lower reducing shareholders' payoffs and subsequent levels of investment.

Adjustment costs also play an important role here. For shareholders the costs of capital structure adjustment are just the transaction costs of recapitalization. For the inefficient management the adjustment costs include not only the transaction costs but also the agency-type costs of reducing the resources under managers' control, therefore reducing managers' power. This makes the leverage adjustment costs higher for management than for shareholders implying that imperfect management will tend to under-adjust the capital structure. Corporate governance, which is supposed to reduce the agency-type adjustment costs and thus align the interests of shareholders and managers in this context, shall help firms to better adjust their capital structures.

Moreover, when a firm must obtain new capital, i.e. adjusting its capital structure either through issuing shares or attracting the debt, its managers will incur the monitoring of the capital markets (Rozeff, 1982; Easterbrook, 1984). The cost of monitoring of shareholders is one form of agency costs that is costly for shareholders especially in case of relatively dispersed ownership. The problem of collective action ensures that shareholders undertake too little of it. Managers may avoid this monitoring and the possibility the funds will be unavailable or available only at high explicit prices by financing projects from internal sources by, for example, not paying (or reducing) the dividends. Jensen (1986) argues that debt that firm issues in exchange for stock enables managers to bond their promise to pay out future cash flows in a way that cannot be accomplished otherwise (e.g. by simple dividend increases).

Both the monitoring problem and the risk-aversion problem are less serious if the firm is constantly in the market for new capital. When managers raise new funds at financial markets (either equity or debt), the firm's business is carefully reviewed by investors and/or creditors. Such managers are more likely to act in investors' interests than managers who are not subject to this kind of monitoring (Easterbrook, 1984). The principal value of keeping firms constantly in the market for capital is that the suppliers of finances are very good monitors of managers. For instance, new investors do not suffer from the collective choice problem of existing investors. They examine the managers' behavior before investing, and they will not buy new stock unless they are offered compensation (in the form of lower prices) for any agency costs of management (Jensen and Meckling, 1976). Thus, managers that are in the capital market have incentives to reduce the agency costs in order to attract financial resources at the highest possible price. Managers of firms with fixed capital structures may well have substantial discretion to be inert, consume perquisites, or otherwise act in their own interests rather than the investors' interests.

Important factor that determines the ability of firms to adjust their capital structures is access to finance, which is relatively constrained in transition economies of former Soviet Union. Liquidity constraints were significantly relaxed in Ukraine during 2000-2007 both in terms of availability and cost of finance. However, the access of companies to credit was still restricted due to relatively high interest rates. Nevertheless improved liquidity provided more opportunities for firms to adjust their capital structures. We hypothesize in this study and our results confirm that namely firms with better corporate governance were those who seized the opportunity and managed to faster adjust their capital structures.

Relaxation of liquidity constraints implies that also firms with poor corporate governance have better access to financing. Most likely, especially if money looks cheap, such companies would also borrow to finance their projects. However, according to our hypothesis such companies were slower in adjusting their capital structures, thus they did not manage to gain from the improved financing opportunities to the extent that better governed firms did. In this respect it would be interesting to investigate how companies with different corporate governance practices and financial structures survived during the financial crisis; however this is beyond the scope of the study.

On the other hand there were a number of companies that realized the need to attract financial resources from the international capital market, which offered lower interest rates. This in turn required significant improvement of company's practices of corporate governance as a prerequisite of investors' trust. In some instances firms might truly improve their corporate governance. In other cases firms may implement some corporate governance practices in order to send a signal to investors; however it might not mean that genuine improvement of corporate governance happened. In the last case that might cause the endogeneity problem in our estimation, however it is believed that its effect is negligible due to small number of such companies.

4. Methodology and Empirical Model

In this section we present a dynamic capital structure model mainly following Banerjee, Heshmati, and Wihlborg (2004). The model presumes that the observed at a particular time and target capital structures of a firm need not be the same. It assumes that a company dynamically adjusts its capital structure to a moving target, which is not observed. We aim to specify and estimate how the speed of adjustment is related to firm-specific characteristics. By doing this we allow firms to control their speed of adjustment.

Let the (unobserved) target level of leverage of a firm L_{it}^* be a function of several observable determinants:

$$L_{it}^* = f(Y_{it}) \quad (1)$$

where L_{it}^* is the optimal leverage of a firm i in year t , Y_{it} is a vector of observed time-varying determinants of capital structure. Thus the optimal leverage may change over time for each firm. In a perfect world, the actual leverage would equal the target, $L_{it} = L_{it}^*$. In reality, firms do not fully adjust their leverage to the target at least due to the presence of adjustment costs. They do adjust it partially:

$$L_{it} - L_{it-1} = \delta_{it} (L_{it}^* - L_{it-1}) \quad (2)$$

where δ_{it} is the parameter for the speed of adjustment that represents the magnitude of desired adjustment for one period. The presence of adjustment costs is represented by the restriction $|\delta_{it}| < 1$, which implies that at $t \rightarrow \infty$ we have $L_{it} \rightarrow L_{it}^*$. If $\delta_{it} = 1$, the entire adjustment is achieved within one period, and thus the actual leverage equals the optimum at the end of the period.

To endogenize the speed of adjustment, δ_{it} is specified as a function of factors Z_{it} that theoretically determine it:

$$\delta_{it} = g(Z_{it}), \quad (3)$$

Rewriting (2) using (1) and (2) yields the following equation:

$$L_{it} = (1 - \delta_{it})L_{it-1} + \delta_{it}L_{it}^* + u_{it} = (1 - g(Z_{it}))L_{it-1} + (g(Z_{it}))(f(Y_{it})) + u_{it}, \quad (4)$$

Assuming linear relationship we have:

$$L_{it} = (1 - \beta Z_{it})L_{it-1} + (\beta Z_{it})(\alpha Y_{it}) + u_{it},$$

And final equation is:

$$L_{it} = L_{it-1} - \beta Z_{it}L_{it-1} + \alpha \beta Z_{it}Y_{it} + u_{it}, \quad (5)$$

where u_{it} is idiosyncratic error term.

Z_{it} preliminary includes corporate governance variables and dummies for increases/decreases in the leverage levels (to account for asymmetry of responses). Y_{it} includes tangibility, firm's size, profitability, foreign ownership, growth, and year and industry dummies.

To deal with potential asymmetry in leverage responses we propose to use dummy variables for increases/decreases in the leverage. It is quite reasonable to expect that capital structure adjustment is not symmetric, i.e. marginal change (in absolute terms) in leverage or its adjustment speed due to increase in Z or Y is the same as that of an equal size decrease. For example, the rate of increase in the leverage in response to the 1%-decrease in the interest rates may not be the same as the rate of decrease in the leverage in response to the 1%-increase in the interest rates from the same their level. There are at least several reasons of asymmetry of leverage responses to the changes in interest rates. One is that might be easier and faster to reduce rather than to increase the level of debt, for example if company has sufficient free cash flow to repay the part of its debt. Increasing the level of debt may become even more difficult at the high levels of interest rates. Similar asymmetry in leverage responses might be expected relating to the corporate governance changes. For example, the introduction of independent directors at the board may help to set some rules (recommendations about the minimum and/or optimal levels of leverage, requirements regarding terms of adjustment) that would make managers to better adjust the leverage level. But the already adopted (and proved to be effective) rules would not necessarily be disregarded if once the company decides to abolish the independent directors practice.

For empirical estimation dynamic panel data estimators are employed to estimate (5) and estimation strategy is discussed in the following sections. Some authors (e.g. Loof, 2002) apply non-linear least square estimator to estimate the parameters in (5), however, as noted by Drobetz and Wanzenried (2006) such estimators are generally biased and inconsistent due to the potential correlation between error term and the lagged leverage. To deal with that Drobetz and Wanzenried (2006) apply the dynamic panel data estimator suggested by Arellano and Bond (1991). In particular, they estimate (5) in first differences using GMM, where the lagged (twice or more) levels of all right-hand side variables are supposed to be valid instruments.

5. Data, Definitions and Expected Results

5.1. Data

Our data comes from SMA database (www.sma.ua) of annual financial statements of Ukrainian open joint-stock companies. The databases provide annual financial statements for the universe of open joint-stock companies in Ukraine for years 2000-2007. Data cover enterprises of all sizes, all industries, and all regions of Ukraine. The summary of definitions, and the descriptive statistics for the variables used in the analysis are presented in Tables 2-5.

Firm-years are retained in the sample only when they contain complete information (nonmissing values for leverage, tangibility, assets, growth, profit, foreign ownership, and corporate governance measures). Observations on variables showing highly volatile fluctuations from one year to the next are removed. They are excluded if they meet any of the following criteria: continuing firm increase (decrease) by a factor greater than five, continuing firm decline (rise) by a factor greater than five⁴.

⁴ Outliers defined on the basis of output, capital, labor and materials are excluded from productivity regressions. Excluded observations constitute about 2.7% of the sample.

The total number of firms in the leverage regression sample is 5,792. On average, each firm is observed for about 2.4 years, and the total number of firm-year observations is 13,496. Summary statistics for the basic variables used for regressions are provided in Tables 2-5.

The source of the data on corporate governance for all years is annual reports. Corporate governance data for 2003-2007 are obtained from the annual survey (as a part of annual report) conducted by the Commission. The survey is mandatory and all firms are obliged to fill it. Table 2a contains the description and means of individual corporate governance elements in 2000-2002 and Zheka (2007) provides explanations on construction and potential problems associated with these elements. Table 2b contains a description and means of the individual elements of corporate governance that are used for construction of corporate governance indices for 2003-2007. The measures of corporate governance are discussed in more detail in separate section 4.3.

To investigate the impact of firm ownership and origin on leverage, a dummy for foreign owned firm is used, which is constructed as follows. First, state and private firms are distinguished. State firms are those that have a private share less than 50%. Among private firms, foreign-owned companies (FO) are defined as those with foreign share larger than domestic private share, and domestic-owned companies as the remaining private companies. Ownership is measured as of the reporting date, the beginning of the calendar year. There are about 8% of foreign owned companies in our regression sample. The definitions and descriptive statistics of other variables are discussed in the next section and Tables 3-5.

5.2. Definitions and Descriptive Statistics

Definition of leverage: Despite the existence of many competing theories of capital structure, there is no clear definition of leverage in the academic literature. The specific choice depends on the objective of the analysis. Following Rajan and Zingales (1995) and Drobetz and Wanzenried (2006) the broadest definition of leverage is the ratio of total liabilities to total assets. It can be viewed as a proxy of what is left to shareholders in case of liquidation. The problems with this measure are that (i) it does not provide a good indication of whether the firm is at risk of default in the near future and (ii) since total liabilities also include items like accounts payable (which are used for transaction purposes rather than for financing) it is likely to overstate the degree of leverage and (iii) this measure of leverage is potentially affected by provisions and reserves, such as pension liabilities.

An alternative, and perhaps more appropriate, definition of leverage is the ratio of interest bearing debt to capital, where capital is defined as total debt plus equity. Thus it looks at the employed capital and, perhaps, better represents the effects of past financing decisions. This measure is mostly directly related to the agency problems associated with debt, as suggested by Jensen and Meckling (1976) and Myers (1977). Thus, the second definition of leverage is used in this paper.

Table 4a presents the average levels of leverage by years for all available observations. The average level across firms and years is .06 and, interestingly it increases each year from .03 in 2000 to .13 in 2007. The detailed distribution of leverage across firms is presented in Tables 5a-5c. Interestingly, more than 50% of firms are not levered at all (Table 5b). Table 5a presents the distribution of the leverage means for all firms calculated for the entire period 2000-2007. The distribution demonstrates that about 50% of firms in our regression sample never have the debt in that period implying that the majority of zero-leverage observations in our dataset represent the firms that have zero leverage constantly rather than in separate years. To further explore this issue the characteristics of sub-sample with zero leverage and sub-sample with positive leverage are compared in Table 5d. The table shows that the two sub-samples are considerably different in terms of growth prospects, tangibility, output (net sales), capital, assets, profit, R&D expenditures, foreign ownership and average industry leverage. Thus, most likely the zero-leverage sub-sample represents a completely different universe and could be removed from analysis.

Harris and Raviv (1991) summarize that “leverage increases with fixed assets, non-debt tax shields, investment opportunities, and firm size and decreases with volatility, advertising expenditure, the probability of bankruptcy, profitability, and uniqueness of the product.” Four of these variables, tangibility of assets (the ratio of fixed to total assets), firm size, growth opportunities; and profitability (measured as the return on assets) are used in this study. In addition, foreign ownership and average industry level of leverage, which are also shown in the literature to be important determinants of leverage adjustment, are included as control variables. Brief explanations for the variables are provided below.

Tangibility: Empirical evidence by Titman and Wessels (1988), Rajan and Zingales (1995) and Fama and French (2002) suggest that the tangibility is an important factor for leverage. However, it may impact leverage in both directions. On the one hand, larger stock of tangible assets provides the creditors with better guarantee of repayment, thus helping solve the classical conflict between creditors and shareholders (Galai and Masulis, 1976, and Jensen and Meckling, 1976). The trade-off theory then predicts a positive relationship between leverage and the tangible assets. On the other hand, in the presence of debt, less of free cash flow is left (after repaying the debt and interests) for managers to consume excessive perquisites. Additionally, debt holders more closely monitor such firms (e.g., Grossman and Hart, 1982). In fact, firms with lower level of tangible assets may voluntarily choose higher debt level to limit the consumption of non-pecuniary benefits. This in turn implies a negative relationship between the tangibility and leverage.

Firm size: The effect of firm size on leverage is also ambiguous. Warner (1977) and Ang, Chua, and McConnel (1982) document that bankruptcy costs are relatively higher for smaller firms. Similarly, Titman and Wessels (1988) argue that larger firms are usually more diversified and generally tend to go bankrupt less often. Thus, the trade-off theory predicts an inverse relationship between size and the probability of bankruptcy, and, in turn, a positive relationship between size and leverage. If diversification is accompanied with stable cash flow then the firm size has also a positive impact on the supply of debt (Jensen, 1986 and Easterbrook, 1984).

On the other hand, a firm size can be considered as a proxy for information asymmetry between firm insiders and the capital markets. Larger firms are more carefully analyzed by a larger number of analysts and thus shall be more capable of issuing equity (valuation of which is sensitive to the information about a firm). This reduces debt level for larger firms. Thus, the pecking order theory of the capital structure predicts a negative relationship between leverage and size, with larger firms tending to prefer equity financing more often than debt.

We expect a positive relationship between firm’s size and the speed of adjustment mainly because fixed costs of the adjustment (especially if they are proportionally high) are relatively smaller for larger firms as well as larger firms have better access to outside capital.

Growth opportunities: It is generally acknowledged that the costs of issuing debt and the associated shareholder-bondholder conflict are higher for firms with substantial growth opportunities. Therefore, the trade-off model predicts that firms with better growth prospects carry less leverage in order to signal that they do not engage in underinvestment and asset substitution. Jensen (1986) also predicts this arguing that firms with better investment opportunities need less of the disciplining by debt. Previous empirical results are not unambiguous. Titman and Wessels (1988) find a negative relationship, while Rajan and Zingales (1995) report a positive association between leverage and growth. In fact, the simple version of the pecking order theory supports the latter result. Debt typically grows when investments exceed retained earnings and falls when investments are less than retained earnings. Thus, better investment prospects predict higher book leverage given profitability. However, in a more complex model, firms are concerned with both future and current costs of capital. Firms with larger expected growth opportunities may maintain low-risk debt capacity to avoid new equity issues in the future. Thus, the more complex version of the pecking order theory predicts that firms with larger expected investments have lower current leverage (Drobtetz and Wanzenried, 2006).

A relationship between growth prospects and the speed of adjustment is expected to be positive because it is generally easier to attract financing (for capital structure adjustment) if firm has better investment opportunities.

Profitability (ROA): According to the trade-off theory, agency costs, taxes, and bankruptcy costs push better performing firms towards higher book leverage. First, the expected bankruptcy costs are lower when profitability increases. Second, the possibility to deduct corporate interest payments from taxes induces more profitable firms to finance with debt. Finally, in the agency models (Jensen and Meckling, 1976, Easterbrook, 1984, and Jensen, 1986), higher leverage helps alleviate agency problems suggesting a positive relationship between leverage and profitability. On the other hand, by Ross (1977), managers may use higher levels of debt to signal about firm's high profitability. According to the pecking order theory higher earnings should result in lower leverage. Previous empirical evidence is mixed. Rajan and Zingales (1995) report a negative relationship between leverage and profitability (supporting the pecking order theory), while Jensen, Solberg, and Zorn (1992) find a positive one (supporting the tradeoff theory).

5.3. Notion of Corporate Governance and Construction of Corporate Governance Variables

Using corporate governance variables permits to directly investigate the agency effects on capital structure and which corporate governance practices help firms better adjust their capital structures. It is hypothesized that better corporate governance shall be associated with higher speed of adjustment. And, on the contrary, lower levels of corporate governance (and thus worse agency problems) are expected to be associated with lower speed of leverage adjustment, generally due to the misalignment of interests of firm stakeholders. The worse corporate governance the more managers may prefer timing the adjustment of capital structure, to make more free cash flow available to them. Berger et al. (1997) find that entrenched CEOs seek to avoid debt—leverage levels are lower when CEOs do not face pressure from either ownership and compensation incentives or active monitoring. On the other side, based on agency theories corporate governance practices and debt can in some extent be treated as substitutes for resolving agency conflicts. Firms with good corporate governance practices need less debt to resolve the shareholders-managers conflict, thus corporate governance is expected to be negatively related to the optimal leverage.

5.3.1. Literature on the Construction of Corporate Governance Variables

The empirical literature that uses some measures of corporate governance for investigation of the relationship between governance and other economic phenomena can be divided into two strands. A large literature focuses on *particular aspects of governance*, such as board composition, shareholder activism, executive compensation, takeover defenses, disclosure/transparency, etc. The most closely related paper is Frank and Goyal (2007) who studies the effect of top managers on corporate financing decisions. The authors find that differences among CEOs are significantly associated with variation in leverage among firms and firms that offer higher pay-for-performance to the top executives adjust leverage to target more rapidly.

Another literature, much more limited, attempts to investigate some measures of the *overall corporate governance*, e.g. Gompers, Ishii and Metrick (2003), Klapper and Love (2004), Durnev and Kim (2005), Black, Jang and Kim (2006), Bhagat and Bolton (2007). However, as far as I know only one paper, by Bhagat and Bolton (2007), indirectly investigates the leverage implications of corporate governance practices. Bhagat and Bolton (2007) estimate the system of simultaneous equations to investigate the impact of corporate governance on performance. Their equations also include both the leverage and corporate governance equations; however they do not present the regression results for leverage.

Gompers et al. (2003) construct their corporate governance index by assigning equal weights to 24 corporate governance provisions collected by the Investor Responsibility Research Center (IRRC). Bebchuk, Cohen and Ferrell (2004) use the same data but try to recognize that some of the provisions may matter more than others, and create an “entrenchment index” comprising of four provisions that restrict shareholder rights and two that make hostile takeovers more difficult.

Interestingly, they find that the other 18 provisions are not significantly associated with firm value or stock returns, and they conclude that it might be more appropriate to use small number of most relevant corporate governance indicators.

Other examples of studies that construct their own indices of corporate governance are Brown and Caylor (2004), and Black, Jang and Kim (2006). Brown and Caylor (2004) use 52 indicators of corporate governance related to board structure and processes, management and director compensation etc. taken from Institutional Shareholder Services (ISS) database. Black, Jang and Kim (2006) construct Korean Corporate Governance Index (KCGI) using 39 elements from a survey of corporate governance practices conducted by the Korea Stock Exchange (KSE). Black et al. (2006) assign equal weight to each individual element and group them in five sub-indices such as board procedure, board structure, shareholder rights, disclosure and ownership, and, then they group the five sub-indices into one overall corporate governance sub-index. Other studies, such as Klapper and Love (2004) and Durnev and Kim (2005) use corporate governance ratings provided by the rating agencies like S&P and CLSA⁵.

5.3.2. Corporate Governance Measures: 2003-2007

Under the *quality of corporate governance* at a firm we understand the *extent* to which a firm adopts and conforms to guidelines of good practices of corporate governance *overall* (S&P, 2002⁶). There is no corporate governance index (estimated by some rating agencies) available for the companies in our dataset. However, some indicators of corporate governance are available from annual reports of firms and, moreover, starting from 2003⁷ each open joint-stock company in Ukraine should fill and submit a comprehensive survey on corporate governance along with annual financial statements to the Commission on Securities and Stock Market (the Commission). The summary of the issues covered by the survey is provided in Appendix 1. This provides us with a unique set of variables on corporate governance of firms in Ukraine. Above hundred variables are extracted from the survey questions. Following Black et al. (2006), questions that are subjective (e.g. they ask the opinion of managers or future plans), lack clear relevance to corporate governance, are ambiguous as to which answer indicates better performance, or had minimal variation between firms are excluded. This results in 89 usable corporate governance indicators. I follow Black et al. (2006) to classify these individual indicators into four sub-indices: shareholder rights, board structure, board procedure and transparency.

The definitions and descriptive statistics for the available indicators of corporate governance for 2003-2007 are reported in the Table 2b. In total, there are 9 variables (bs1 through bs9) describing the supervisory board structure at the firm. There are 26 variables (bp1-bp29) describing

⁵ While such measures usually include more comprehensive list of governance indicators, as noted by Black et al. (2006) they also have serious potential problems. The CLSA measure is significantly impacted by analysts' subjective views, which could be biased by analysts' knowledge of stock returns. The S&P's measure used in other studies is limited to disclosure, which causes an omitted variable bias problem since disclosure closely correlates with other, omitted, elements of corporate governance (for evidence of this problem, see Black et al, 2004). Another problem is that the researcher is restricted to a particular sample of public companies for which the index was produced; usually the largest companies in the world. A rating agency spends vast resources in terms of time, labor and financial resources for creation of the index only for one company (e.g. construction of index by S&P's might take about a half of year for one company) and not all companies can afford to pay for this. Therefore the studies that use such measures cannot take into account the information on other public companies. The advantage of the former approach is that the researcher can choose the sample, carefully select the governance indicators and construct good objective measures of corporate governance; however usually in such cases a fewer number of indicators is available due to constraint in available resources.

⁶ There is no one model of corporate governance that works in all countries and all companies. Indeed, there exist many different codes of "best practices" that take into account specific legislation, board structures and business practices in individual countries. Nevertheless, there are standards that can apply across a broad range of legal, political and economic environments. With this in mind, the Business Sector Advisory Group on Corporate Governance to the OECD has articulated a set of core principles of corporate governance practices that are relevant across a range of jurisdictions (OECD, 1999). These are Fairness, Transparency, Accountability and Responsibility.

⁷ The survey data are available for five years, 2003-2007. Therefore, these data are complemented with years 2000-2002 where the corporate governance measures constructed by Zhaka (2007) are used.

board procedures at the firm. There are 14 variables (sh1-sh14) describing shareholder rights at the firm. And, there are 40 variables (tr1-tr40) describing the level of transparency/information disclosure at the firm.

All individual corporate governance variables are grouped into respective four indices by summing over the non-missing observations for each firm and dividing it by corresponding number of non-missing values, so making them vary from 0 to 1. As a result, board structure index is on average .32, board procedure index – .40, shareholder rights index – .52 and transparency index – .37. Then, all indices are averaged to obtain the overall index of corporate governance, *cgi*, which, on average, comprises .45. Table 5 reports the detailed distribution of the *cgi*.

5.3.3. Corporate Governance Measures: 2000-2002

We complement the 2003-2007 data with corporate governance variables for 2000-2002 constructed in Zheka (2007). Zheka (2007) used similar approach and constructed his own measures of corporate governance from selected indicators using annual financial statements and some additional databases. The only difference of 2000-2002 data from 2003-2007 data is that the former has much smaller number of governance indicators. The 2000-2002 governance variables are summarized in Table 2a.

6. Estimation Approach and Results

We cannot use static framework for investigation of the capital structure due to presence of adjustment costs that do not allow us to use observed debt ratio as a proxy for the optimal or long-term leverage (especially in transition context). Most important, the well-established theories explain differences in the optimal (or long-term) rather than observed debt-equity ratio across firms. Titman and Wessels (1988) and Rajan and Zingales (1995) used a static framework, where the observed debt ratio is used as a proxy for the optimal leverage of a firm. However, as well-summarized by Heshmati (2001), the theory of capital structure does not propose to explain the *observed* differences in debt ratios, but rather the differences in the *optimal* debt-equity ratios across firms. Using observed debt ratios is particularly problematic if the adjustment to the optimal capital structure is costly. In the presence of adjustment costs, it might be cheaper for firms not to fully adjust to their targets even if they recognize that their existing leverage ratios are not optimal. The standard static capital structure models cannot capture the dynamic adjustments in leverage ratios. Recent survey evidence by Graham and Harvey (2001) and Drobetz, Pensa, Wöhle (2006) among US and German/ Swiss firms, respectively, documents that managers seek a target debt-equity ratio. The main objective in setting debt policy is not to minimize a firm's weighted average cost of capital, but rather to preserve financial flexibility in the context of a pecking order theory of the capital structure. But there is also evidence that due to random events or other changes, firms may temporarily deviate from their optimal capital structure, and then only gradually work back to the optimum. Moreover, we know that Ukrainian firms had initially very low leverage levels (e.g. in 2000) that were far from optimum and, consequently, we cannot use the observed debt ratio as proxy for the optimum. To account for these stylized facts, several authors used a dynamic model approach, where the observed and optimal leverage may differ due to the presence of adjustment costs.

The set of regressions in Table 6 indicate that the hypothesis that the coefficient on lagged leverage is zero (the assumption of static approach), or that a firm's observed leverage is also its desired leverage, is strongly rejected by the data for Ukraine, which is consistent with the evidence for other countries. When we add the lagged dependent variable to the specification it has a highly significant coefficient for all estimators. Thus, the simple static regressions appear to omit an important explanatory variable, implying that we cannot use it for inference.

This chapter presents the leverage adjustment regressions in Section 6.1 and adjustment speed regressions in Section 6.2. The dependent variable is leverage ratio in year t in all regressions. The results are reported for both the whole sample and only for firms that had positive leverage. I

present the results only with the square term for corporate governance that appeared to be highly significant in most regressions.

All explanatory variables are measured in year $t-1$. Other regressors include full set of industry-year dummies (their coefficients are not reported). Whenever possible standard errors are adjusted for intra-group correlation by correcting for firm clustering or robust standard errors (using Huber/White/sandwich estimate of variance) are estimated. This provides accurate assessments of the sample-to-sample variability of the parameter estimates even when the model is miss-specified (Wooldridge, 2002; Petersen, 2007; and Frank and Goyal, 2005).

The regressions use dynamic panel data estimator. In particular, lagged leverage is one of the right-hand side variables. The error term has two components, unobserved, time-invariant, firm-specific effect and the usual residual. Because the residual component of lagged leverage is correlated with the unobserved firm-specific effect in the error term, an OLS estimated coefficient on lagged leverage will be biased upwards (Anderson and Hsiao (1981), Baltagi (2001), Bond (2002).

Fixed effects estimator eliminates the unobserved firm-specific effects from regression and provides estimates that do not suffer from this problem. However, since we have a lagged dependent variable, fixed effects estimator introduces complicated correlation of the transformed lagged dependent variable with the transformed error term by construction (Wooldridge, 2002). As a result, the coefficient on the lagged leverage is biased downwards by a factor of (approximately) one over number of time periods. In panel datasets with large cross-sectional dimension and small time dimension, as is the case in our dataset, the bias can be substantial and must be carefully addressed to obtain consistent estimates. Therefore the true coefficients for lagged leverage should lie somewhere in between the OLS and FE estimates (Bond, 2002; Flannery and Ragan, 2006).

Baltagi (2001) provides a survey of the consistent estimators for dynamic panel data that generally involve first-differencing of the model to eliminate unobserved fixed effects and use lagged dependent variables to instrument for the lagged first-difference. Such estimators rely on two key assumptions to produce unbiased and consistent estimates. First, the error term should be serially uncorrelated, since first order serial correlation makes the lagged dependent variable correlated with the differenced regression residual. Second, the dependent variable should not have unit root properties. Otherwise, first-difference will be close to zero and the instruments will be weak.

Two consistent dynamic panel data estimators, Arellano and Bond's (1991) GMM estimator and Arellano-Bover (1995)/Blundell-Bond (1998) linear dynamic panel data estimator are used for estimation. The Arellano and Bond estimator can perform poorly if the autoregressive parameters are too large or the ratio of the variance of the panel-level effect to the variance of the error is too large. Arellano and Bover (1995) and Blundell and Bond (1998) developed a system estimator that uses additional moment conditions. Eventually, only the results of Arellano and Bond GMM estimator are reported because the Arellano-Bover (1995)/Blundell-Bond (1998) estimator produces very similar results.

The results are reported both for the whole sample and only for firms that do not have zero leverage. Table 6A shows that about half of the firms in the sample have always zero leverage during the estimation time period. Moreover, the firms with non-zero leverage are significantly different from the firms with zero leverage (Table 5D) in growth prospects (0.11 for non-zero-leverage group vs. 0.01 for zero-leverage group), average output (147 millions of UAH for non-zero-leverage group and 20 millions of UAH for zero-leverage group), average capital (48 millions of UAH for non-zero-leverage group and 7 millions of UAH for zero-leverage group), average profit (14 millions of UAH for non-zero-leverage group and 2 million of UAH for zero-leverage group), average R&D spending (1.6 millions of UAH for non-zero-leverage group and 0.1 million of UAH for zero-leverage group) and proportion of foreign-owned firms (.11 for non-zero-leverage group and .05 for zero-leverage group). Therefore, the behavior of the sub-sample of zero-leverage firms most likely is sufficiently different from that of non-zero-leverage firms and thus the former can be excluded from the estimation sample.

6.1. Leverage Adjustment Regressions

The dynamic estimation framework allows us to investigate both determinants of long-term leverage and determinants of speed of adjustment from observed to the long-term (or optimal) leverage. In particular, we seek to estimate the parameters ‘beta’ and ‘alpha’ from our eq. 5 that represent the effects of factors on the speed of adjustment and the long-term leverage respectively. This framework is consistent with the previous contemporary literature: Flannery and Rangan (2006), De Miguel and Pindado (2001), Frank and Goyal (2007), Roberts (2002), Drobetz, Pensa, and Wanzenried (2006), Heshmati (2002), Banerjee, Heshmati and Wihlborg (2004), Drobetz and Fix (2005), Drobetz and Wanzenried (2006).

This section explores a standard partial adjustment model, which is a simplified version of equation (5). It allows a firm’s observed leverage to be different from its desired leverage. The main simplifying assumption (and how it is different from (5)) is that all firms have the same adjustment speed. This is equation (4) from Flannery and Rangan (2006). For convenience, the estimated equation is as follows: $L_{it} = (1 - \delta)L_{it-1} + \delta\alpha Y_{it} + u_{it}$. The data can then indicate a typical adjustment speed. Each year, the typical firm closes a proportion δ of the gap between its actual L_{it-1} and its desired leverage αY_{it} . The equation further implies that the long run impact of Y_{it} on the capital ratio is given by its estimated coefficient divided by δ .

Flannery and Rangan (2006) found that adjustment speed constitutes about 34.4 % per year. They contend that their specification is preferred despite that, as they note the ‘conventional wisdom’ holds that a firm’s annual adjustment speed lies at about 8-15%. Roberts (2002) finds even higher adjustment speeds in his Kalman filter model of partial adjustment. His results imply annual adjustment speeds ranging from a low of 18% to a high of more than 100% depending on the industry. Both these papers accounted for the firm fixed effect in their specifications.

The set of regressions in Table 6 indicate that the hypothesis that the coefficient on lagged leverage is zero or that a firm’s observed leverage is also its desired leverage, is strongly rejected by the data for Ukraine, which is consistent with the evidence for other countries. When we add the lagged dependent variable to the specification it has a highly significant coefficient for all estimators. Thus, the simple static regressions appear to omit an important explanatory variable.

Simple OLS estimates of adjustment speed are presented in the first two columns of Table 6. Because the residual component of lagged leverage is correlated with the unobserved effect in the error term, an OLS estimated coefficient on lagged leverage will be biased upwards (Anderson and Hsiao, 1981; Baltagi, 2001; Bond, 2002). The OLS results imply that firms close at least 24.3% – 25.2% of the gap between current and desired leverage within one year. At this rate, it takes about four years to close the gap between current and desired leverage ratios of a typical firm. Even this moderate adjustment is consistent with the hypothesis that firms select target leverage ratio by trading off their costs and benefits of leverage. Corporate governance, average industry leverage, firm’s size and foreign ownership impacting the desired leverage level carry significant coefficients.

However, the OLS estimator fails to recognize the panel characteristics of the data. A panel estimator with unobserved (fixed) effects is more appropriate if firms have relatively stable, unobserved variables affecting their leverage targets. In the presence of a lagged dependent variable, the within transformation introduces correlation of the transformed lagged dependent variable with the transformed error term by construction (Wooldridge, 2002; Baltagi, 2001). As a result, the coefficient on the lagged dependent variable is biased downwards approximately by a factor of one over number of periods. Columns 3 and 4 report the results of FE⁸ estimator. An important difference between OLS and FE results is the much smaller coefficients on lagged leverage that implies a substantially faster adjustment speed (72.4%-78.4%) in the panel model. This adjustment speed implies that a typical firm closes a leverage gap in about 16 months.

⁸ Both FE and RE regressions were estimated. However, Hausman tests have shown that FE shall be used.

Interestingly, the results of Tobit panel estimator in column 5 imply smaller adjustment speed levels, which might reflect the presence of a larger number of zero-leverage observations in the regression sample that, in fact do not undertake any leverage adjustments at all.

Consistent estimation of the adjustment speed in a dynamic panel data requires careful attention to the serial correlation properties of the dependent variable and the residuals of the regression (Wooldridge, 2002). Columns 6 and 7, which report the results of Arellano and Bond's (1991) GMM estimator, address the correlation between a panel's lagged dependent variable and the error term that biases the estimated adjustment speed. Importantly, the estimated coefficients for the lagged dependent variable (0.533 and 0.367) lie between the OLS and FE estimates, as predicted by Bond (2002). The coefficients imply the adjustment speed at about 46.7-63.3% that means that the typical firm completes the required leverage adjustment in about two years, which is faster than estimated by many previous authors including Flannery and Rangan (2006). This difference in estimated effects might be explained by the transition context that implies that firms start from relatively low initial leverage levels and make large adjustments to the targets. It might also imply that firms in Ukraine that adjust their capital structures prefer adjusting it in as few as possible steps. This is consistent with the evidence that firms choose some target levels of leverage and try to adjust their actual leverage to those targets. Since adjustment is costly firms try to complete the adjustment to the target in as few adjustments as possible.

Corporate governance and average level of industry leverage appear to be marginally significant predictors of long-term levels of leverage for a sample of firms with positive levels of leverage. The relationship between corporate governance and long-term leverage seems to be inversely U-shaped with some optimum in the middle. This implies that firms with both higher and lower levels of corporate governance tend to have lower leverage targets. The investigation of the responses by industries did not produce interesting results. Within each industry the coefficients of the lagged dependent variable and other variables were insignificant. This might be due to the relatively small number of observations and lack of variation within each industry that result in the lack of identification.

Arellano-Bond test for zero autocorrelation in first-differenced errors of 2nd order cannot reject the null hypothesis of no autocorrelation for a sample of firms with positive levels of leverage. Thus, as the residual is not serially correlated, lags of dependent variable do not fail the exogeneity test. Moreover, the dependent variable series do not have high persistence. Along with the result that, as expected from theory, Arellano and Bond's (1999) estimator produces coefficients that lie in between the OLS and FE estimates this implies that Arellano and Bond's (1991) GMM procedure is likely to yield consistent results. Thus, the results imply the adjustment speed at about 46.7-63.3% and that the typical firm completes the required leverage adjustment in about two years.

6.2. Adjustment Speed Regressions

This section relaxes the assumption of the previous section that all firms have the same adjustment speed. The adjustment speed is modeled to depend on firm-specific factors as in the specification (5). This section reports results on the effects of (overall index of) corporate governance, square term for corporate governance, and dummies for positive and negative leverage changes on the speed of adjustment of leverage.

As discussed above the behavior of the sub-sample of zero-leverage firms is different from that of non-zero-leverage firms. Importantly, most of zero-leverage firms do not undertake any adjustments of their capital structures. In this respect we are more interested in firms that do adjust their leverage levels and our goal is to investigate how corporate governance influences this adjustment process. Based on the significant differences in characteristics of zero-leverage and non-zero-leverage sub-samples of firms it is decided to exclude former sub-sample of firms from the estimation sample.

Table 7 reports the results of adjustment speed regressions. Following the literature that uses corporate governance variables, the effects of the sub-indices, such as board procedure, board structure, transparency and shareholder rights on speed of leverage adjustment are also investigated.

The dependent variable is level of leverage. Regressions (1), (2), (3), (4) and (5) use respectively index of board structure, board procedures, shareholder rights, transparency and sum of (1) to (4) as corporate governance variable. The coefficients of corporate governance variables are significant and the coefficient for its square term is marginally significant in all specifications except the one with transparency index. Most likely there is a non-linear relationship between corporate governance and speed of leverage adjustment. The results for different corporate governance variables imply similar parabolic relationships that to some point the effect of corporate governance on the speed of leverage adjustment declines and then, after that point, it starts increasing; only the optimum points and spans are found to be different for different corporate governance variables. Arellano-Bond test for zero autocorrelation in first-differenced errors of 2nd order failed to reject the null hypothesis of no autocorrelation in all specifications.

With regard to long-term effects growth prospects variable is found to have significant and positive effect on target leverage in regression with shareholder rights variable. Similarly, the coefficient of tangibility variable is found to be significant in regression with board structure index. In both cases, the direction of effect is positive implying that better growth prospects and more tangibility imply larger target leverage. Other variables such as firm's size, profitability and foreign ownership are not found to have significant relationship to long-run target leverage level.

The same specification as in Table 7 was estimated for each industry separately. The results are not reported since the coefficients of corporate governance variables were not significant for all industries, probably due to lack of identification with a significantly reduced number of observations. Nevertheless, some interesting evidence can be drawn for determinants of long-term leverage. In particular, growth prospects are found to be important determinant of long-term leverage for agriculture and fishery, trade and restaurants, as well as financial and commercial services. Size of the company had significant coefficient for processing industry. Tangibility of assets is an important determinant for manufacturing and transportation industries. Foreign ownership is found to be important determinant of long-term leverage only for companies offering financial and commercial services.

Several other specifications were estimated but not reported. Some of the specifications included the controls for asymmetry of leverage responses: dummy variables for increases and decreases in leverage from the previous to the current period. The coefficients for the asymmetry of responses appeared to be positive and insignificant in all regressions implying that the speed of adjustment does not depend on whether it is upward or downward adjustment of leverage in our sample. Other coefficients including the coefficients of lagged dependent variable and corporate governance were found to be similar to our main regressions and Arellano-Bond test for zero autocorrelation in first-differenced errors of 2 order failed to reject the null hypothesis of no autocorrelation.

Regressions with dummy variables for time periods (year) among the determinants of long-term leverage produced significant coefficients for time variables almost in all cases with overall corporate governance index and corporate governance sub-indices. Negative significant coefficients are obtained for 2001-2005 period that along with negative coefficient for the interaction of corporate governance and lagged leverage implies that during this period companies were raising their target leverage levels. For the year 2006 and especially for 2007 there are positive and significant coefficients implying that companies reduced their long-term leverage targets. This is consistent with the presence of initially relatively low credit level of Ukrainian companies before 2000 and relaxation of liquidity constraints after 2000. Moreover, the 2006-2007 reduction in long-term leverage levels might imply that firms reached some local maximum in their target leverage level in 2005 and now they corrected it downward. It looks like that by reducing their target leverage levels firms in Ukraine correctly anticipated the following financial crisis and as a result again worsening of credit markets and overall liquidity.

7. Conclusions

The hypothesis that a firm's observed leverage is also its desired leverage is strongly rejected by the data for Ukraine, which is consistent with the evidence for other countries. The dynamic panel data estimators produce the estimate of the adjustment speed at about 46.7-63.3% annually. It means that typical firm in Ukraine completes the required leverage adjustment in about two years, which is faster than the speed estimated by many previous authors including Flannery and Rangan (2006) who documented the adjustment speed at the level of 34.4% annually for firms in Compustat database. The result is consistent with the fact that Ukrainian firms were highly constrained in terms of access to liquidity in the beginning of the period under investigation while Western firms were not. Thus, the result shows that significantly improved liquidity during 2000-2007 stimulated firms in Ukraine to quickly adjust their capital structures.

The paper documents evidence that firms that practice better corporate governance benefited from the improved liquidity the most as they were able to more quickly adjust their financial structures. It is found that there is statistically and economically significant relationship between corporate governance and the speed of adjustment of capital structure. The relationship most likely has a parabolic relationship implying that the effect of corporate governance declines to some point and then, after that point it increases. The coefficients for shareholder rights, supervisory board structure and supervisory board procedure are also found to be significant both economically and statistically, however with different turning points and spans. Transparency variable is not found to have significant coefficient. Other control variables for the speed of adjustment determinants, such as controls for asymmetry of responses do not have statistically significant coefficients, implying that speed at which firms adjust their leverage does not depend on whether they adjust it upward or downward.

With respect to long-term effects, growth prospects variable is found to have significant and positive effect on target leverage in regression with shareholder rights variable. Similarly, the coefficient of tangibility variable is found to be significant in regression with board structure index. In both cases, the direction of effect is positive implying that both better growth prospects and more tangibility imply larger target leverage. Other variables such as firm's size, profitability and foreign ownership are not found to have significant relationship to long-run target leverage level.

Table 1. Volumes of share and corporate bonds issues registered by Ukrainian State Commission on Securities and Stock Market (billions of UAH)

Year	Volumes of share issues	Volumes of issues of corporate bonds
1996	1.95	0.13
1997	9.97	1.16
1998	12.49	0.08
1999	7.92	1.32
2000	15.49	0.70
2001	21.92	6.94
2002	12.80	4.27
2003	18.02	4.24
2004	28.34	4.11
2005	24.81	12.75
2006	43.54	22.07
2007	50.00	44.48

Table 2a. Descriptive Statistics for Elements of Corporate Governance: 2000-2002

Variable	Mean
<i>Board Structure Index</i>	
= the percentage of outside directors at Supervisory Board	0.5100
<i>Board Procedure Index</i>	
=1 if the Chairman of Supervisory Board is not employed at the company he serves as chairman	0.5873
=1 if company's CEO does not also serve as the company's Chairman	0.9470
<i>Transparency Index</i>	
=1 if the annual report contains information on firm's auditor	0.9536
=1 if the auditor is the recognized international company	0.0002
=1 if the annual report contains information on firm's registrar	0.9337
=1 if the annual financial information was published properly (by Sept, 30)	0.7055
=1 if the company has a website as a way of communication with its stakeholders	0.0306
= 1 if there is no nominal shareholding in a firm	0.9566
<i>Shareholder Rights Index</i>	
=1 if the registrar is independent	0.9466
=1 if there were an annual general shareholder meeting	0.6416

Table 2b. Description and descriptive statistics of individual corporate governance indicators: 2003-2007

Label	Variable	mean
Board Structure Index		
bs1	There is a supervisory board at a firm	0,905
bs2	There are shareholders-workers representatives in the supervisory board	0,471
bs3	There are minor shareholders representatives in the supervisory board	0,454
bs4	There are legal person shareholders representatives in the supervisory board	0,272
bs5	There is strategic planning committee	0,033
bs6	There is audit committee	0,026
bs7	There is remuneration committee	0,021
bs8	There is investment committee	0,025
bs9	There is an auditing committee at the firm	0,919
Board Procedure Index		
bp1	Supervisory board meets at least 4 times annually during the last three years	0,503
bp2	Firm's internal documents require creation of committees within the supervisory board	0,027
bp3	performance remuneration for board members is used (e.g. remuneration is measured as a percentage of net profit or an increase in the market value of the shares)	0,030
bp4	Remuneration to s. board members is paid in the form of firm's shares Which of the requirements to s. board member are specified in the internal documents of the firm:	0,017
bp5	Relevant business sector knowledge and experience	0,323
bp6	Knowledge in the field of finance and management	0,242
bp7	Personal qualities (honesty, responsibility)	0,379
bp8	Independence (or absence of conflict of interest)	0,238
bp9	Auditing committee meets at least one time per year during the last three years According to the Statute of the firm:	0,746
bp10	strategic decisions are made either by general shareholder meeting or supervisory board and not by executive body	0,139
bp11	business plans are approved by supervisory board and not by executive body	0,191
bp13	CEO can be appointed/dismissed by general shareholder meeting and/or supervisory board and not by executive body	0,963
bp14	Members of executive body can be appointed/dismissed by general shareholder meeting and/or supervisory board and not by executive body	0,924
bp17	Auditing committee's head and members can be appointed/dismissed by general shareholder meeting and/or supervisory board and not by executive body	0,967
bp18	Decisions on remuneration of the CEO and members of executive body can be made by general shareholder meeting and/or supervisory board and not by executive body	0,791
bp21	Decision about repurchase, sale and floatation of own shares can be made by general shareholder meeting and/or supervisory board and not by executive body	0,842
bp22	External auditor can be appointed by general shareholder meeting and/or supervisory board and not by executive body	0,295
bp23	Approval of agreements where the representatives of the executive body have personal interest (conflict of interests) can be made by general shareholder meeting and/or supervisory board and not by executive body	0,784
bp24	The Statute contains restrictions on the maximum size of a deal that executive body can make/sign without approval of shareholders/board	0,685

bp25	The Statute contains regulations on conflict of interests	0,230
	Which of the following documents exist at the firm:	
bp26	Regulations about supervisory board	0,697
bp27	Regulations about executive board	0,666
bp28	Regulations about firm's officials	0,423
bp29	Regulations about auditing committee	0,688

Transparency Index

	How do the shareholders can obtain the following information about the firm:	
	-- the following information is distributed at the general shareholder meeting:	
tr1	financial statements, financial results	0,741
tr2	information about shareholders of 10% and more of statute capital	0,325
tr3	information about the composition/structure of bodies of management/governance at a firm	0,691
tr4	statute and internal documents	0,505
tr5	minutes of general shareholder meetings after the meetings	0,280
tr6	the size of remuneration of the members of executive body of a firm	0,258
	-- The following information is published in mass media	
tr7	financial statements, financial results	0,762
tr8	information about shareholders of 10% and more of statute capital	0,290
tr9	information about the composition/structure of bodies of management/governance at a firm	0,506
tr10	statute and internal documents	0,032
tr11	minutes of general shareholder meetings after the meetings	0,032
tr12	the size of remuneration of the members of executive body of a firm	0,017
	-- The following information can be provided for familiarization directly at the firm	
tr13	financial statements, financial results	0,655
tr14	information about shareholders of 10% and more of statute capital	0,348
tr15	information about the composition/structure of bodies of management/governance at a firm	0,632
tr16	statute and internal documents	0,727
tr17	minutes of general shareholder meetings after the meetings	0,722
tr18	the size of remuneration of the members of executive body of a firm	0,350
	-- The copies of the following documents can be provided at the request of shareholder:	
tr19	financial statements, financial results	0,570
tr20	information about shareholders of 10% and more of statute capital	0,249
tr21	information about the composition/structure of bodies of management/governance at a firm	0,436
tr22	statute and internal documents	0,446
tr23	minutes of general shareholder meetings after the meetings	0,528
tr24	the size of remuneration of the members of executive body of a firm	0,229
	-- The following information is put on the firm's web-page:	
tr25	financial statements, financial results	0,137
tr26	information about shareholders of 10% and more of statute capital	0,074
tr27	information about the composition/structure of bodies of management/governance at a firm	0,084
tr28	statute and internal documents	0,017
tr29	minutes of general shareholder meetings after the meetings	0,017
tr30	the size of remuneration of the members of executive body of a firm	0,007
tr31	The financial statements are prepared in accordance with the International Accounting Standards	0,591

tr32	The external audit was conducted at least once per year during the last three years	0,927
tr33	The external auditor was appointed by either general shareholder meeting or supervisory board and not by executive body	0,172
tr34	External auditor was has been changed during the last three years	0,291
tr35	The auditing committee did check the firm's activity last year	0,784
tr36	The supervisory board checked the firm's activity last year	0,206
tr37	Outside consultant checked the firm's activity last year	0,346
tr38	The firm purchased services of consultants of corporate governance or financial management	0,181
tr39	The firm has it is own corporate governance code	0,015
tr40	The firm published information about its corporate governance code	0,013

Shareholder Rights Index

sh1	The firm had at least one general shareholder meeting this year	0,698
sh2	The firm had at least one general shareholder meeting each year during the last three years	0,708
sh3	there was a control over the registration of shareholders for their participation in the last general shareholder meeting	0,593
sh4	control over the registration of shareholders for their participation in the last general shareholder meeting was performed by the independent registrar	0,229
sh5	Voting at the general shareholder meeting was by bulletins (secret voting).	0,205
sh6	There is department/position that is responsible for the relations with shareholders	0,233
sh7	annual report/balance/budget is approved by general shareholder meeting and not by executive body	0,908
sh8	Chairman can be appointed/dismissed by general shareholder meeting and not by executive body	0,970
sh9	sb members can be appointed/dismissed by general shareholder meeting and not by executive body	0,973
sh10	Decisions on board members remuneration can be made by general shareholder meeting and not by supervisory board and not by executive body	0,642
sh11	Decision about additional issue of shares can be made by general shareholder meeting and not by supervisory board and not by executive body	0,851
sh12	Regulations about general shareholder meeting	0,643
sh13	Regulations about firm's shares	0,368
sh14	Regulations about distribution of profit	0,478

Notes: Description and summary statistics for the 87 elements included in Ukrainian corporate governance index (UCGI). These data are available for 2003-2007. All variables are coded as yes=1, no=0.

Table 3. Means and Standard Deviations for the Regression Sample

variable	Explanation	mean	sd
Leverage	the ratio of interest bearing debt to capital, where capital is defined as total debt plus equity	.0734783	.1508737
Firm Size	ln(Total assets)	2.146268	.1927831
Growth opportunities	% change of total assets	.05759	.3496924
Tangibility	Intangible fixed assets/total fixed assets	.0397444	.1180247
Profitability	The ratio of pre-tax operating profit to output	6264.649	83317.48
Foreign firm	= 1 if the firm is majority private and the majority of private shares are owned by foreigners, in the beginning of year $t-1$, otherwise 0.	.0646071	.2458403
Positive change in leverage from $t-1$ to t	=1 if lever-1.lever>0, otherwise 0.	.3020547	.4591654
Negative change in leverage from $t-1$ to t	=1 if lever-1.lever<0, otherwise 0.	.2205904	.4146597
Board structure index	Sum of non-missing bs1-bs9 divided by corresponding number of non-missing values	0.4004	0.3261
Board procedure index	Sum of non-missing bp1-bp29 divided by corresponding number of non-missing values	0.5193	0.3048
Shareholder rights index	Sum of non-missing tr1-tr40 divided by corresponding number of non-missing values	0.5976	0.3089
Transparency index	Sum of non-missing sh1-sh14 divided by corresponding number of non-missing values	0.4321	0.1933
Overall corporate governance index (CGI)	Sum of board structure, board procedure, shareholder rights and transparency indices	0.5350	0.2147

Notes: These are the descriptive statistics for the dependent and independent variables used in this paper. The variables are measured in thousands of Ukrainian hryvnya as of the end of previous to reporting year.

Table 4a. Average Levels of Leverage by years (all available observations)

year	mean	N	min	max
2000	.02568	8184	0	.9869
2001	.03209	5644	0	.9849
2002	.04396	8856	0	.9988
2003	.05627	5375	0	.9997
2004	.06604	5276	0	.9998
2005	.08598	4476	0	.9998
2006	.1036	4744	0	.9944
2007	.1276	4005	0	.9987
Total	.06054	46560	0	.9998

Table 4b. Average Levels of Leverage by years (observations with leverage>0)

year	mean	N	min	max
2000	.09428	2229	6.01e-06	.9869
2001	.1015	1785	1.61e-06	.9849
2002	.1353	2878	7.88e-06	.9988
2003	.1344	2251	6.07e-07	.9997
2004	.1504	2317	1.30e-06	.9998
2005	.18	2138	.0000212	.9998
2006	.2052	2394	6.86e-07	.9944
2007	.2401	2129	8.26e-06	.9987
Total	.1555	18121	6.07e-07	.9998

Table 4c. Average Levels of Leverage by years (regression sample)

year	mean	N	min	max
2001	.03353	2625	0	.9849
2002	.04139	1246	0	.8383
2003	.06044	1301	0	.951
2004	.06583	2597	0	.9846
2005	.08218	1918	0	.9998
2006	.1061	2055	0	.9934
2007	.121	2239	0	.9987
Total	.07407	13981	0	.9998

Table 4d. Average Levels of Leverage by years (regression sample and firms always with zero leverage are excluded)

year	mean	N	min	max
2001	.06719	1310	0	.9849
2002	.07378	699	0	.8383
2003	.1021	770	0	.951
2004	.1096	1560	0	.9846
2005	.1295	1217	0	.9998
2006	.1633	1335	0	.9934
2007	.1791	1512	0	.9987
Total	.1232	8403	0	.9998

Table 5a. The distribution of leverage means calculated for the entire 2000-2007 period (regression sample)

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	5901
25%	0	0	Sum of Wgt.	5901
50%	.0027304		Mean	.0717514
		Largest	Std. Dev.	.1421287
75%	.0752506	.9827948		
90%	.2405141	.9849329	Variance	.0202006
95%	.3807961	.990601	Skewness	2.995353
99%	.7033982	.9933887	Kurtosis	13.49117

Notes: This distribution is calculated for the firms leverage levels of averaged for the entire 2000-2007 period.

Table 5b. The distribution of leverage levels of firms (regression sample)

	Percentiles	Smallest		
1%	0	0		
5%	0	0		
10%	0	0	Obs	13822
25%	0	0	Sum of Wgt.	13822
50%	0		Mean	.0734783
		Largest	Std. Dev.	.1508737
75%	.0700121	.990601		
90%	.2571796	.9933887	Variance	.0227629
95%	.4126548	.9986514	Skewness	2.862723
99%	.7289102	.9997731	Kurtosis	12.01416

Table 5c. The distribution of leverage levels of firms (regression sample, only positive values)

	Percentiles	Smallest		
1%	.0005371	6.27e-06		
5%	.0034761	8.26e-06		
10%	.0079863	.000012	Obs	6324
25%	.0251891	.0000127	Sum of Wgt.	6324
50%	.0857885		Mean	.1605973
		Largest	Std. Dev.	.1891096
75%	.2290887	.990601		
90%	.4314502	.9933887	Variance	.0357624
95%	.569297	.9986514	Skewness	1.767331
99%	.8383079	.9997731	Kurtosis	6.037522

Table 5d. The comparison of the subsamples (regression sample): zero-leverage subsample vs positive leverage subsample

variable	Mean for observations with zero leverage	Mean for observations with non-zero leverage	Total
Leverage	0	.1605973	.0734783
CGI	.5513503	.5310897	.5420439
Board structure index	.1065262	.1072298	.1068494
Board procedure index	.1453419	.1386923	.1422855
Shareholder rights index	.1719534	.1655617	.1690163
Transparency index	.1176518	.1099576	.1141168
Growth opportunities	.0123738	.11083	.0594285
Tangibility	.038417	.0296759	.0344216
Output	20319.19	147132.3	78340.18
Capital	7290.132	48853.68	26306.76
Ln(assets)	8.110263	9.527063	8.758494
Profit	1896.377	13930.54	7404.734
R&D spending	86.38831	1611.94	952.6426
Foreign owned firm	.0474473	.1067896	.0743187
Industry leverage	.0769214	.0953041	.085332
Dummy for positive change of leverage	0	.6601834	.3020547
Dummy for negative change of leverage	.1228328	.3364959	.2205904

Table 6. Leverage Adjustment Regressions

	(1) ols	(2) ols lever>0	(3) fe	(4) fe lever>0	(5) xttobit	(6) AB	(7) AB lever>0
Leverage	0.748*** (0.020)	0.757*** (0.020)	0.276*** (0.029)	0.216*** (0.030)	0.898*** (0.014)	0.533** (0.214)	0.367*** (0.107)
CGI	-0.092** (0.037)	-0.088** (0.039)	0.007 (0.034)	0.031 (0.069)	-0.095*** (0.032)	0.084 (0.090)	0.233* (0.124)
CGI squared	0.095*** (0.032)	0.090*** (0.033)	-0.020 (0.029)	-0.049 (0.057)	0.101*** (0.029)	-0.038 (0.061)	-0.147* (0.078)
Industry leverage	0.141** (0.064)	0.127** (0.060)	0.185*** (0.047)	0.275*** (0.103)	0.078 (0.048)	-0.078 (0.061)	-0.148* (0.089)
Tangibility	0.008 (0.015)	0.007 (0.016)	-0.031** (0.014)	-0.048 (0.030)	-0.021 (0.017)	-0.001 (0.026)	-0.014 (0.052)
Firm size	-0.005*** (0.001)	-0.005*** (0.001)	0.032*** (0.006)	0.029*** (0.011)	0.016*** (0.001)	-0.014 (0.016)	-0.027 (0.018)
Growth Opportunities	0.004 (0.008)	0.005 (0.008)	-0.005 (0.007)	0.006 (0.011)	-0.005 (0.005)	-0.001 (0.009)	0.011 (0.013)
Profitability	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	0.000 (0.002)	-0.008*** (0.001)	-0.000 (0.001)	0.002 (0.002)
Foreign firm	0.013** (0.006)	0.011* (0.006)	0.007 (0.009)	0.013 (0.014)	0.008 (0.007)	0.004 (0.012)	0.007 (0.016)
Constant	0.091*** (0.015)	0.088*** (0.015)	-0.246*** (0.055)	-0.164* (0.097)	-0.276*** (0.016)	0.147 (0.134)	0.368** (0.181)
Observations	6259	6124	13266	6126	13308	6178	3068
R-squared	0.57	0.57	0.12	0.12			
Number of okpo			5742	3011	5757	2991	1652
Arellano-Bond test for zero autocorrelation in first-differenced errors of 2 order						z=2.2071 p=0.0273	z=1.4067 p=0.1595

Notes: These are leverage adjustment regressions. The dependent variable is level of leverage. Regressions 2, 4 and 7 include only observations with positive leverage. Other regressors include full set of industry-year dummies. Industry classification is based on the one and two digit classification. Standard errors (corrected for firm clustering in OLS and FE regressions and robust in AB regressions) are shown in parentheses. Foreign firm = 1 if the firm is majority private and the majority of private shares are owned by foreigners, in the beginning of year $t-1$. All variables are measured in year $t-1$. In regressions 6 and 7, differences of variables are used. * = significant at 10% level; ** = significant at 5% level; *** = significant at 1% level.

Table 7. Adjustment Speed Regression

	(1)	(2)	(3)	(4)	(5)
	cgi=board structure	cgi=board procedure	cgi=rights of shareholders	cgi= transparency	cgi=overall cgi
Leverage	-0.688*** (0.250)	-0.841*** (0.313)	-0.897** (0.401)	-0.774** (0.344)	-1.042*** (0.380)
cgi*Leverage	1.654** (0.828)	1.956** (0.966)	1.988* (1.090)	2.153 (1.374)	2.746** (1.348)
cgi squared*Leverage	-1.166* (0.628)	-1.335* (0.724)	-1.348* (0.747)	-1.768 (1.340)	-2.055* (1.144)
cgi*Tangibility	0.107 (0.084)	-0.075 (0.110)	-0.083 (0.088)	-0.027 (0.125)	-0.302 (0.214)
cgi*Firm size	0.006 (0.007)	0.006 (0.008)	-0.000 (0.006)	-0.001 (0.007)	-0.000 (0.022)
cgi*Growth Opportunities	0.043 (0.061)	0.015 (0.065)	0.079*** (0.028)	0.067 (0.046)	0.127 (0.086)
cgi*Profitability	0.008 (0.005)	0.009 (0.006)	-0.000 (0.005)	0.003 (0.005)	0.008 (0.010)
cgi*Foreign ownership	-0.045 (0.043)	0.005 (0.045)	0.050 (0.035)	0.065 (0.047)	0.077 (0.069)
cgi squared*Tangibility	-0.196* (0.118)	0.034 (0.147)	0.049 (0.131)	-0.065 (0.122)	0.296 (0.245)
cgi squared* Firm size	-0.009 (0.009)	-0.012 (0.011)	0.001 (0.010)	-0.001 (0.008)	-0.005 (0.020)
cgi squared*Growth opportunities	-0.053 (0.077)	-0.017 (0.097)	-0.126** (0.054)	-0.060 (0.058)	-0.178 (0.120)
cgi squared*Profitability	-0.009 (0.007)	-0.012 (0.009)	0.001 (0.008)	-0.001 (0.007)	-0.009 (0.013)
cgi squared*Foreign ownership	0.043 (0.061)	-0.011 (0.066)	-0.069 (0.055)	-0.078 (0.054)	-0.098 (0.088)
Constant	0.205*** (0.016)	0.212*** (0.020)	0.191*** (0.022)	0.203*** (0.018)	0.222*** (0.063)
Observations	3068	3068	3068	3068	3068
Number of okpo	1652	1652	1652	1652	1652
Arellano-Bond test for zero autocorrelation in first-differenced errors of 2 order	z=-.0157 p=0.99	z=.4990 p=0.61	z=-.2106 p=0.83	z=4264 p=0.67	z=.57839 p=0.56

Notes: These are speed adjustment regressions. The dependent variable is level of leverage. Regressions (1), (2), (3), (4) and (5) use respectively index of board structure, board procedures, shareholder rights, transparency and sum of (1) to (4) as corporate governance variable. Standard errors (corrected for firm clustering in OLS and FE regressions and robust in AB regressions) are shown in parentheses. Foreign ownership = 1 if the firm is majority private and the majority of private shares are owned by foreigners, in the beginning of year $t-1$. All variables are measured in year $t-1$. * = significant at 10% level; ** = significant at 5% level; *** = significant at 1% level.

Appendix 1. List of survey questions on corporate governance in annual reports (2003-2007)

I. GENERAL SHAREHOLDER MEETING

1. How many were there general shareholder meetings in each of the last three years?
2. Which organization registered shareholders for participation in the last meeting?
3. Which organization controlled the registration of shareholders or their representatives?
4. What method was used for voting last meeting?
5. What was a reason for last special shareholder meeting?

II. Governance bodies

6. Does your firm have a supervisory board?
 7. How often do the members of the supervisory board meet?
 8. What is a structure of supervisory board?
 9. Is it required by firm's internal documents to create Committees within the supervisory board?
 10. Which Committees are created within the supervisory board?
 11. Is there a special position or department that is responsible for the work with shareholders?
 12. What types of remuneration are used for members of supervisory board?
 13. Which requirements to supervisory board members are documented in the internal papers of firm?
 14. How the new members of supervisory board become familiar with his rights and responsibilities?
 15. Is there an auditing commission at your firm?
 16. What is the size of auditing commission?
 17. How often the auditing commission meets?
 18. Who is responsible for keeping minutes of general shareholder meeting, supervisory board meeting and executive board meeting?
 19. According to the Statute who (shareholder meeting, supervisory board, executive board, nobody) decides the following questions:
 - determining the strategy
 - approval of business-plans
 - approval of annual financial statements/balance sheet/budget
 - appointment and dismissal of CEO
 - appointment and dismissal of executive directors
 - appointment and dismissal of the Chairman
 - appointment and dismissal of members of supervisory board
 - appointment of the head and members of auditing committee
 - the size of remuneration for executive directors
 - the size of remuneration for supervisory directors
 - additional issue of equity
 - choice of external auditor
 - approval of deals with conflict of interests
 20. Does the Statute contain restrictions on the maximum size of deal that executive board can make without approval?
 21. Does the Statute or other internal documents contain the regulations on conflict of interests?
 22. Which documents do exist at your firm: general shareholder meeting regulations, supervisory board regulations, executive board regulations, regulations on company officials, regulations on auditing commission, regulations of company shares, regulations on the distribution of profits, others...
 23. How shareholders can obtain information about your company: ...
 24. Does your firm prepare the financial statements according to IAS?
 25. How many times per year your firm was audited by external auditor during the last three years?
 26. Who appointed the external auditor?
 27. Why the auditor was changed?
 28. Who did check the activity of the company in the last year?
 29. Who initiated the check-up by the auditing commission last time?
 30. Did your firm receive the consulting services with respect to corporate governance?
- ### **III. Investments and improvement of corporate governance practices**
31. Does your firm plan to attract the investments within the next three years? If yes, then in which ways?
 32. Does your firm plan to attract foreign investments next three years?
 33. Does your firm plan to have its shares listed?
 34. Does your firm have corporate governance ranking?
 35. Does your firm have own Code of Corporate Governance?

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