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Financing Behavior of Romanian Listed Firms in Adjusting to the Target Capital Structure

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Abstract
This study investigates financing behavior in adjusting to the target capital structure of Romanian firms listed on the Bucharest Stock Exchange during the period 2004–2011. Using a dynamic panel data model and Arrelano's and Bond's Generalized Method of Moments (GMM), we estimate the size of the adjustment speed to the target capital structure of Romanian listed firms and investigate which of the determinants of the target capital structure explain the financing behavior of these firms. The results show that the size of the adjustment speed is quite high for Romanian firms, indicating that their deviation from the target capital structure is costly. In addition, we found that profitability and the firms' size and asset tangibility are the most important determinants of the target capital structure and that the ownership structure has no significant effect on the target capital structure of Romanian firms. The theoretical and practical implications of these findings are discussed.

1. Introduction

The question of how firms adjust their capital structure to the target capital structure has been the focus of finance research in recent decades. Starting with Modigliani's and Miller's (1958) proposition of irrelevance of the capital structure, a considerable number of studies have tried to demonstrate that a firm can increase its market value and growth rate by changing the optimal ratio between equity and debt capital. Some studies (e.g., Kraus and Litzenberger, 1973; Frank and Goyal, 2005) showed that the optimal debt ratio of firms reflects a trade-off between the tax benefits of debt and bankruptcy costs, supporting the assumptions of the trade-off theory. Frank and Goyal (2005) proposed two versions of the trade-off theory, specifically the static and the dynamic trade-off theories. The static trade-off theory states that firms' optimal capital structure is determined by balancing the benefits of using debt against the costs of financial distress. The dynamic trade-off theory states that when a firm has an optimal capital structure and deviates from it, then the firm exhibits adjustment behavior toward the target capital structure and try to reach that target (Frank and Goyal, 2005).

Other studies (Jensen and Meckling, 1976; Jensen, 1976) indicated that the optimal capital structure can be obtained by balancing the agency costs of debt against the benefits of debt. The agency costs are generated by the conflicts of interest between stakeholders (i.e., managers, shareholders and stockholders), which are presumed by the agency theory of capital structure. Myers and Majluf (1984) contradicted the existence of an optimal capital structure by proving that firms' shares are undervalued by the market due to information asymmetry. As a consequence, managers avoid issuing undervalued securities by financing projects with retained earnings and with low-risk debt. This financing behavior is in accordance with

the pecking order theory, which states that firms finance investments first with retained earnings, then with safe debt, then with risky debt and finally with equity. More recently, Baker and Wurgler (2002) also rejected the existence of adjustment behavior toward the target capital structure and introduced the market timing theory, according to which managers are able to time the equity market and issue equity when its value is high. This ability of managers affects the given company's security issuance decision and eventually the capital structure of that company.

To sum up, while the trade-off and agency theories imply the existence of a target debt ratio and the adjustment behavior of firms with respect to this target, the other capital structure theories (i.e., pecking-order, market timing) reject the existence of adjustment behavior of firms, assuming instead the influence of some external and internal factors on the financing decisions of firms. Among the external factors that explain the differences arising between firms' capital structure in different countries, the most important ones are macroeconomic conditions such as economic growth, inflation and the average interest rate (de Angelo and Masulis, 1980; Hatzinikolaou, Katsimbris and Noulas, 2002; Zwick, 1997). The internal firm-specific factors are represented by profitability, asset tangibility, firms' size and their growth opportunities, and financial distress costs (Chen, 2004; Delcoure, 2007; Rajan and Zingales, 1995). Both types of factors were included in econometric models that have been empirically validated on the different capital markets. The first econometric dynamic models used to investigate firms' optimal capital structure have highlighted some limitations regarding the estimation methods for determining the dynamics of firms' capital structure and the size of transaction costs (Brennan and Schwartz, 1984; Fischer, Heinkel and Zechner, 1989; Kane, Marcus and McDonald, 1984). Recent developments in the econometric methodologies as a result of the use of dynamic panel data models enable the identification of both the costs of adjusting to the target debt ratio and the factors influencing the target debt ratio (de Miguel and Pindado, 2004; Drobetz and Wanzenried, 2006).

The empirical results obtained using these dynamic panel data models vary considerably as a function of the types of firms included in the sample, the period of time analyzed and the economic conditions of each country (de Haas and Peeters, 2006). In the current study, we focus on the effects of internal and external factors on the capital structure of Romanian listed firms using an econometric model similar to those proposed in other studies, i.e., a dynamic panel data model (e.g., de Miguel and Pindado, 2001; Antoniou, Guney and Paudyal, 2008). To the best of our knowledge, there is no study that captures the dynamics of financing behavior for Romanian firms. Most of the previous studies (de Haas and Peeters, 2006; Nivorozhkin, 2005) that have investigated the optimal capital structure of firms the Central and Eastern European (CEE) countries included Romania in the sample of CEE countries, but without focusing on the particularities of the Romanian capital market. Therefore, the aim of the current study is to investigate the adjustment behavior pertaining to the target capital structure and the determinants of this target for Romanian listed firms. More specifically, we first measured the financing behavior involving adjustment to the target capital structure for Romanian listed firms by computing the adjustment costs and the speed of adjustment to the target capital structure. Second, we investigated the role of the determinants of the target capital structure on the adjust-

ment behavior of these firms. Third, we examined the role of the conflicts of interests between stakeholders in the financing behavior of Romanian firms.

Unlike the previous studies (de Haas and Peeters, 2006; Nivorozhkin, 2005), in the current study the period of analysis has been extended, including the years 2004–2011. We also focused on the influence of the agency problems on the target capital structure of Romanian listed firms. Furthermore, from a methodological perspective, we employed a dynamic panel data estimation using the System Generalized Method of Moments (GMM) estimator, as suggested by Arellano and Bover (1995) and Blundell and Bond (1998), which is efficient for the estimation of highly persistent data.

The structure of this paper is as follows: Section 2 provides a descriptive analysis of the financing behavior of Romanian firms during the period 2004–2011. Section 3 presents the dynamic panel data model and the research methodology used for the estimation of this model. In Section 4 the results of the estimation are discussed. In Section 5 we address the conclusions of this study.

2. Financing Behavior of Romanian Listed Firms: A Descriptive Analysis

As the first step in describing the financing behavior of Romanian listed firms, we provide a summary of the development of the Romanian capital market.

2.1 Development of the Romanian Capital Market

Since 1989, with the transition to a market economy, a major objective of successive governments has been to promote reform programs in all sectors. A very important measure taken after 1989 was to develop the Romanian capital market. This development was kick-started through a mass privatization program which was implemented in the 1990s. By 2002, Romania had privatized many major state-owned enterprises with the assistance of the World Bank, the International Monetary Fund (IMF) and the European Union (EU). Today only a few companies have the state as a major shareholder. However, the privatization program was influenced by poor corporate governance principles and protection laws for minority shareholders. For example, some listed firms used the issuance of equity as a strategy to dilute the stakes of minority shareholders. The year 2005 was a crucial moment in the development of the Romanian capital market, when the Bucharest Stock Exchange merged with the former RASDAQ stock market with the purpose of creating a single, more capitalized and more liquid stock exchange market. Nowadays, there are 1062 companies listed on the Bucharest Stock Exchange, including former 959 RASDAQ companies. On the Romanian capital market, shares are divided according to certain criteria (e.g., dispersion of publicly distributed shares, the value of equity in the past year) into three tiers: Tier 1, Tier 2 and Tier 3. With one exception, the shares of the firms in Tier 3 are all listed on RASDAQ and they have low liquidity. That means that the share price does not always reflect the fair value of the firms' equity. In addition, a lot of data are missing for these companies, as they are often unlisted. To minimize these effects, we have excluded Tier 3 companies from our study.

2.2 Data Set

In order to study the financing behavior of Romanian listed firms, we have collected data from Bucharest Stock Exchange database for all firms in Tiers 1 and 2

Table 1 Debt Ratio of Romanian Firms for the Period 2004–2011

Debt ratio	2004	2005	2006	2007	2008	2009	2010	2011
Mean	0.35	0.40	0.42	0.40	0.35	0.39	0.41	0.45
Maximum	1.64	0.88	0.97	1.00	0.91	1.37	1.55	3.25
Minimum	-5.44	0.01	0.03	0.02	-2.66	0.01	0.013	0.01

listed on the Bucharest Stock Exchange and RASDAQ during the period 2004–2011. It should be noted that we did not include financial firms (i.e., banks, insurance companies) in our sample due to the fact that the balance sheets of those firms are different from those of non-financial companies. The final sample used in the current study consists of 77 firms, 69 of which are listed on the Bucharest Stock Exchange and eight on RASDAQ.

2.3 Descriptive Analysis of the Financing Behavior of Romanian Listed Firms

The financing behavior of firms is characterized generally by the *debt ratio* (*DR*). In some studies, the debt ratio is calculated as the ratio of total debt to total assets (e.g., Chen, 2004; Delcoure, 2007; Ozkan, 2001), whereas in other studies it is computed as the ratio of total debt to total debt plus equity in the market and book values (e.g., de Miguel and Pindado, 2001; Nivorozhkin, 2005; Rajan and Zingales, 1995). In the current study the book values were used instead of market values, and the debt ratio was computed as the ratio of total debt to total assets. The average value of the debt ratio was of 40% in our sample of Romanian firms during the period 2004–2011. This value is below the value recorded in some developed countries (e.g., 59% for Swiss firms; see Drobetz and Wanzenried, 2006), but greater than the value of the CEE countries (23%), including Romania, during the period 1997––2001 (see Nivorozhkin, 2005). As de Haas and Peeters (2006) stated, the gradual development of the financial systems in developing countries enable firms to reach a higher debt ratio. *Table 1* presents the descriptive statistics of the debt ratio for the period 2004–2011.

As shown in *Table 1*, a rising trend of the debt ratio of Romanian listed firms was registered during the period 2004–2011. Furthermore, the debt ratio of Romanian firms is much greater than that reported by Nivorozhkin (2005) for the period 1997––2001 (19%).

For studying, at the descriptive level, whether Romanian listed firms follow a target debt ratio or not, we calculated the average relative change of each firm's debt ratio during the period 2004–2011. As Hermanns (2006) pointed out, when the average relative change is low, than there is an indication that firms follow a target debt ratio. However, when the average relative change is large, then firms most probably do not have a target debt ratio. The results obtained in our study indicate that 80% of Romanian listed firms recorded an average relative change in the debt ratio lower than 30%.

This result suggest that the majority of Romanian listed firms (80%) have a low average relative change in the debt ratio during the period 2004–2011, which indicates that these firms have a target debt ratio. However, these descriptive results need to be completed with more empirical evidence given the fact that a high relative

change in debt ratio does not necessarily mean that the firms have a target debt ratio. For example, Hermanns (2006) stated that large average changes might also be associated with firms' losses, which impede them in maintaining a target debt ratio. For this reason, we analyzed the financing behavior of Romanian listed firms using a dynamic panel data model and taking into account the determinants of the target debt ratio.

3. Target Adjustment Model of Romanian Listed Firms

For analyzing the financing behavior of Romanian listed firms, a dynamic model was defined including the determinants of the capital structure proposed in the literature. Before specifying the dynamic model, we will describe the determinants included in the model and the expected relationships between them and the dependent variable (i.e., the debt ratio).

3.1 Variables of the Model

The dependent variable of the model is the debt ratio defined as the ratio of total debt and total assets (for more details about this variable, see Section 2). The explanatory variables included in the model were selected based on the previous empirical evidence regarding the financing behavior of firms in developing countries (Delcoure, 2007; de Haas and Peeters, 2006; Nivorozhkin, 2005). These variables are profitability, company size, asset tangibility and growth opportunities.

The first explanatory variable mentioned as an important determinant of the capital structure in both the trade-off theory and the pecking order theory is *profitability* (*Prof*). According to the trade-off theory, there is a positive relationship between profitability and the debt ratio, due to the fact that more profitable firms have a lower probability of bankruptcy while they can benefit from debt-related tax shields. Conversely, according to the pecking order theory, there should be a negative relationship between profitability and the debt ratio, because as sources of financing firms use their internal sources first and debt only as a last resort. Following the approach initiated by Drobetz and Wanzenried (2006), in the model estimated in our study the return on assets (ROA) was used as a proxy for profitability and a negative relationship between profitability and the debt ratio of Romanian listed firms is expected.

According to *the* financial literature (Diamond, 1991; Mazur, 2007; Rajan and Zingales, 1995) *company size (Size)* is one of the most important factors that influence the debt ratio. It has been shown that larger firms are more likely to finance themselves using debt, because they have a better reputation and a lower probability of becoming bankrupt, and can therefore take out debt more easily (Myers, 2003). In this paper we use the natural logarithm of net sales as a proxy for the company size variable and we expect a positive relationship between company size and the debt ratio.

Another variable mentioned in many studies is *asset tangibility (Tang)* computed as the ratio between tangible fixed assets and total assets (Cornelli, Portes and Shaffer, 1998; Nivorozhkin, 2002; Daskalakis and Psillaki, 2008). Tangible assets are assumed to serve as collateral in the case of financial distress, which indicates a positive relationship between tangibility and the debt ratio of firms (Rajan and Zingales, 1995; Titman and Wessels, 1988). In transition economies, such as in

Table 2 Summary Statistics of the Explanatory Variables

Variables	Mean	Std deviation	Min	Max
Prof	0.020	0.146	-2.119	0.821
Growth	0.294	2.108	-0.956	44.921
Tang	0.555	0.210	0.019	0.964
Size	18.266	1.46	14.624	23.531

Note: Prof = profitability, Growth = growth opportunities, Tang = assets tangibility, Size = company size

Romania, the importance of tangible assets as collateral is limited by factors such as underdeveloped and inefficient legal systems and thin and illiquid secondary markets for firms' assets. Therefore, for firms in those countries a negative relationship between asset tangibility and the debt ratio was found (Nivorozhkin, 2005). A similar negative correlation is also expected for Romanian listed firms.

Finally, another determinant that has been shown to have an effect on firms' capital structure is *growth opportunities (Growth)*. For example, Myers (1977) noted that firms with great growth opportunities have more options to finance their future investments compared to firms with lesser growth opportunities. This assumption is supported also by the pecking order theory, according to which firms with great growth opportunities use mostly internal resources and little debt for financing their activities (Myers and Majluf, 1984). In addition, according to the trade-off theory, firms with great growth opportunities tend to borrow less than firms that hold more tangible assets, because growth opportunities cannot serve as collateral for debt (Myers, 2003). The proxies used for growth opportunities were either the ratio of relative change in assets to total assets (Titman and Wessels, 1988), the ratio of the book value of total assets minus the book value of equity plus the market value of equity to the book value of total assets (Chen and Zhao, 2006; Rajan and Zingales, 1995), and the ratio of sales growth to total asset growth (Chen, 2004; Delcoure, 2007). In the current study, the proxy used for growth opportunities is the ratio of sales growth to total sales, and a positive correlation between growth opportunities and the debt ratio is expected.

Table 2 presents the descriptive statistics of the explanatory variables included in the dynamic model. These variables are profitability, company size, asset tangibility and growth opportunities.

3.2 Specification and Estimation of the Model

The studies regarding the financing behavior of firms in CEE countries show an adjustment financing behavior for Romanian firms (Nivorozhkin, 2005; de Haas and Peeters, 2006). In other words, the Romanian firms adjust their debt ratios towards the target debt ratio, and this process is a dynamic one involving certain adjustment costs. The size of adjustment costs indicates the speed with which firms reach the target debt ratio (de Miguel and Pindado, 2001).

In order to determine the adjustment costs and the adjustment speed of Romanian listed firms, we first proposed the target debt ratio as a function of profitability, company size, asset tangibility and growth opportunities. The final expression for the target debt ratio is:

$$DR_{it}^{*} = c + b_1 Prof_{it} + b_2 Size_{it} + b_3 Tang_{it} + b_4 Growth_{it} + \varepsilon_{it} \quad (1)$$

where DR_{it}^{*} is the target debt ratio, b_1, b_2, b_3, b_4 are the coefficients to be estimated and ε_{it} is the error term.

According to the model of de Miguel and Pindado (2001) and based on the empirical evidence that Romanian firms use adjustment costs, we define the adjustment model to the target debt ratio as follows:

$$DR_{it} - DR_{it-1} = \beta\left(DR_{it}^{*} - DR_{it-1}\right), \text{ where } 0 < \beta < 1 \quad (2)$$

where DR_{it} and DR_{it-1} represent the debt ratios in the current and previous period, while DR_{it}^{*} represents the target debt ratio. The coefficient β reflects the adjustment costs and there are three possible situations depending on the value of β: (i) $\beta = 1$, then the adjustment costs are 0 and firms' debt ratio is equal to the target debt ratio; (ii) $\beta = 0$, then $DR_{it} = DR_{it-1}$, which means that the current debt ratio remains at the level of the previous period because the adjustment costs are too high; (iii) β takes values between 0 and 1, then the firms adjust the debt level inversely proportionately to the level of adjustment costs.

Based on equation (2) the actual debt ratio can be determined:

$$DR_{it} = \beta DR_{it}^{*} + (1-\beta) DR_{it-1} \quad (3)$$

Substituting equation (1) in equation (3), and considering that we deal with a panel data model, the final form of the dynamic model can be computed as follows:

$$\begin{aligned} DR_{it} = {} & \beta c + (1-\beta) D_{it-1} + \beta b_1 Prof_{it} + \beta b_2 Size_{it} + \\ & + \beta b_3 Tang_{it} + \beta b_4 Growth_{it} + \mu_i + \eta_t + \varepsilon_{it} \end{aligned} \quad (4)$$

where μ_i is a firm-specific effect, η_t is a time-specific effect which includes the macro-economic conditions and ε_{it} is an error term.

Previous studies have shown that estimating dynamic panel data models may cause some problems. For example, Nickell (1981) indicated that the lagged dependent variable is correlated with the firm-fixed effects, which creates a bias in the estimation of the model's coefficients. The solution to this problem is to apply a first-difference transformation in order to eliminate both the constant term and the firm-fixed effects. However, the problem is not completely solved in this case because there is still a correlation between the lagged dependent variable and the differenced errors. As a result, the Ordinary Least Squares (OLS) estimation will lead to inconsistent estimators for the model's coefficients. Another problem is related to the fact that some explanatory variables, e.g. profitability and company size, might be endogenous with respect to the debt ratio (Drobetz and Wanzenried, 2006).

For solving these problems, an instrumental variables estimation method that assumes that all endogenous variables (e.g., profitability, company size) are instrumented should be used. The dynamic panel data estimator proposed by Arellano and Bond (1991), i.e. the System GMM estimator, was used in this paper. The original Arellano and Bond estimator sets up a generalized method of moments problem in

which the instrumental variables are obtained from the moment conditions that exist between the lagged values of the independent variables and the errors. This estimator is known as the difference GMM estimator, while the extension of it is known as the System GMM estimator. The latter assumes that when the time series are persistent, lagged levels of the independent variables are weak instruments for the first differenced independent variables (Blundell and Bond, 1998). Due to the fact that debt ratios are generally highly persistent variables, equation (4) is estimated using the System GMM estimator. The System GMM estimator uses the levels equation (i.e., equation (4)) to obtain a system of two equations—the levels equation (4) and the first difference of equation (4)—as follows:

$$\begin{aligned} D_{it} - D_{it-1} = (1-\beta)\left(D_{it-1} - D_{it-2}\right) + \beta b_1\left(Prof_{it} - Prof_{it-1}\right) + \\ + \beta b_2\left(Size_{it} - Size_{it-1}\right) + \beta b_3\left(Tang_{it} - Tang_{it-1}\right) + \\ + \beta b_4\left(Growth_{it} - Growth_{it-1}\right) + \varepsilon_{it} - \varepsilon_{it-1} \end{aligned} \quad (5)$$

The instruments for equation (4) are the lagged differences (i.e., $D_{it-2} - D_{it-3}$, ..., $D_{i1} - D_{io}$) and the instruments for equation (5) are the lagged levels (D_{it-2}, ..., D_{io}).

In order to test the endogeneity of the explanatory variables, we used the Durbin-Wu-Hausman Test (Hausman, 1978; Wu, 1973). The results of this test indicate that profitability and asset tangibility are endogenous variables, while company size and growth opportunities are exogenous variables.

The results of the dynamic model' estimation also indicate that the coefficient of the lagged debt ratio obtained by using the System GMM estimator lies between OLS and fixed effects (FE) estimators that are biased downwards and upwards, respectively. *Table 3* reports the estimation results obtained using the System GMM estimator.

For checking the robustness of the model, we first estimated equation (4) for two equal time periods (2004–2007 and 2008–2011), and we checked for stability of the adjustment speed over time. Second, we used as a proxy for the firms' capital structure Tobin's Q ratio calculated as the ratio of total debt plus market capitalization and assets. We then estimated equation (4) with the new dependent variable, Tobin's Q ratio. Finally, we included in the dynamic model a new variable, the market-to-book ratio, in order to see whether this variable affects our results referring to the target debt ratio and adjustment speed. The rationale for including this new variable in the model is based on the assumption of the market timing theory (Baker and Wurgler, 2002) according to which the *market-to-book ratio (M/B)* has a signifi-cant influence on firms' capital structure. More specifically, firms are more likely to issue equity when their market-to-book ratio is high and to repurchase equity when their market-to-book ratio is low. This financing behavior also implies that a high market-to-book ratio indicates a lower debt ratio for firms and, therefore, a negative correlation between the market-to-book ratio and the debt ratio for Romanian listed firms is expected.

4. Empirical Results

4.1 System GMM Estimated Model

The estimation results of equation (4) using the System GMM estimator are presented in *Table 3*.

Table 3 Estimation Results Using the System GMM Estimator

Variables	Coefficients		
DR_{it-1}	0.36*** (0.119)	No. of entities	77
Prof	-1.481*** (0.245)	No. of observations	521
Growth	-0.0002 (0.006)	Sargan test	0.522
Tang	-0.354* (0.187)	AR(2)	0.231
Size	0.039*** (0.013)	No. of instruments	43

Notes: The regression includes unreported year dummies.

Standard errors in brackets.

*** denotes significance at the 1% level.

The Sargan test indicates the validity of the instrumental variables. The null hypothesis is that "the instruments as a group are exogenous" and *p*-value is reported.

The Arellano-Bond test for autocorrelation (AR(2)) has the null hypothesis of no autocorrelation between residuals. *p*-value is reported.

DR_{it-1}= lagged value of the debt ratio, *Prof* = profitability, *Growth* = growth opportunities, *Tang* = assets tangibility, *Size* = company size.

As can be noted in *Table 3*, the coefficient for the lagged value of the debt ratio is equal to 0.36 and it is statistically significant, at the 5% significance level. The value of the coefficient indicates the level of adjustment costs used by Romanian firms to adjust their actual debt level to the target debt level. In comparison with other countries, the adjustment costs of Romanian firms are relatively small. For example, for British firms the estimated value of the adjustment costs was 0.45 (Ozkan, 2001), for Swiss firms the value was 0.613 (Gaud, Jani, Hoesli and Bender, 2005), for American firms the value was 0.655 (Flannery and Rangan, 2006), and for firms in CEE countries (e.g., Bulgaria, Hungary, Latvia and Romania) the values varied between 0.83 and 0.93 (de Haas and Peeters, 2006).

De Miguel and Pindado (2001) pointed out that a low level of adjustment costs could be associated with a low level of development of the bond market. The low level of adjustment costs found for Romanian firms can be explained by the existence of an underdeveloped bond market in Romania, which means that the firms have no access to public debt and are forced to use private debt. The fact that private debt has lower adjustment costs than public debt explains why the adjustment costs used by Romanian listed firms are lower than those in developed countries.

Furthermore, the low level of adjustment costs of Romanian listed firms indicates that the speed of adjustment to the target debt ratio is high. More specifically, within one year Romanian firms cover 63% (i.e., (1 – 0.37)*100) of the gap between the actual debt ratio and the target debt ratio. Romanian firms' high speed of adjustment is an indication of the fact that their attempt to reach the target debt ratio seems to explain a large part of the variation in firms' debt ratios (see Flannery and Rangan, 2006).

In addition, the results of the model estimation indicate that the correlation between *profitability* and the total debt ratio is negative and statistically significant.

This is in line with the empirical evidence for both developed and developing countries, and supports the assumption of the pecking order theory that more profitable firms use less debt because they can use their available internal financing resources (Myers and Majluf, 1984). In other words, according to the pecking order theory, the order in which firms finance themselves is the following: first with retained earnings, than with debt and finally with equity. However, because in developing countries, including Romania, banks provide short-term loans rather than long-term loans, firms in these countries finance their investments mostly with equity. In addition, in these countries the laws for protecting shareholders are poor and thus firms' managers prefer retained earnings as a source of financing. The fact that firms in developing countries first use as a source of financing retained earnings, then equity and finally debt reflects a new financing behavior as stated by the "new pecking order" theory (Chen, 2004).

Concerning the relationship between *company size* and the target debt ratio, the results of the estimation model used in this article indicate a positive and statistically significant correlation. This result is in line with the findings for developing countries, according to which the creditors consider larger firms more stable and, as a result, such firms obtain debt financing more easily (Nivorozhkin, 2005).

Firms with large proportions of *tangible assets* proved to have a lower debt ratio, which is contradictory to the assumptions of the trade-off theory and to the results obtained for developed countries such as Germany, France, Italy, etc. (Rajan and Zingales, 1995; Titmann and Wessels, 1988). However, this result is in line with the findings for developing countries and it suggests that tangible assets are a poor source of collateral for Romanian listed firms (Nivorozhkin, 2005).

Finally, the results indicate that the coefficient of the growth opportunities variable is not statistically significant, which shows that Romanian listed firms do not increase their debt ratios in order to exploit their growth opportunities (de Haas and Peeters, 2006).

4.2 Findings from Robustness Tests

For testing the stability of the dynamic model over time, the estimation of the model was run for two different periods, namely 2004–2007 and 2008–2011. The results of the estimation for the estimated models are presented in *Table 4*.

For the period 2004–2007, the results indicated that the adjustment costs and the coefficients of the explanatory variables are quite similar to the results of the estimation of the dynamic model for the entire period 2004–2011 (see *Table 3*). For the period 2008–2011, the adjustment costs are very high due to the fact that the coefficient of the lagged debt ratio is 0.89. The high value of the coefficient of the lagged debt ratio for Romanian listed firms indicates a high level of adjustment costs, and as a consequence a low level of the speed of adjustment to the target debt ratio. In other words, Romanian firms did not try to reach the target debt ratio during the period 2008–2011. A possible explanation for these results is the scarcity of data, as the period of study was restricted to four years and the estimation method assumed the use of second order lags of the endogenous variables as instrumental variables.

Table 4 Results of the Robustness Check for Two Equal Time Periods

Variables	Period: 2004–2007	Period: 2008–2011
DR_{it-1}	0.402* (0.221)	0.893* (0.483)
Prof	-1.341*** (0.386)	-1.433*** (0.455)
Growth	-0.0004 (0.012)	0.001 (0.008)
Tang	-0.379* (0.23)	-0.33 (0.369)
Size	0.027* (0.016)	0.0006 (0.048)
No. of entities	77	77
No. of observations	223	221
Sargan test	0.430	0.887
No. of instruments	15	15

Notes: The regression includes unreported year dummies.

Standard errors in brackets.

*, **, *** denote significance at the 10%, 5% and 1% levels, respectively.

The Sargan test indicates the validity of the instrumental variables. The null hypothesis is that "the instruments as a group are exogenous" and *p*-value is reported.

DR_{it-1}= lagged value of the debt ratio, *Prof* = profitability, *Growth* = growth opportunities, *Tang* = assets tangibility, *Size* = company size.

Another explanation is related to the fact that this period (i.e., 2008–2011) coincides with the recent financial crisis. As Brendea (2013) pointed out, the recent financial crisis had a positive effect on the financing behavior of Romanian listed firms, indicating that during the crisis these firms used more debt in order to finance their activities without taking into account the target debt ratio. Romanian firms' high demand for debt can be explained by the reduction of their internal financing resources and by the low market value of their equity during the financial crisis.

As long as the capital structure can be measured using different proxies, we checked whether or not the costs of adjusting to the target capital structure depend on these proxies. The results of the estimation for the dynamic model having Tobin's Q as the dependent variable showed that the estimated adjustment costs are almost the same as those obtained for the estimation of the dynamic model having the debt ratio as the dependent variable (see *Table 5*). In addition, the determinants of the target capital structure have the same signs and statistically significance as those obtained from the estimation of the model with the debt ratio as the dependent variable.

For checking if our results regarding the target capital structure are robust to the changes made in the dynamic model, we conducted a regression with the market-to-book ratio as an additional explanatory variable. As can be seen in *Table 6*, the market-to-book ratio variable did not significantly change the results obtained for the estimation of equation (4).

The coefficient for the market-to-book ratio is statistically significant at the 5% significance level and the inclusion of this variable in the regression did not

Table 5 Results of the Robustness Check with an Alternative Proxy for the Debt Ratio

Variables	Coefficients		
DR_{it-1}	0.457*** (0.112)	No. of entities	77
Prof	-2.506*** (0.670)	No. of observations	519
Growth	0.004 (0.006)	Hansen test	0.325
Tang	-0.136 (0.458)	AR(2)	0.291
Size	0.033 (0.03)	No. of instruments	43

Notes: The regression includes unreported year dummies.

Standard errors in brackets.

, * denote significance at the 5% and 1% levels, respectively.

The Hansen test indicates the validity of the instrumental variables in robust estimation. The null hypothesis is that "the instru-ments as a group are exogenous" and *p*-value is reported.

The Arellano-Bond test for autocorrelation (AR(2)) has the null hypothesis of no autocorrelation between residuals. *p*-value is reported.

DR_{it-1}= lagged value of the debt ratio, *Prof* = profitability, *Growth* = growth opportunities, *Tang* = assets tangibility, *Size* = company size.

Table 6 Results of the Robustness Check with the Market-to-Book Ratio as an Additional Variable

Variables	Coefficients		
DR_{it-1}	0.335*** (0.119)	No. of entities	77
Prof	-1.484*** (0.241)	No. of observations	519
Growth	-0.0007 (0.006)	Sargan test	0.571
Tang	-0.364* (0.187)	AR(2)	0.389
Size	0.042*** (0.013)	No. of instruments	44
Market-to-book ratio	0.012** (0.006)		

Notes: The regression includes unreported year dummies.

Standard errors in brackets.

, * denote significance at the 5% and 1% levels, respectively.

The Sargan test indicates the validity of the instrumental variables. The null hypothesis is that "the instruments as a group are exogenous" and *p*-value is reported.

The Arellano-Bond test for autocorrelation (AR(2)) has the null hypothesis of no autocorrelation between residuals. *p*-value is reported.

DR_{it-1}= lagged value of the debt ratio, *Prof* = profitability, *Growth* = growth opportunities, *Tang* = assets tangibility, *Size* = company size.

change the statistical significance of the variable DR_{it-1}. The results of the robustness tests proved that the estimated dynamic model is quite robust.

4.3 Effects of Agency Problems on Firms' Adjustment Financing Behavior

Firms' capital structure can be optimized by balancing the agency costs of debt with the benefits of debt. Agency costs are generated when, at the company level, the interests of stakeholders are not aligned. More specifically, the separation between ownership and control may lead to inappropriate financing behavior of managers. For example, due to the fact that managers will not receive the entire profit obtained from firms' activities, but will support all expenses related to these activities, they may invest less effort in managing firms' financing resources or transfer the firms' resources in their own interests. A solution for preventing these problems is to increase the debt ratio, as this limits the amount of money available to managers (Jensen, 1976). As a side effect, an increase of debt ratio can generate conflicts between debt holders and shareholders. In this case, shareholders encourage managers to undertake investment projects of greater risk because of the possibility to increase their incomes at the expense of debt holders, who alone suffer the consequences of failure of these projects (Jensen and Meckling, 1976).

The purpose of this section is to expand the existing research by examining how ownership concentration is related to the debt ratio. The findings of the research on this relationship vary and are contradictory: while some researchers (Cepedes, Gonzales and Molina, 2010; Huang and Song, 2006) found a positive relationship for firms in developing economies, others (Kocenda and Svejnar, 2003) found a negative relationship. An explanation for the negative relationship between the debt ratio and ownership concentration for developing economies is given by the fact that in these countries the market for long-term debt is almost nonexistent, the credit market presents supply-side imperfections, and firms' need of long-term financing is satisfied through an increase of equity. However, in transition countries the structure of corporate governance is poor and this leads to a reluctance of minority shareholders to invest in firms' stocks. In contrast, major shareholders can exercise enough control over firms, which allows them to protect their own interests despite poor governance (Nivorozhkin, 2005). As a result, equity is more concentrated in the hands of several major shareholders.

Following the approach of Dragota, Lipara and Ciobanu (2013), we used as a proxy for ownership concentration the Herfindhal Index (*HI*), calculated as the sum of the squares of the fractions of equity held by each shareholder with more than 5% of the shares. It should be noted that we calculated the Herfindhal Index for the Romanian firms included in the sample during the period 2007–2011 due to availability of data. The mean of the Herfindhal Index for Romanian listed firms is 0.6, which indicates a high ownership concentration. Based on the previous empirical findings (Kocenda and Svejnar, 2003; Nivorozhkin, 2005), we expected a negative correlation between the debt ratio and the Hefindhal Index.

Another important issue related to the agency problems is the type of controlling shareholder. More specifically, shareholders of state-owned firms tend to avoid losing their control over firms and as a result they use more debt than equity as a source of financing. In order to control for the effect of this type of controlling shareholder on the target debt ratio of Romanian listed firms, we used in our analysis a dummy variable (*TYPE_OWN*) which takes the value of 1 for the firms that have, in one year, the state as a major shareholder and the value of 0 in other cases.

Table 7 Estimation Results of the Model Including Agency-Problem Variables

Variables	Coefficients		
DR_{it-1}	0.421** (0.174)	No. of entities	77
Prof	-1.545*** (0.381)	No. of observations	300
Growth	-0.004 (0.009)	Sargan test	0.581
Tang	-0.221 (0.37)	AR(2)	0.818
Size	0.075* (0.04)	No. of instruments	20
HI	-0.0006 (0.007)		
TYPE_OWN	-0.559 (0.586)		

Notes: Standard errors in brackets.

*, **, *** denote significance at the 10%, 5% and 1% levels, respectively.

The Sargan test indicates the validity of the instrumental variables. The null hypothesis is that "the instruments as a group are exogenous" and *p*-value is reported.

The Arellano-Bond test for autocorrelation (AR(2)) has the null hypothesis of no autocorrelation between residuals. *p*-value is reported.

DR_{it-1}= lagged value of the debt ratio, *Prof* = profitability, *Growth* = growth opportunities, *Tang* = assets tangibility, *Size* = company size, *HI* = Herfindhal Index, *TYPE_OWN* = dummy variable regarding the type of controlling shareholders.

We introduced the variables *HI* and *TYPE_OWN* into equation (4), eliminating the time specific dummies to avoid the dummy trap. The new equation has the following form:

$$DR_{it} = \beta c + (1-\beta)D_{it-1} + \beta b_1 Prof_{it} + \beta b_2 Size_{it} + \beta b_3 Tang_{it} + \\ + \beta b_4 Growth_{it} + \beta b_5 HI_{it} + \beta b_6 TYPE\_OWN + \mu_i + \varepsilon_{it} \quad (6)$$

Furthermore, we estimated equation (6) using the System GMM estimator for the period 2007–2011. The results of the estimation are presented in *Table 7*.

As can be noted in *Table 7*, the coefficient for the Herfindhal Index is not statistically significant, which indicates that ownership concentration has no significant effect on the target debt ratio of Romanian listed firms. These results support the findings of Nivorozhkin (2005) for the CEE countries. A potential explication is related to the fact that during the period 2007–2011 the Herfindhal Index registered very small changes for all Romanian firms in the sample, which in turn caused small changes in the firms' ownership concentration that could affect their capital structure.

Furthermore, the coefficient of the type-of-ownership dummy variable (*TYPE_OWN*) has no significant effect on the firms' capital structure. One possible explanation for this result is that only five firms included in the sample have the state as a major shareholder. The estimated results for the other variables (i.e., profitability, company size, asset tangibility and growth opportunities) of the model are similar to those obtained for the adjustment financing behavior of Romanian listed firms during the period 2004–2011 (see *Table 3*).

5. Discussions and Conclusions

In this study we estimated a dynamic model using a dynamic panel data methodology in order to investigate the factors that influence the target capital structure and the speed of adjustment to the target capital structure for a sample of 77 Romanian listed firms during the period 2004–2011. On average, the debt ratio of these Romanian listed firms is lower than those of firms in developed and advanced developing countries. In addition, the empirical results indicated that the average debt ratio for Romanian firms during the period 2004–2011 registered an increase of 21% compared with the period 1997–2001 (for this final period we used the value provided by Nivorozhkin, 2005), which reflects the success of Romanian macroeconomic and institutional reforms.

The results of the estimation of the dynamic model showed that Romanian listed firms have a target debt ratio and adjust quickly to the target because their adjustment speed is relatively high compared to that of firms in other developed and developing countries (for the results from other countries, see de Haas and Peeters, 2006; Flannery and Rangan, 2006; and Ozkan, 2001). These results suggest that being away from the target capital structure is costly for Romanian listed firms, and that the dynamic trade-off theory explains to a great extent the financing behavior of these firms.

In addition, the results indicate that profitability, company size and asset tangibility are the statistically significant factors determining Romanian firms' target capital structure. The negative correlation between the debt ratio and profitability of Romanian listed firms supports the premises of the "new pecking order theory" (formulated by Chen, 2004). More specifically, the financing behavior of Romanian firms is characterized by the fact that they first use retained earnings as financing resources, then equity and, lastly, debt. The positive relationship between the debt ratio and the size of Romanian firms supports the findings found for developing countries, suggesting that size is considered a stability proxy for creditors. The tangibility of assets had a negative effect on the target capital structure of Romanian listed firms, indicating that these firms use tangible assets as collateral to a lesser extent. The results are in line with those obtained for less advanced developing countries (e.g., Bulgaria) and contradict the findings obtained for developed countries (e.g., Germany, France and Italy) and more advanced developing countries (e.g., the Czech Republic and Estonia). Ownership concentration had no effect on the target capital structure of Romanian firms due to the fact that the Herfindhal index registered small changes for the analyzed period (i.e., 2004–2007).

The results of robustness tests indicated that the dynamic adjustment model used in the current study for explaining the financing behavior of Romanian firms is quite robust. Moreover, introducing the market-to-book ratio variable in the model as a proxy for the market timing behavior of Romanian firms did not change the results regarding the level of the adjustment speed. This means that Romanian listed firms have a target debt ratio, but their financing behavior is explained not only by the dynamic trade-off and pecking order theories, but also by the market timing theory.

Robustness testing for the dynamic model revealed a change in the financing behavior of Romanian listed firms after 2008. More specifically, between 2008 and 2011 the speed of adjustment to the target debt ratio was two times higher than

the speed recorded between 2004 and 2007. The most probable explanation of this result is the effects of the recent financial crisis on the financing behavior of Romanian listed firms. More specifically, after 2008 Romanian firms' adjustment speed was very low, suggesting that the firms no longer followed the target capital structure.

To sum up, the current study builds on earlier studies showing that Romanian listed firms increase their average debt ratio and their speed of adjustment to the target debt ratio. In addition, the effects of internal factors (i.e., profitability, tangibility and company size) on the target debt ratio of Romanian firms for the period 2004–2011 are similar to the effects found for CEE countries during the period 1997–2001 (see Nivorozhkin, 2005).

REFERENCES

Arellano M, Bond S (1991): Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies*, 58:277–297.

Arellano M, Bover O (1995): Another look at the instrumental variable estimation of error–components models. *Journal of Econometrics*, 68:29–52.

Baker M, Wurgler J (2002): Market timing and capital structure. *Journal of Finance*, 57:1–32.

Blundell R, Bond S (1998): Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87:115–143.

Booth L, Aivazian V, Demirguc–Kunt A, Maksimovic V (2001): Capital structure in developing countries. *Journal of Finance*, 56:87–130.

Brendea G (2013): The impact of the recent financial crisis on the capital structure choices of the Romanian listed firms. *Review of Economic Studies and Research Virgil Madgearu*, 6(2):15–26.

Brennan MJ, Schwartz ES (1984): Optimal financial policy and firm valuation. *Journal of Finance*, 39:593–607.

Cespedes J, Gonzalez M, Molina C (2008): Ownership concentration and the determinants of capital structure in Latin America. *Journal of Business Research*, 63:248–254.

Chen J (2004): Determinants of capital structure of Chinese-listed companies. *Journal of Business Research*, 57:1341–1351.

Chen L, Zhao X (2006): On the relation between the market-to-book ratio, growth opportunity, and leverage ratio. *Finance Research Letters*, 3:253–266.

Cornelli F, Portes R, Schaffer M (1996): The capital structure of firms in Central and Eastern Europe. *CEPR Discussion Paper*, no. 1392.

Daskalakis N, Psillaki M (2008): Do country or firms factors explain capital structure? Evidence from SMEs in France and Greece. *Applied Financial Economics*, 18:87–97.

Delcoure N (2007): The determinants of capital structure in transitional economies. *International Review of Economics and Finance*, 16:400–415.

Demirguc-Kunt A, Maksimovic V (1999): Institutions, financial markets and firm debt maturity. *Journal of Financial Economics*, 54:295–336.

Diamond D (1991): Monitoring and reputation: the choice between bank loans and directly placed debts. Journal of Political Economy, 99: 689–721.

Dragota V, Lipara C, Ciobanu R (2013): Agency Problems and Synergistic Effects in Romania: The Determinants of the Control Premium. *Finance a úvěr-Czech Journal of Economics and Finance*, 63(2):197–219.

Drobetz W, Wanzenried G (2006): What determines the speed of adjustment to the target capital structure? *Applied Financial Economics*, 16:941–958.

Fischer E, Heinkel R, Zechner J (1989): Dynamic capital structure choice: theory and tests. *Journal of Finance*, 44:19–40.

Flannery M, Rangan K (2006): Partial adjustments toward target capital structures. *Journal of Financial Economics*, 79:469–506.

Frank M, Goyal V (2005): Trade–off and pecking order theories of debt. The *Handbook of Empirical Corporate Finance*. Elsevier Science.

Gaud P, Jani E, Hoesli M, Bender A (2005): The capital structure of Swiss companies: an empirical analysis using dynamic panel data. *European Financial Management*, 11(1):51–69.

Graham JR, Harvey C (2001): The theory and practice of corporate Finance: Evidence from the Field. *Journal of Financial Economics*, 60:187–243.

Haas R de, Peeters M (2006): The dynamic adjustment towards target capital structures of firms in transition economies. *Economics of Transition*, 14(1):133–169.

Hermanns J (2006): *Optimale Kapitalstruktur und Market Timing.* DUV Verlag, Germany.

Huang G, Song F (2006): The determinants of capital structure: evidence form China. *China Economic Review*, 17:14–36.

Huang R, Ritter J (2009): Testing theories of capital structure and estimating the speed of adjustment. *Journal of Financial and Quantitative Analysis*, 44(2):237–271.

Jensen M, Meckling W (1976): Theory of the firm: managerial behavior, agency costs and capital structure. *Journal of Financial Economics*, 2:305–360.

Jensen M (1976): Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review*, 76:323–339.

Kane A, Marcus A, McDonald R (1984): How big is the tax advantage to debt? *Journal of Finance*, 39:841–853.

Kocenda E, Svejnar J (2002): The Effects of Ownership Forms and Concentration on Firms Performance after Large—Scale Privatization. *William Davidson Working Paper*, no. 471.

Mazur K (2007): The determinants of capital structure choice: evidence from Polish companies. *International Advances in Economic Research*, 13:495–514.

Miguel A de, Pindado J (2001): Determinants of capital structure: new evidence from Spanish panel data. *Journal of Corporate Finance*, 7:77–99.

Myers S (1984): The capital structure puzzle. *Journal of Finance*, 39:575–592.

Myers S (2003): Financing of corporations. *Handbooks of the Economics of Finance, 1A*, pp. 216–253.

Myers S, Majluf N (1984): Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13:187–221.

Nickell S (1981): Biases in dynamic models with fixed effects. *Econometrica*, 49(6):1417–1426.

Nivorozhkin E (2002): Capital structures in emerging stock markets: the case of Hungary. The *Developing Economies*, XL–2:166–187.

Nivorozhkin E (2005): Financing choices of firms in EU accession countries. *Emerging Markets Review*, 6:138–169.

Ozkan A (2001): Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data. *Journal of Business Finance & Accounting*, 28:175–198.

Rajan RG, Zingales L (1995): What do we know about capital structure? Some evidence from International Data. *Journal of Finance*, 50:1421–1460.

Titman S, Wessels R (1988): The determinants of capital structure choice. *Journal of Finance*, 43:1–19.