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CAPITAL STRUCTURE – ROMANIAN AND EASTERN-EUROPE COMPANIES

Abstract:

This paper analyses company's capital structure using a sample of listed companies on a ten year period. It mainly tackles one of the most debated issues in corporate finance, the relationship between profitability and debt level of a company. Shareholder funds are considered at book value, while profitability is counted as profit on total assets. The study tries to answer the question of whether the structural changes in Romanian economy, regarding cost and availability of capital, have affected, or were affected by the profit making capacity of companies. After analyzing Romanian companies sample, the new objective was to compare it with a set of listed companies from emerging economies of Eastern Europe member states. By this it was intended to compare the results and see if there is any particularity for Romanian firms. Linear regression method is used through a panel data random effects model. Results confirmed past studies as negative relationship between leveraging and profitability was found. This finding is in line with pecking order theory of capital structure and contradicts trade-off and signal theory for Romanian listed companies.

Keywords:

capital structure, performances, trade-off theory, leverage, pecking order theory, Romania, panel data

JEL Classification: G32

INTRODUCTION

Capital structure of companies was a theme of interest for a large number of studies in corporative finance area. The starting point on this subject was Modigliani and Miller (1958) working paper which was the first to cast attention on the influence leverage has on company value. They were first to prove that the mixture between capital and debt is important for maximizing company value. Modigliani and Miller's *Trade-off theory* was followed by many studies that tried to investigate on possible dependencies between companies' financial indicators and capital structure. Tinman and Wessel (1988) considered as possible factors in determining capital structure financial indicators as assets tangibility, liquidity ratio, profitability, size, level of taxation, volatility and growth.

A closed attention was given to company's performance as one of the most important variable in explaining capital structure optimisation in view of maximizing company value. Company financial performance can be measured by various methods or indicators. Strictly economical, it is not necessary to be dependent on debt level.

What one company produces and exceedes total costs, that is the profit that will be distributed among interested parts, such as shareholders, creditors and others. Importance of company performance and her distribution was included in Spence (1973) and Leland and Pyle (1977) studies.

Regarding this matter, Ross' *Signal Theory* (1977) states that the greater is the leverage, the greater is the company's performance. This opposes to *Pecking Order Theory* as proposed by Myers (1984). The latter considers that a performing company will first finance from own profits, and only then will look for external resources.

Present study tries to establish whether the pattern of capital structure for Romanian companies was affected by the cumulated effects of the financial crisis. It will try to determine on a sample of listed companies whether there is a statistically significant relationship between profitability and leverage. The test will be performed on a period of time between 2005 and 2013, and therefore will try to compare the results in relation with economic turmoil occurrance.

Financial data was collected from secondary sources and econometric analysis was performed using *pooled ordinary least squares* (OLS). The method was also used by Ozkan (2001), Bennet and Donnelly (2003) and Akdal (2010) to determine the relationship between leverage and variables like profitability, size, growth, tangibility, non-debt tax shield, volatility and liquidity.

1. Literature review

As mentioned before, Modigliani and Miller working paper was the first step in studying capital structure issues. Consequent to that, many authors proposed other theories in

explaining the optimal capital structure in order to maximize company value. Even if there is a large number of papers trying to model capital structure optimization, there is still debate on which are the most important factors in determining it, and how these factors influence debt level.

What is for sure is that the relation between these factors and capital structure is sensible to general economic conditions and economic environment cycles.

Financial distress, as an important component of economic enviroment in which a company performs, is directly determining the *cost of capital*[1]. Berk şi DeMarzo (2007) define *financial cost* as that moment of distress when a company is countering dificulties in paying its debts.

Kraus and Litzenberger (1973) are studying the problem of high default probablity when the company is massively borrowing funds (leverage rises). The more risk generated by massive borrowing, the greater the financing cost will be for that company.

1.1. Trade-off theory

This theory states that fiscal deduction and bankrupcy cost play crucial role in determining the leverage. Companies will choose to borrow if this debt will generate fiscal deductions. This will happen till the bankrupcy cost will exceed the gain from fiscal deduction resulted from massive indebtness (Gajurel, 2005). According to this theory, profitable companies will be more favorable for having high leverage rates in view of reducing the fiscal burden (Barclay and Smith, 2005). The bigger the profit is, the bigger is the fiscal burden to be paid.

However, more recent papers considered this theory as being limited in explaining capital structure issues.

1.2. Pecking order theory

Pecking order theory was first described by Myers and Majluf (1984) and is based on companies' preference for internal sources of financing. It is more easier to use its own money rather than to try to borrow from external sources. The main source for financing should be the profits a company generates, and in case of losses, company will borrow money from others parties. Moreover, authors of this theory indicate that stock issuing, or other capital market financing, should be measures of last resort.

Regarding the matters discussed in this paper, pecking order theory is important because it can explain the positive relationship between a high level of profitability and a low leverage. This was met in studies that included samples from companies from emerging market countries.

[1] Berk, J. and DeMarzo, P. (2007) *Corporate Finance*. Pearson International Edition:Addison Wesley.

On the other side, Dragota and Semenescu[2] (2008) found that Romanian listed companies manage to finance its assets from capital funds, comercial debt, and financial debt, in that order. When different industry sectors were considered, results diverged from earlier findings. Although results were not uniform across all observed industry sectors, they were partly in line with results of papers made on companies from developed economies (Rajan and Zingales, 1995) and on other emerging economies such as Poland and Hungay (Devic and Krstic, 2001).

Myers (2001) states that trade-off theory does not render a good explanation for capital structure variation. He finds a semnificative positive relationship between profitability and leverage[3]. As a result, small companies will borrow to finance investments and will be more profitable.

Others like Ozkan (2001), Kester (1986), Titman and Wessels (1988), all find negative relationship between profitability and leverage. As far as numbers are concerned, there are more studies favorable to pecking order theory in explaining the inverse relation between profitability and leverage.

In case of Romania there are Klapper (2002), De Haas and Peters (2004), Nivorozhkin (2005) studies, which all found negative relationship between profitability and debt level of the companies. Similar results obtained Ivanescu (2007), analysing a sample of 25 Romanian companies. He discovered as primary cause the precarious acces to financing of Romanian companies, determining autofinancing. Contolencu (2010), Alupoaie and Stancu (2012) also found for Romanian companies negative relationship between profitability and leverage.

In *Figure 1* are presented all the studies mentioned before. In addition, there are studies made on companies from emerging economies that found dependence between profitability and leverage.

Figure 1. Similar studies

Study	Period	Sample	Sample size
Chen (2003)	1995-2000	Chinese listed companies	88
Sahh şi Hijazi (2004)	1997-2001	Pakistanese non financial companies	445
Bauer (2004)	2000-2001	Czech companies	74
Dragotă şi Semenescu (2008)	1997-2005	Romanian listed companies	54
Dean şi Dean (2009)	2005-2007	Macedonian companie	32
Liu şi Ren (2009)	2004-2007	Listed IT Chinese companies	98
Abor (2009)	1988-2003	Ghanese companies	230
Ramachandran şi Packkirisamy (2010)	1997-2007	Indian companies	73

(Source: Own calculations)

[2] Dragota, M. And Semenescu, A. (2008) „A Dynamic Analysis of Capital Structure Determinants. Empirical Results for Romanian Capital Market"

[3] Myers, S.C. (1984) „The Capital Structure Puzzle", *Journal of Finance*, Vol. 39, pp. 575–592.

2. METHODOLOGY

In studying the relationship between profitability and leverage liniar regression ecuations is used. Because the sample is restricted to a period of ten years (2004-2013), having annual observations frequence, a panel data model is employed. This method uses time and cross sectional data series, allowing for a number of observation equal to the product between number of companies and time period of the sample.

2.1. Data sample

In order to estimate the regression model a sample of data composed of 326 Romanian companies listed at Bucharest Stock Exchange was collected. Data was provided from international databases and companies with missing data were eliminated. Another criteria used in selecting the sample of companies was the type of activity. Only *industrial companies* were included, because financial companies have different accounting reporting standards. As a result, banks, insurance companies and other financial companies were not included in the sample. Another criteria was not to consider companies with more than 25% ownership by public authorities.

In order to compare the results of the Romanian companies with other countries, we applied the same method for a sample of listed companies from Eastern Europe countries. After the same filters used for Romanian sample, it was obtain a sample of 90 listed companies. Companies selected are from Poland, Hungary, Czech Republic, Baltic states, Croatia, Slovakia, Slovenia and Bulgaria.

2.2. Data analysis

To model the relationship between leverage and profitability with panel data method we estimate proxies for the both variables.

Profitability = EBITDA/Total Assets,

Leverage = (Current Liabilities + Non-Current Liabilities) / Shareholder funds

or: *Leverage* = (Short-term debt + Long-term debt) / Book Value of Shareholder funds;

Profitability is the independent variable and the leverage is considered dependent variable in the model.

Figure 2 shows descriptive data for the sample of data used in model estimation.

Figure 2. Descriptive data for Romanian Companies

	Min	1st quart	Median	3rd quart	Max	Mean	Std.Dev	Skewness	Kurtosis
Leverage	0.00	0.21	0.49	1.29	29.70	1.13	2.33	9.69	154.5
Profitab.	-0.45	-0.03	0.01	0.07	2.05	0.02	0.13	-0.68	44.31

(Source: own calculation)

2.3. Model specification

Following a similar method with that used in the above-mentioned studies, we estimate independent variable coeficients with *pooled ordinary least squares* (OLS) in Eviews 8.1 software.

$$Y_{it} = \alpha + X_{it}'\beta + \delta_i + \gamma_t + \varepsilon_{it}\,, \quad (1)$$

where Y_{it} is the dependent variable, X_{it} is a k rank vector of regressors, ε_{it} is error term for $i=1, 2, 3,\ldots, M$ cross-sectional units for periods $t=1, 2, 3,\ldots, T$. Term α represents the general constant of the model, while δ_i , γ_t are horizontal effects (cross-sectional) and period-specfic effects (fixed or random). For our specific model we can rewrite:

$$Leverage = \alpha + \beta_1 P \quad (2)$$

α – constant

β – regression coeficient

P – profitability;

2.4. Results

While employing a data panel method one can use three different types of models.

- Pooled OLS Regression Model
- Fixed Effects sau LSDV model
- Random Effects model

First one of the these models implies taking all data from a *pool* and regress them by least square method. This is done by neglecting the fact that data sets are structured on both temporal component and horizontal one (cross-section). In case of the model build in this paper this should not be a problem because we are not interested in the dependence between variables on each company (as a horizontal cross-sectional element). We are interested only in the global estimation output.

Fixed Effects model allows that heterogeny problem of each cross-sectional elements (companies) to be treated. This thing is possible because the value of the *intercept* is different for each company in the sample. Though, this is time constant, the sum of all variations being zero.

Random effects model implies that companies acquire a common average value for *intercept* term. This catches the variations caused by temporal dimension. A core hypothetis of random effects estimation is that these effects are uncorelated with explicative variables.

To test this hypothetis Hausman Test (1978) it is applied in order to compare estimation coeficients obtained from fixed effects and random effects. In this model we theoretically

assume that we have the same estimated coeficients for all companies from the sample. Null hypothetis of this test is that random-effects model is the most appropriate for the wanted estimation.

Figure 3. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.638352	1	***0.4243***
Variable	Fixed	Random	Var(Diff.)
PROF	-0.991986	-1.051072	0.005469

(Source: own calculation)

The value of probability (Prob.) is to be noticed, meaning that the null hypothetis can't be rejected. This means the acceptance of the hypothetis that renders *random effects model* as the apropriate one.

2.4.1. Romanian companies

There were estimated the regressions using *Random effects* model on various time periods. Considering the whole sample, it was noticed that coeficients for the profitability variable are statistically significant and negative. This means that the relationship between the two variables

Figure 4. Empirical estimation for Random Effects model for Romanian companies

Perioadă	**Var.**	**Coef.**	**Prob.**	**Prob.F-statistic**	**R^2**
2005-2013	*prof*	*-1,20*	*.0001*	*.0000*	*.0052*
2004-2007	prof	-2.93	.0000	.0000	.0250
2005-2009	prof	-1.87	.0000	.0000	.0151
2009-2010	prof	2.26	.0000	.0000	.0241
2010-2012	prof	1.27	.0041	.0041	.0081
2011-2013	prof	-4.07	.0000	.0000	.0366
2012-2013	prof	-5.36	.0000	.0000	.0536

(Source: own calculations)

There were estimated the regressions using *Random effects* model on various time periods. Considering the whole sample, it was noticed that coeficients for the profitability variable are statistically significant and negative. This means that the relationship between the two variables is inversed. When the level of profitability rises, the leverage is lowering, meaning that, the profitable the company is, the less it borrows.

Executing the same type of regression but switching the observed period, we obtain different results. Between 2004 and 2009, the relationship is negative and stronger at the beginning of the period (coeficient -2.90 in 2004-2007). This can be explained by the fact of a period of a sustained economic growth, when companies registred profits and manage to autofinance. This translates in a low level of debt.

Between 2009 and 2012 the relationship between the two variables becomes positive, and the coeficient on 2009 and 2010 is 2.26. Economically and theoretically speaking, this can be explained by trade-off and signaling theories. When profit rises, debt rises too for fiscal avoidance and to signal that the company is recommended for investments. On the other side, if profits are lowering, the debt lowers to because the company finds it hard to access funds.

For the last period in the sample, the coeficient is bigger but negative, indicating that a low profitability generates a rise in debt level.

2.4.2. Eastern Europe companies

Same procedure was applied for Eastern Europe companies' sample and the results are presented in *Table 5*. As for Romanian companies samples, Hausman test indicated that Random effects is appropriate for Eastern Europe companies. The strongly negative coefficients are the first thing to be noticed. This time the relation is even more pronounced, in an inversed way. The indirect relationship between profitability and leverage is negative over the whole sample, similar to the one for Romanian companies. The coefficients are larger than the ones obtained for Romania, indicating that profitability is a more important variabile in explaining the debt level. This is shown by superior R-square values, which tops for 2012-2013 period by a two-figure number (12%).

Figure 5. Empirical estimation for Random Effects model for Eastern Europe companies

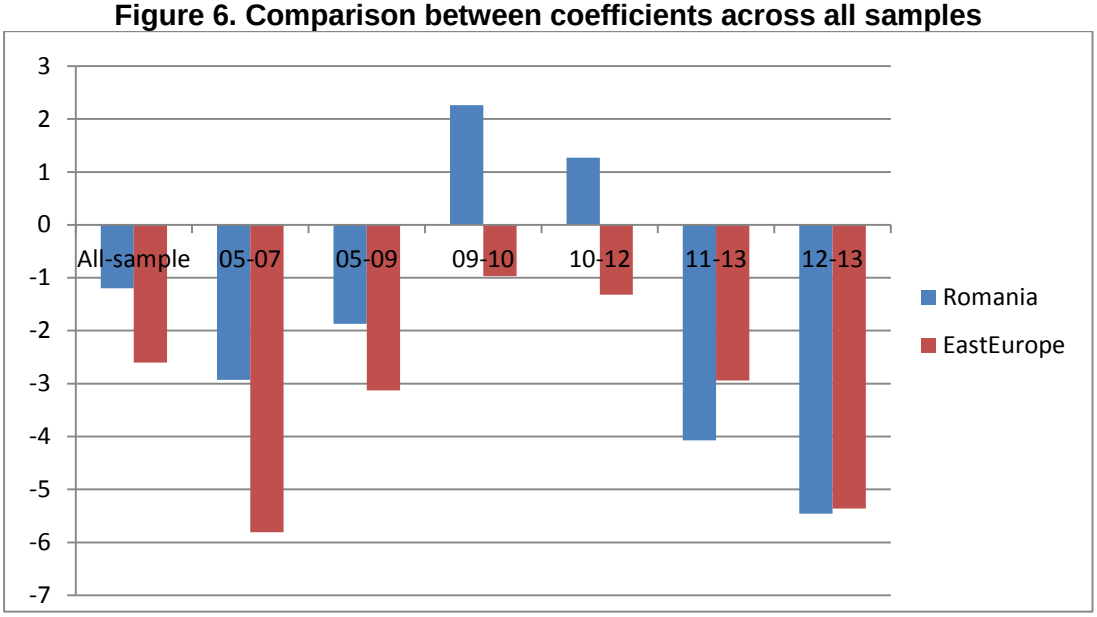
Perioadă	Var.	Coef.	Prob.	Prob.F-statistic	R^2
2005-2013	*prof*	*-2,60*	*.0000*	*.0000*	*.035*
2005-2007	Prof	-5,81	.0000	.0000	.06
2005-2009	prof	-3.13	.0000	.0000	.04
2009-2013	prof	-1.86	.0000	.0000	.05
2009-2010	prof	-0.97	.0246	.0244	.02
2010-2012	prof	-1.32	.0041	.0041	.03
2011-2013	prof	-2.94	.0000	.0000	.07
2012-2013	prof	-5.46	.0000	.0000	.12

(Source: own calculations

Another matter that differs from the results for Romanian companies is that of permanently negative coefficients of profitability at all sub-samples. There are no periods where leverage is positive dependent of profitability variable. Anyway, in post-2008 samples it has been recorded smaller coefficients, indicating a lighter dependence between the two variables. For Eastern-Europe companies, 2009-2010 is the period with the lower coefficient for profitability variable, the lower R-square value, and the higher Prob. F-statistic value. This can be explained by the financial distress that occurred in Europe following Lehman's Brother bankrupcy and the beginning of the economic crisis. In times of financial turmoil, companies delay investments plan, banks are reluctant to lend and financial indicators of companies worsen. This effects were seen for Romanian

companies in positive coefficients for profitability. For Eastern-Europe companies the coefficients remained positive, although declined strongly compared with other periods.

Figure 6. Comparison between coefficients across all samples



(Source: own calculations)

Figure 6 shows both coefficients (Romanian and Eastern Europe) for the same time-samples in the one figure. The first thing to be noticed is the trend of both coefficient, which moves in similar way. In the pre-crisis period (2005-2009), coefficients for Romanian companies is significantly lower than that of european counterparts. After 2010, the relationship changes and Romaninan coefficient becames higher, meaning that profitability is more important in describing leverage's dynamic. Nominal value is bigger for both samples in post crisis period. What is of interest is the coefficients value for 2009-2012 sample, period marked by high financial distress and economic turmoil. The relationship between profitability and leverage becames more difused and less significant. For Romanian sample it even changes direction, becoming positive.

2.5. Further studies

In order to complete the results of this paper, it's necessary to introduce suplimentary variables tot explain in a larger proportion the variation of the leverage. A possibility would be the introduction of proxies for financial indicators such as liquidity, nature of assets, size of the company, volatility[4], taxation level or growth opportunities. Another possibility is considering a proxy for shareholder funds at market value, rather than book value. Market value is more important when evaluating credit score and company performance. Market

[4] Akdal, S. (2010) „Capital Structure? UK Evidence", *Munich Personal RePEC Archive*, No. 29199, 8 martie 2011.

value reflects how investors are evaluating a company financial future, giving a better image about the company.

It would also be useful to group companies by industry sectors, in order to test the fixed effects[5] through panel data estimation. Deviation from the average will be the industry effect.

Conclusions

In this paper I used a sample of Romanian listed companies to check if the capital structure theories are valid in explaining the relationship between profitability and the leverage (level of debt). Considering the whole time sample, the coeficient of profitability variable was negative, describing a negative dependency between the two indicators. This result is in line with pecking order theory, conclusion that resulted in most studies over Romanian companies.

The coeficient is not negative on the whole time sample. Executing regression for smaller periods inside the whole time sample, we got positive coeficients between 2009 and 2012. Unfortunately, the R-squared coeficients are low (5%), indicating that is necessary to introduce other variables for a better explanation of the leverage variation.

To see if the results are in line with those of other emerging economies, I estimated, using the same procedure, coefficients of profitability for a sample of companies from member states from Eastern Europe. The results confirmed pecking order theory and showed that relationship between profitability and leverage of Romanian companies had the same dynamic as their European counterparts. The study also found that 2008-2012 period is marked by financial turmoil that seriously affected dependence between the two variables.

[5] Dragotă şi semenescu.

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