

TESTING THE LEVERAGE EFFECT FOR THE COMPANIES LISTED ON THE CAPITAL MARKET

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ABSTRACT: *The financial theory admits that levered firms record a value surplus compared to unlevered firms, at least because of the tax savings, related to interest. A series of fundamental studies indicate this phenomenon. However, incurred debt, especially the long term debt, has a more consistent influence on performance, as stated by the Modigliani-Miller model. To this respect, the paper proposes the empirical testing of this model, using financial-accounting data of firms listed on the Romanian capital market. In particular, the statistical significance of the leverage effect will be analyzed, on a sample of companies listed on the Bucharest Stock Exchange.*

KEY WORDS: *leverage effect, financial lever, financial return, regression, capital market*

1. INTRODUCTION

The goal of this paper is to determine the existence of a causal connection between the capital structure of a firm, materialized in its debt, and the corporate performance. The starting point consists of the financial data which describes the financing sources. These data is collected from the most representative Romanian firms, particularly those whose shares are traded on the Romanian capital market.

Studying the dependency between the financial structure of an enterprise and its performance can be reduced to analyzing the degree of leverage impact, quantified by the financial lever, on shareholders' financial return on equity, according to the Modigliani- Miller model.

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2. LITERATURE REVIEW

The Modigliani & Miller model offers one of the most used formulas in financial theory. The relationship shows that the estimated financial return for a levered firm, from the class of risk k , is a linear function of the leverage ratio (Dragotă, M., 2006, p.69):

$$R_{fin} = E(R)_k + [E(R)_k - R_{dob}] \times \frac{DAT}{CPR} \quad (1)$$

The notation system is as follows: R_{fin} = the financial return rate of the levered company, included in the class of risk k ; $E(R)_k$ = the expected return of the company from the class of risk k ; R_{dob} = the interest rate, also called cost of debt; DAT = the company's long term debt; CPR = shareholders' equity.

The formula shows that a levered company can obtain a return on equity ratio superior to that of an unlevered company, at the same cost of capital. The term that is added to $E(R)_k$ is called leverage effect and may take three forms:

- a) lever effect $\Leftrightarrow E(R)_k > R_{dob}$;
- b) boomerang effect $\Leftrightarrow E(R)_k < R_{dob}$;
- c) null effect $\Leftrightarrow E(R)_k = R_{dob}$.

Thus, if the intrinsic return rate of the company surpasses the debt cost, then the shareholders' earning increases directly proportional to the degree of leverage. In the opposite case, when the interest rate is higher than the company's return on assets, supplemental leverage will enhance the negative performance and will lead to a reduction in the return of shareholders.

The Modigliani & Miller conclusions are radically amended under taxation conditions. Taking into consideration the tax on profit will favour levered companies to those unlevered, due to the deductible interest expenses of loans contracted (Modigliani and Miller, 1963, pp.433-443).

The deduction of interest from the operating profit will lead to the reduction of the tax amount and to the simultaneous completion of tax savings. Regarding the shareholders' wealth, the value of the levered company will be greater than the value of the unlevered company (Stancu, I., 2007, p. 688). The value difference is owed to tax savings. Their value, perpetually discounted, equal to $\tau \cdot DAT$, will add value to the unlevered company; τ represents the tax on profit rate. The following relationship is obtained:

$$V^L = V^U + DAT \times \tau \quad (2)$$

Identifying an optimal capital structure for the companies from the Romanian financial market represents a poorly addressed research topic. The majority of studies had been concerned with the influence factors of financing policy, proving to be useful both to investors and firms. The latter's management is interested in anticipating financing decisions' implications on the company's market value.

On the Romanian capital market, Dragotă (2006, p.194) used a sample of companies listed during 1997-2003 on the Bucharest Stock Exchange (BSE). The two main findings of this study are the following (Dragotă, M., 2006, pp.209-224):

- Romanian firms have a high degree of leverage, explained to a significant extent by the weight of interest free accounts payable;
- profitable enterprises contract less debt because they have got sufficient own resources to finance investment projects.

Using information drawn from the balance sheets and the results accounts of the companies listed on BSE and RASDAQ, during 2001-2004, Robu (2005) examined the correlation between the stock price and financial accounting data. According to the results obtained, the links between financial rates and stock-market performances for the companies from the sample are generally weak in intensity and can be quantified only by means of non-linear models (Robu, 2005).

3. METHODOLOGY FOR ANALYSIS

As a general rule, for the analyses contained in this paper we will apply the most commonly used relationship for determining shareholders' return, both between theoreticians and practitioners, namely *ROE*. Regarding the moment in time used as reference, *the results from the year-end will be compared to the capital invested at the beginning of the year*:

$$ROE = \frac{\text{Net profit}_1}{\text{Shareholders' equity}_0} \quad (3)$$

Nevertheless, the financial practice had become familiar with return rates of capital amounts invested at the end of the financial year, which will produce results in the next year. In support of this claim we present, for example, the method of calculation that stems from the financial data of the companies listed on the Bucharest Stock Exchange, posted on the www.ktd.ro site. In the financial results section of this web site we find the so-called "equity return", in which the net profit is divided by the equity invested at the end of the financial year (KTD Invest, 2009, www.ktd.ro).

As an exception to the rule, we will use this method of calculation only in situations when we do not have enough data to apply the appropriate formula.

The financial structure of the firm can be described by the amount of debt, but also by means of financial leverage. The objective of the analysis is to detect the influence which leverage exerts on performance. In order to quantify leverage, a multitude of leverage ratios can be used (Brezeanu, P., 2007, p.331), which divide contracted debts (or a part of them) by total liabilities (or by shareholders' equity). Of these we selected the *financial lever*, which is determined by dividing the long-term debt by the shareholders' equity:

$$L = \frac{\text{Long-term debt}}{\text{Shareholders' equity}} \quad (4)$$

The analysis of the relationship between the considered quantitative variables is based on the regression analysis; this is one of the most important econometric methods used in studying economic phenomena. The connection between a dependent (explained) variable Y and one or several other independent (explanatory) variables can be mathematically modelled by the following function: $Y = f(X)$.

Yet, any type of function cannot fully describe the link between economic phenomena. Therefore, a residual variable (error) must be added in the model, in order to take into consideration the observed values' deviations from the values estimated using the model. In addition, the direction and the intensity of the relationships between variables imply a particular importance.

The analysis consists of carrying out two simple regressions:

- for percentage values, where: x = financial lever and y = financial return;
- for absolute values, where: x = long-term debt and y =profit.

4. DATABASE CONSTRUCTION

In general, constructing databases for empirical studies is a difficult undertaking, for analyzing the Romanian capital market, because there is no public database that provides information. This status quo represents a genuine shortcoming that the researcher has to overcome in order to procure his "prime matter", the input of his analysis.

In the absence of complete data sources we directed our attention over data and information posted on websites of institutions such as the Bucharest Stock Exchange and the National Securities Commission. Although the NSC digital resource offers numerous data from a quantitative point of view, its lack of systematization drove us to, eventually, assume the data from the *BSE site*, because the latter is ordered and systematized in a superior fashion that makes collecting it much easier (BSE, 2009, www.bvb.ro).

Consistent with the purpose of the proposed analysis, respectively the testing of leverage effect on performance, the database contains the following financial-accounting data:

- long-term debt, equity and financial lever;
- net profit and financial return.

The delimitation used on these two coordinates serves the purpose of highlighting separately the regression variables: the independent variable and the dependent variable.

Long-term debt is synonymous with financial debt, long-term and medium-term debt, or with debt contracted on a greater than one year term. Dividing long-term debt and net profit by shareholders' equity we obtain the financial lever and the financial return. Thus, it can be observed that the role of equity is only to contribute to the definition of variables; it is not a factor in the regression.

The generic structure of the database is the following:

Table 1. Database structure

Company	Year	Financial return	Net profit	Equity	Long-term debt	Financial lever
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Collected data is annual and has been taken from the balance sheets and the profit and loss accounts of companies whose shares are quoted at the first 3 tiers of the Bucharest Stock Exchange. The time period under analysis is of 3 years, with the reference interval [2005-2007]. Argument: most of the financial data posted by issuers on the BSE site contains recordings from this interval. For the year 2008, data is available only for 28% of issuers, namely 19 firms.

The data sample does not include financial intermediation companies because their degree of leverage is influenced by a number of specific financial regulations, depending on which they operate. Also excluded from the sample are those companies for which there is not sufficient information available from the selected time period, in order to accomplish a rigorous analysis. We consider that the researcher cannot be held accountable for this shortage of data. We once again emphasize the difficulty of constructing a database which is proper for high-level research, considering that in our country, a universal and complete database, including financial information of public interest, in a coherent and transparent manner, covering a time period suitable to relevant statistical analysis, does not exist.

From a total of 69 companies listed at the first three tiers of the stock exchange, three were excluded, for which we bring the following arguments:

- S.S.I.F. BROKER S.A. (BRK) is a financial intermediation company;
- CASA DE BUCOVINA-CLUB DE MUNTE (BCM) has data available only for 1 year, thus not allowing the computation of financial return;
- CONTOR GROUP S.A. Arad (CGC) does not have any data available.

It should also be noted that for companies ROCE, UZT and VESY there is no data available for 2006, and that the issuer CMCM did not post any financial-data recordings for the year 2007. For TRP, data is available only for 2007 and 2008, but as performance in percentage values can be computed, we decided to hold this firm in the sample. These “lacks” need to be covered, in order to ensure cohesion to the database.

The 19 issuers for which records are available at the level of the year 2008, are the following: BIO, SOCP, ALU, APC, ARS, BRM, CMF, COTR, ECT, EFO, ENP, SNO, STZ, TUFE, VNC, UAM, CMCM, UZT and VESY.

For banks (TLV, BCC and BRD) and for the insurance company ASA, in the absence of accounting records consistent with the structure of the database, we have assumed the liabilities item “debt regarding credit institutions” as representing long-term debt, and the liabilities item “equity subscribed” – as representing equity. In particular, for ASA we collected the total debt data, because of the absence of a detailed debt recording.

In order not to distort the calculations by accepting null values, owing to the absence of data, we agreed on the following compromise solution:

- null values from the *long-term debt* column were replaced with the value from the previous year, when such a value exists;
- null values from the *long-term debt* column were replaced with recordings from the liabilities item “total debt”, when there is no value available for *long-term debt* from any of the previous years, to replace the null value;
- the value from the *financial return* column, corresponding with the first year of analysis (for which data is available from the firms’ records; ex: 2005) is determined by dividing the net profit from year t_1 by the shareholders’ equity from the same year, because there is no data available from the previous t_0 year (ex: data for shareholders’ equity from 2004 would be required).

To summarize, the database contains the cumulated recordings of values for the previously described variables, for companies listed at the first 3 tiers of the BSE, over a period of at least 3 years. The regression is performed on global data series, with values recorded for all the companies selected for the sample. It comprises of 66 companies and 213 observations on: financial return, net profit, shareholders’ equity, long-term debt and financial lever.

5. REGRESSION ANALYSIS RESULTS

The results of the regression analysis with variables expressed in **percentage values** - financial lever and financial return, are the following:

Table 2. Regression results for percentage values

Regression Statistics					
Multiple R					0.00459888
R Square					2.11497E-05
Adjusted R Square					-0.004740654
Standard Error					0.757093733
Observations					212

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	0.002545845	0.002546	0.004442	0.946927877
Residual	210	120.3700934	0.573191		
Total	211	120.3726393			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	0.059350769	0.052273759	1.135384	0.257509	
0.142301275	-0.000962215	0.014437964	-0.06664	0.946928	

On these results we have to specify the following essential observations:

- Multiple R shows a very weak link between the two variables;
- R Square indicates a very small proportion in which the financial return is explained by the financial lever;
- P-value is greater than 5%; this implies that we cannot reject the null hypothesis which states that the regression parameter is equal to 0; consequently, there is no real connection between financial return and financial leverage;
- Significance F is greater than 5%, which implies that the regression model is not valid; the influence of the explanatory variable on the explained variable is insignificant.

The results of the regression analysis with variables expressed in **absolute values** - long-term debt and net profit, are as follows:

Table 3. Regression results for absolute values

Regression Statistics					
Multiple R		0.33696181			
R Square		0.113543261			
Adjusted R Square		0.109322039			
Standard Error		227877859			
Observations		212			

ANOVA					
	df	SS	MS	F	Significance F
Regression	1	1.39678E+18	1.4E+18	26.89819	5.03534E-07
Residual	210	1.09049E+19	5.19E+16		
Total	211	1.23017E+19			
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	
Intercept	34332945.14	16143287.24	2.126763	0.034607	
150101676	0.147976391	0.028531912	5.186347	5.04E-07	

On these results we have to state the following essential comments:

- Multiple R indicates a weak link between the two variables;
- according to the R Square result, approximately 11,35% from the net profit is explained by the long-term debt factor;
- P-value <5%; we reject the null hypothesis which states that the regression coefficient is equal to 0; thus, a real connection exists between net profit and long-term debt;
- Significance F < 5%, which implies that **the regression model is valid**; the influence of the independent variable on the dependent variable is significant.

6. CONCLUSIONS

The results of this study are contradictory. The regression model tested for percentage values is not valid, yet the regression performed for absolute values has been validated. Both regressions analyzed the relationship between leverage and performance.

Therefore, the Modigliani-Miller model is not verified on data selected from companies listed on the Romanian capital market, and **the defined leverage effect has no statistical significance**. The financial lever does not influence shareholders' financial return on equity; this finding is opposite to the paradigm of finance.

By analyzing the relationship between the amount of financial debt (term debt) and net profit, we detected a significant influence of leverage on performance, sufficient in order to validate the regression. Nevertheless, there is a weak link between the variables.

In conclusion, the manner in which companies listed on the Bucharest Stock Exchange - tiers I, II and III decide to finance their assets has little significant impact on performance (11.35%). This finding partially supports the conclusions of the study conducted by Robu (2005). The analysis needs to be completed by adding more observations to the sample, in subsequent studies in this direction.

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