Trade off theory of capital structure choice and its relevance for emergent markets: the Romanian case

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Abstract: - Standard corporate finance theory supposes that a company chooses a capital structure that maximizes company value. The capital structure of a company is basically described by the two main elements that characterize its debt: financial leverage and maturity. Optimal leverage represents a compromise between the "nominal" stream of tax benefits generated by debt, and the probability of this stream being received. This paper briefly tries to determine a relation between financial leverage and Price Earnings Ratio (PER). The main hypothesis is that such a relation reflecting in fact the linkage between the choice of capital level and structure and the market value of the company. For this purpose, we conduct an empirical research that covers 46 selected companies traded at the Bucharest Stock Exchange within the time period 2005-2009. Our main results reveal a negative relation between the ratios mentioned. Such output suggests that the earnings effect of changes in financial leverage prevails on price adjustments effects.

Key-Words: - capital structure, financial leverage, value of company, PER, GMM-System estimators, Romanian capital market

1 Introduction

The capital structure of a company is basically described by the two main elements that characterize its debt: financial leverage and maturity. Optimal leverage represents a compromise between the "nominal" stream of tax benefits that debt generates, and the probability of this stream being received. As the company increases its leverage, interest payments are higher, and also higher the tax deductions associated to these payments. This would induce the company to choose a leverage rate equal to 100 percent. However, there are two reasons why a company will never do this: First, higher leverage means higher default probability, with the costs associated to this event. Second, and more importantly, tax deductions only apply if the company has a taxable income, that is, if the company is getting positive profits, and these are less likely to happen with such level of interest payments.

It is standard in literature to estimate it's capital structure by financial leverage. As for the definition of leverage, the ratio of total liabilities to total assets is the broadest one and used in many empirical studies. However, Rajan and Zingales (1995) point out that this definition is inappropriate for financial leverage since total liabilities includes items used for transaction purposes (e.g. account payable) rather than financing [1]. Also, Rajan and Zingales (1995) suggest that total debt to capital probably best represents the effects of past financing decisions. Therefore it could be define leverage as the ratio of total debt (short-term and long-term borrowing plus bond) to capital (total debt plus equity) in addition to total liabilities to total assets.

The paper is organized as follows. The next section highlights theoretical considerations regarding the relation between capital structure, financial leverage and value of the company. The third section briefly describes the methodological framework, where for an empirical research we try in section four to search for a relation between financial leverage and value of the company expressed by PER. The data characteristics and the results are reported in this section, whilst the last section summarizes the conclusions of the paper.

2 Literature Review

The roots of the modern capital structure theory can be assumed to be grown up on the seminal paper of Franco Modigliani and Merton Miller (1958) commonly known as the MM theory, dating back to 1958 as one of the most influential papers in the economics literature [2]. It states that based on the assumption of no brokerage, tax and bankruptcy costs, investors can borrow at the same rate as corporations and they would tend to have the same information as management about the company's future investment opportunities. The MM theory proves that under some restrictions a company's value would be unaffected by its capital structure and thus assumes that earnings before income tax

(henceforth EBIT) would not have been related to the use of debt, that leads to the inference that capital structure may be considered irrelevant.

Despite the fact that some of the fundamental assumptions of the theory can be assumed unrealistic in the eyes of investors and other economic agents, the MM relevance theory was generally accepted and subsequent research focused on relaxing some of its assumptions in order to develop a more realistic approach. In this sense, MM published another paper considering some of the criticisms or deficiencies of their theory and relaxed the assumption that there were no corporate taxes [3].

The underlying rationale for the MM theory is that the value of the company is determined solely by the left hand side of the balance sheet which reflects the company's investment policy [4]. So their theory suggests that the value of the company tends to be independent from the debt balance of the company, and instead, it is mainly affected by the presence of a number of projects handled with positive net present value (NPV). In line with these theoretical fundamentals, several arguments lead to the development of trade off theory which suggests that a company's target leverage is determined by taxes and costs of financial distress. Based on the trade off theory that the interest payments tend to be tax deductible, market debts appears to be less expensive than the use of equity financing. In effect, the government pays some portion of the interest incurred, or in other words, debt provides tax shelter benefits. As a result, debt increases the EBIT that provides more inflow to investors. Adding debt to a company's capital structure lowers its (corporate) tax liability and increases the after-tax cash flow available to the providers of capital. This leads us to assume that there would be a positive relationship between the (corporate) tax shield and the value of the company. However in practice, the companies rarely use 100% debt financing. When a company raises excessive debt to finance its operations, it may default on this debt and thus can be exposed to bankruptcy costs. For these reasons, trade off theory claims that tax shield benefits of debt financing need to be adjusted for financial distress costs that rise with increasing debt levels, creating an optimal capital structure that balances both forces [5].

Although the MM theory assumes that investors have the same financial information about a company with that of the managers, which can be referred to as symmetric information, in practice, it is more convenient to assume that managers are likely to have insider information (asymmetric information). Myers and Majluf (1984) accept that company managers have superior information about the actual value of the company [6]. Managers will enable to adjust themselves for the just-timing of the new equity issues if they observe that market price seems to be exceeding their own assessment of the stock value, that is, if the stocks tend to be overvalued by the market. Since investors are aware of the existence of the information asymmetry they will interpret the announcement of an equity issue as a signal of that the listed stocks are overvalued, which subsequently will cause a negative price reaction. If companies are required to finance new projects by issuing equity, under pricing may be so severe that new investors capture more than the net present value of the new project, which would result in a net loss to current shareholders. Even a positive net present value project will be rejected, leading to yet another underinvestment problem. The information costs associated with debt and equity issues have makes Myers (1984) to argue that a company's capital structure reflects the accumulation of past financial requirements. According to the pecking order theory of Myers (1984), companies prioritize their sources of financing - from internal financing to equity issues- according to the law of least effort, or of least resistance, preferring to raise equity as a financing means of last resort. Hence, internal funds are likely to be used first, and only when they are depleted will the companies apply to the new debt issues. Also when it is not sensible to issue any more debt, they would be obliged to realize new equity issues. This theory maintains that companies adhere to a hierarchy of financing sources and prefer internal financing when available, and debt is preferred over equity if external financing is required. The theory suggests that the companies apply to external finance if and only if internal finance has not been sufficient. In case of using external financing, the companies issue the cheapest security first so they start with debt, and then possibly apply to hybrid securities such as convertible bonds, and the issue equity only as a last resort. In contrast to the trade-off theory, there is no well-defined target leverage ratio in the pecking order theory. Debt is considered the first source of external finance on the pecking order. Equity is issued only as a last resort, when the debt capacity is fully exhausted. Tax benefits of debt are assumed to have a second-order effect. The debt ratio varies when there is an imbalance between internal funds and real investment opportunities.

Standard corporate finance theory supposes that a company chooses a capital structure that maximizes company value. Based on this convention, there have been an important amount of researches concerning a company's capital structure decisions. Beginning with the paper of Modigliani and Miller (1958), it develops from models such as tax shelter vs. bankruptcy cost models to agency models, signaling models, and the model based on asymmetric information (pecking-order theory). Also, it is notable that intensive empirical researches followed theoretical development, especially in the U.S. Several studies presented the evidence that

companies behave as if they had target debt-equity ratios and that capital structure models seem to explain actual financing decisions of companies.

From these studies, we know that six important factors seem to affect the determination of financial leverage ratio [7]:

1. *Taxes* - Because of the deductibility of interest payments, using debt rather than equity reduces tax paid by the company. This gain should be large when the company does not have lots of tax shields other than interest payments (non-debt tax shie1ds). Thus, a company with fewer non-debt tax shields issues more debt.
2. *Types of Assets* - The costs of financial distress depend on types of assets. If a company has a large investment in fixed assets (land, buildings, other tangible assets), it will have smaller costs of financial distress than a company with a large investment in research and development (R&D) or advertising. The reason is that fixed assets have relatively high resale value whereas most of R&D or advertising value disappears in financial distress. Therefore, a company with larger fixed assets tends to increase debt, and a company with large expenditures to R&D or advertising prefers to have low leverage to reduce the probability of default.
3. *Investment Opportunities* - Companies having good investment opportunities should use a greater amount of equity finance because highly levered companies are more likely to pass up profitable investment. Also the costs of financial distress are large for the company with good investment opportunities. Thus, the better investment opportunities a company has, the lower leverage should be.
4. *Uncertainty of Operating Income* - Companies with uncertain operating income have a high probability of falling into financial distress, other factors being equal. Thus, these companies tend to issue equity rather than debt to reduce the possibility of financial crisis. In other words, uncertainty of operating income is negatively related to target leverage ratio.
5. *Profitability* - As Myers and Majulf pointed out, under asymmetric information, companies prefer internal funds (internal equity) to external financing (pecking-order-theory). Because profitable companies must have more retained earnings than unprofitable ones, they can finance with plenty of internal funds rather than debt. Thus, we predict the effects of profitability on leverage are negative.
6. *Size* - Large companies in general tend to be more diversified and less likely to be in financial distress. If so, size should have a positive impact on leverage.

However, empirical evidence on the relation between financial leverage and expected stock returns is scarce and contradictory. Bhandari identifies leverage measured in market values as a separate risk factor [8]. Fama-French find that leverage based on book values has a negative risk premium, which contradicts Bhandari's result [9]. They conclude that these results are explained and absorbed by the book-to-market effect. However, Modigliani- Miller's proposition 2 (MM2) does not imply that leverage should be a separate risk factor. Hamada have shown that if the CAPM holds, betas should increase in financial leverage by an arbitrage mechanism [10]. This logic can be extended to show that all factor loadings in a multifactor model should increase in financial leverage.

Base on these previous results, we argued that an increase in financial leverage will exercise at least two sets of distinctive effects on PER dynamic:

- *Income effects* since an increase in the return of borrowed financial resources is expected to improve the overall results of company activities and thus will leads to a decrease in PER level;
- *Price adjustments effects* linked to a greater interest of investors in stocks with lower levels of PER and implicitly with greater potential to growth after the inclusion in their portfolios. Thus, if the prices are elastic, an increase in financial leverage can end by contributing to an increase in PER level.

Of course, these two effects are linked in a multi-periodical sequence and are amplified / inhibit by the global market conditions. More explicitly, if market displays at least a certain degree of informational efficiency, the income effects will be the first to be manifested followed by prices adjustments in a time span depending on prices elasticity.

3 Methodological framework

Overall, the null hypothesis of the present study can be resumed as follows:

H: The financial leverage growth will tend to reduce the level of PER since the income effects will prevail on prices adjustments effects in an emergent market with reduced liquidity and imperfect transaction mechanisms.

Thus, the formal model describing the analytical background will be:

$$PER_{i,t} = f(\text{Financial Leverage}_{i,t}) + \varepsilon_{i,t}$$
$$\frac{\partial f}{\text{Financial Leverage}} > 0 \qquad (1)$$

This study estimates the dynamic panel data model using GMM-System estimator. The system GMM estimator (GMM-SYS) was proposed by Arellano & Bover (1995), Blundell & Bond (1998, 2000), and Windmeijer (2005) [11, 12, 13, 14]. A small panel sample may produce "downward bias of the estimated asymptotic standard errors" in the two-step procedure (Baltagi 2008) and thus we are using the "Windmeijer correction" for the estimated standard errors [15]. There are several advantages of the GMM-SYS over other static or dynamic panel estimation methods. Among them, at least two are relevant for this methodological framework: 1) Static panel estimates, as the OLS models, are subject of the problem of dynamic panel bias (Bond, 2002); 2) In our database there are 46 companies (N) that are analyzed over a period of 5 years (T) and there are several arguments in the literature that that the dynamic panel model is specially designed for a situation where "T" is smaller than "N" in order to control for dynamic panel bias [16].

4 Results and comments

4.1 Data

Data represents annual values of PER and financial leverage covering a time span of 2005-2009. PER is computed as the ratio between the last price of reference year and net income per share. The financial leverage is estimated according to:

$$\text{Financial Leverage}_{i,t} = (\text{ROIA}_{i,t} - \text{eir}_{i,t}) * \frac{\text{Total Debt}_{i,t}}{\text{Total Equity}_{i,t}}$$
$$\text{ROIA}_{i,t} = \frac{\text{Net operating income}_{i,t}}{\text{Total Assets}_{i,t}\,(\text{Net})} * 100 \qquad (2)$$
$$\text{eir}_{i,t} = \frac{\text{Interest expenditure}_{i,t}}{\text{Financial debts}_{i,t}} * 100$$

Where "*ROIA"* represent the return on operational income to total assets and *"eir"* reflect the effective interest rate.

The data are provided by Bucharest Stock Exchange (www.bvb.ro). The data are grouped in two conventional sectors: "A" (or primary and secondary industries- "extraction and manufacture or refined of petroleum, including support services, manufacture of industrial machinery including manufacture of air and spacecraft and related machinery, private and industrial constructions, raw materials extraction and manufacture".) and, respectively, "B" (pharmaceutical products, equipments, telecommunications, transports, manufacture of agriculture products, tourism, and services).

The main statistic characteristics of the data are reported in Table 1. It can be observed that the data are non-normal for both sectors with significant long-tails effects and peaked (*leptokurtic*) distributions.

Table 1: Main statistic characteristic of the data

	Leverage Sector "A"	**Leverage Sector "B"**	**PER Sector "A"**	**PER Sector "B"**
Mean	0.0541	0.0071	16.7361	20.3473
Median	0.0116	0.0015	5.6550	11.3650
Maximum	3.9092	0.4529	258.4900	269.1000
Minimum	-1.1774	-0.1844	0.0000	0.0000
Std. Dev.	0.3866	0.0786	36.0623	32.3537
Skewness	8.0956	2.4026	3.9214	4.7850
Kurtosis	84.7655	17.1767	21.5346	34.1707
Jarque-Bera	34738.7400	1026.9810	2025.1960	4872.9790
Probability	0	0	0	0
Sum	6.493105	0.778735	2008.33	2238.2
Sum Sq. Dev.	17.79	0.67	154758.30	114096.90
Observations	120	110	120	110

4. 2 Results

Table 2 reports the estimations using the GMM-system (GMM-SYS) estimator. In order to check for the robustness of these estimations, along with the Sargan test, are reported also the residuals characteristics.
The dynamic panel data can be considered valid if the estimator is consistent and the instruments itself are valid. Due to the small data sample, we are involving the Windmeijer (2005) correction for errors in small samples.

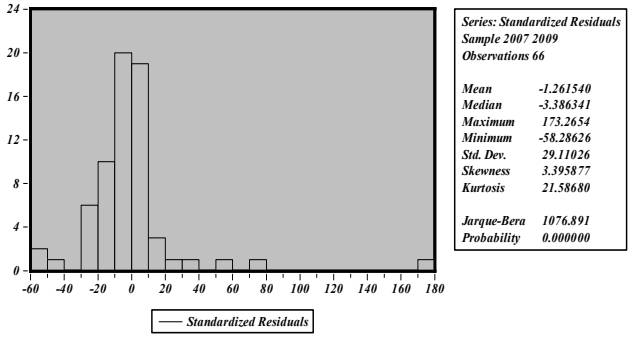
Table 2: GMM-System estimation for the impact of financial leverage on PER indicator
***Dependent Variable**: PER*
***Method**: Panel Generalized Method of Moments (period dummy variables included)*
***Transformation**: Orthogonal Deviations*
***Sample (adjusted)**: 2007 2009*
***Periods included**: 3*
***Cross-sections included**: 24 for sector "A" and 22 for sector "B"*
***Total panel (balanced) observations**: 72 / 66*
White period instrument weighting matrix
White period standard errors & covariance (no degree of freedom correction)

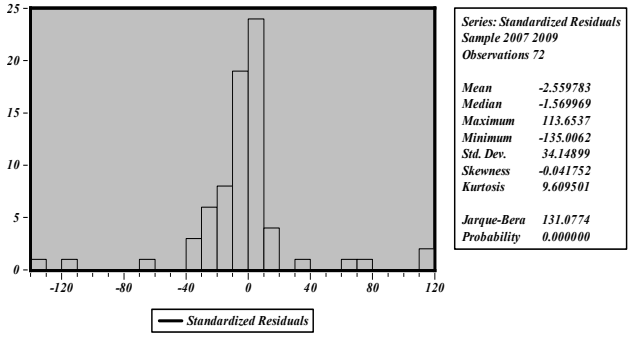
Constant added to instrument list

Variable	Sector "A"	Sector "B"	Expected sign
PER_{it-1}	0.27*** (0.03) [10.06]	-0.13*** (0.02) [-6.19]	+
$FinancialLeverage_{it-1}$	-7.18*** (0.71) [-10.06]	-46.46** (9.55) [-4.86]	-
J-statistic	7.74	9.48	
Sargan test	0.65	0.49	

*, **, *** significance level at 10%, 5%, 1%
Standard errors in () and t-statistic in []

Graphic 1: The histogram of standardized residuals





Overall, the results from Table 2 are indicating a statistical significant negative impact of lagged financial leverage on current dynamic of PER. In the mean time, such impact seems to have non-uniform amplitude in each of these sectors being larger for sector "B" and also displaying different levels of significance. Supplementary, the autoregressive pattern of PER is distinctive, positive for sector "A" and negative for sector "B".

It can be noticed the fact that the values of the Sargan tests for the over-identifying restrictions suggests that their formulation can be seen as satisfactory. However, the values of the distributional parameters for the estimation residuals display some differences between sectors in terms of estimation quality. While for sector "A" the values of skewness and kurtosis indicates a long left tail effect and a peaked (*leptokurtic*) distribution
relative to the normal one, for sector "B" the distribution of residual appears to be more symmetric but still peaked. Still, despite the non-normality of residuals, it can be considered that the estimations are robust enough.

Overall, the empirical evidences tend to support the *H* hypothesis. But the differences in specific results for the two considered sectors raise an important caveat. In greater details, these results seem to highlight some particularities in sectors prices mechanisms in terms of their adjustment speed under the impact of financial information. More exactly, since the spillover effects of financial leverage are larger in sector "B" it can be argued that for the financial instruments with issuers in tertiary sectors the prices are adjusting themselves stronger than for the financial instruments originated in primary and secondary sectors. Here, it should be noticed that the sector "B" is defined by the inclusion of the five financial investments societies "SIF" as well as of three larger credit institutions which are providing together an important fraction of the total market liquidity. Thus the prices adjustments effects are specially enhanced in this sector by the existence of a liquidity premium.

4 Conclusion

The purpose of this study was to provides some empirical evidences on the connection between company's capital structure, as it is this reflected by the financial leverage, and market value described by PER.

In GMM-System estimator, we found that a statistical significant negative correlation between these two variables holds even in the case of an emergent capital market as the Romanian one. In our view such output can be analyzed based on the assumptions of trade off theory.

More exactly, one can argue that for an emergent market, with severe restrictions on financial resources supply side, the choice of the capital structure imply a tradeoff between external sources represented mainly by banking credit and limited appeal to the financing opportunities through the capital market.

Of course this study have several limits both on conceptual as well as on empirical level. Among this:

1. The use of return of operating income to total assets ratio instead of EBIT on total sales ratio. The main reason for such substitution is connected to the real sectors 'prices rigidities and slow adjustments mechanism in an inflationary environment. Thus, we had

considered that the total assets reflect better the output of the company's operational activities.

2. The short-time span considered, the limited numbers of traded companies included the absence of split by sectors, the absence of any references to the inter-correlation between stocks as well as between stocks and global market dynamic, some robustness of the estimated coefficient problems revealed by the existence of certain autocorrelations in estimation residuals etc.

Despite the resulted caveats, we are arguing that there is a support for the trade off theory application to the Romanian case and further investigation are relevant for a better understanding of capital structure formation mechanisms.

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