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The determinants of capital structure choice: Evidence from Western Europe

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This paper examines corporate leverage and its determinants on panel of 921 large Western European companies from 2003 to 2010. The results proved a substantial influence of estimated variables on changes in target debt or leverage ratio. Apart of the determinants from the «core" model, I test the influence of stock price variations on changes in capital structure to conclude if companies «time" the market. The estimation procedure of target debt ratio was performed using Fixed-Effect and FGLS methods. The results were compared to the results of often used methodology in previous research - OLS and Tobit regression. I found statistically significant and negative correlation between target leverage ratio and tangibility, market to book, profitability, product uniqueness and total return (average stock return) and statistically significant and positive correlation between target leverage ratio and size. The results suggest the mix of trade-off and pecking order theory predictions and are consistent with findings of previous studies. Future research should focus on impact of leverage deficit (deviations from target leverage ratio) on corporate decisions in Europe.

JEL Classifications: G15, G30, G32

Keywords: Capital structure, target debt ratio, Western Europe, trade-off theory, pecking order theory

Introduction

During the last five decades, research regarding the issue of capital structure has had both theoretical and empirical continuity - from Miller and Modigliani (1958) to contemporary models and theories. Nevertheless, no theories have been formulated that would offer an answer to a variety of questions, especially those regarding the key issue about the very existence of optimal capital structure. Having said that, there is an inflicting conclusion that it is impossible to create optimal relations between financial sources (in terms of a single pervasive norm), but still each company must develop financial flexibility under imposed specific conditions (Myers, 1984).

Trade-off theory states that targets (Kraus and Litzenberger, 1973) are made in order to trade-off between costs and benefits of debt versus equity, whilst pecking order theory (Myers, 1977; 1984) defines certain financing hierarchy - from internal sources, over debt to equity as a last resort. Even though two main theories of capital structure give opposite conclusions, empirical research suggests that companies define target debt ratio, ranging from more strict to flexible (Brounen et al., 2006; Bancel and Mittoo, 2004; Graham and Harvey, 2001). This means that depending on financial flexibility, and various factors such as information asymmetries, market inefficiencies, transactions, agency and financial distress costs, companies adjust their target debt ratios (Kayhman and Titman, 2007). Therefore the real situation on the market is reflected in the certain mix of two main theories.

In order to test the assumptions of trade-off and pecking order theory and gain insight in companies' financial decisions, their capital structure has to be estimated depending on

various determinants. We must admit that many important factors affect companies' financing decisions, but the estimation model must be narrowed in order to gain more objective and consistent results. In that sense, most empirical researches apply the *core model of leverage* (Frank and Goyal, 2009) which consists of most important capital structure factors. The reasoning behind this model is the fact that these variables/factors are explaining over 30% of variations in leverage. The variations of this model exist, depending on type and empirical research specification.

The aim of this paper is to estimate target debt ratio of large western European companies, regressing it on main determinants used in prior studies (Uysal, 2007; Kayhan and Titman, 2006; Hovakimain, Opler and Titman, 2001; Rajan and Zingales, 1995; Titman and Wessels, 1998). The main idea is to contribute in estimation of target debt ratio in Western Europe, which was not as vastly researched as North American region, especially on sample of large companies. Large companies are prone to significant changes in capital structure especially in process of corporate restructuring (our sample consist on average of 70% companies that performed M&A[1]). Moreover, according to some of previously mentioned studies (Uysal, 2007; Kayhan and Titman, 2006; Hovakimain, Opler and Titman, 2001) I include stock price histories as an important factor which affects capital structure choices. In this manner I can derive conclusions about companies' market timing in context of financial decisions (Baker and Wurgler, 2002). Finally, according to these studies, companies significantly adjust capital structure and deviate from targets. Broadening the analysis with dynamic assumptions, future research should focus on impact of deviations on corporate decisions in Europe.

The remainder of the paper is organized as follows: Literature section presents relevant theoretical and empirical evidence concerning capital structure determinants. Next section reports data and presents research methodology. Last sections provide the argumentation and discussion of results, as well as conclusion.

Literature review

The variations and adjustments of debt ratios has been the subject of constant scrutiny over the last few decades, mainly in the context of establishing adequate capital structure. The generally accepted theoretical assumption is that companies define debt/equity ratio by taking into account factors that affect the costs and benefits of debt and equity issuance. Their influence can be measured by regression estimation of target debt ratio, whereas the factors would be explanatory variables. In the analyses of this type there are few potential problems (Titman and Wessels, 1988):

- The existence of various indicators which can be used to describe the same characteristic of the company. In such a situation, researchers who do not have a solid theoretical background on capital structure, often choose precisely those variables which best show the interdependence in terms of statistical tests (although other variables might have been more relevant in assessing the level of debt or leverage). Adjusting the models in terms of choosing less representative variables can lead to biased results;
- It is often difficult to find a measure of one attribute of the company, which is not correlated with other attributes evaluated by the model;
- Variables, as proxies are not perfect substitutes of an attribute they are measuring. The errors in the evaluation occur for this reason, and these could lead to biased results.

In order to set a properly specified model, variables (indicators) that best describe the attributes of the company must be carefully selected based on previously conducted theoretical and empirical research. Moreover, it is desirable to evaluate a model using

[1] 70% of companies, on average, announced and successfully acquired a target. The rest of companies announced, but did not successfully complete the transaction.

various methodological approaches (ordinary least squares, feasible generalized least squares method, tobit and probit regression, dynamic methods, structural/linear modelling, etc.). We shall further give an overview of the main determinants of capital structure.

Tangible assets

A high share of tangible assets represents a great level of security for the creditors. If a company issues secured debt (debt secured by the value of fixed assets), its equity value may increase by the increase in stock price (positive market response to the financial stability of the company). In addition, Myers and Majluf (1984) believe that in the event of equity issuance, the information asymmetry between managers and stakeholders (investors) may cause greater expenses, which gives priority to debt issuance. For that reason, it is expectable that companies with a higher share of tangible assets make use of the opportunity to issue secured debt. Galai and Masulis (1976) argue about the conflict between shareholders and bondholders in terms of the correlation between leverage and tangible assets. Debt for that reason can be secured not only by collateral but also by clauses within the contract, limiting the underinvestment problem. In this sense, we can say that leverage is positively correlated with the tangible assets.

A stance within the Grossman and Hart (1982) research framework suggests a potential negative correlation between these two variables. Companies that produce specific or unique product often have tangible assets that cannot be easily sold or assets with lower liquidity, which prevents them to use it as collateral. In order to discipline management and decrease agency costs, these companies can shift to another form of collateral. At the end, they can use internal sources or issue equity. Also, based on the pecking order theory (Harris and Raviv, 1991), companies prefer internal as opposed to external financing, which could in practice lead to a negative correlation between leverage and tangible assets. Low information asymmetry associated with tangible assets as potential collateral, decreases equity issuance costs. Additionally, results of various studies (Cassar and Holmes, 2003; Nivorozhkin, 2002; Cornelli et al., 1996) show that actually high proportion of short-term debt in total debt generates negative correlation between leverage and fixed assetsFinally, reduced bank lending and high interest rates - especially considering developing countries, periods of crisis, high country risk (Thalassinos et al., 2010) - can move company towards the use of other sources of financing, which again draws a negative correlation between these two variables.

The tangibility or collateral is most commonly measured through ratios that place fixed assets in a relation to total assets. In some cases inventory is included apart from fixed assets (Titman and Wessels, 1988).

Size

An aspect such as the size of a company clearly has a significant impact on the possibility to issue debt. Size can be a substitute for the efficiency of a company because in business, commonly large companies are effective. According to Baker and Martin (2011), larger enterprises tend to have a diversified business portfolio, which implies smaller cash flow volatility, lower cost of financial distress and probability of bankruptcy comparing to smaller companies. This also means better conditions for borrowing, a stronger negotiating force, and an easier access to funds. Most often large companies are listed on the stock exchanges, which increases business transparency and decreases information asymmetry. For this reason, larger companies are enabled with an easier access to international markets and sources of funding, as well.

Due to the abovementioned, the static trade-off theory defines a negative relation between size and bankruptcies, and a positive one between the size and leverage. On the other hand, from the position of pecking order theory, there is potential for a negative correlation between the size of the company and debt, due to lower information

asymmetry between insiders from companies and investors. Lower information asymmetry allows companies to issue equity.

A normal logarithm of total assets, sales and job quit rates are taken as a measure for this determinant. The assumption is that the larger companies have a greater value of assets and sales, and for this reason the size of the company can be expressed through these variables (Rajan and Zingales, 1995). We could measure the «large business phenomenon», by taking into account quit rates (Titman and Wessels, 1988), as such companies have lower quit rates. Market capitalization formula is not a suitable measure because of frequent fluctuations in the prices of stocks.

Growth

The growth of a company implies existence of a sufficient number of financial sources for investing in its growth and development. These are mostly new investments. In the static trade-off theory, there is a claim that the companies which have more opportunities for investments, tend to issue less debt for fear of potentially unprofitable investment and financial distress, or agency problem between shareholders and creditors. Therefore, the expected growth of a company in the future should cause negative correlation with the level of leverage or debt (Jensen and Meckeling, 1976). Generally, pecking order theory predicts positive relation between growth and leverage, considering that highly profitable companies have more investment opportunities. When investment cost exceeds retained earnings, company issues debt. Myers (1984) argues that previously mentioned agency problems can be solved issuing short-term rather than long-term debt.

On the other side, the more complex view of pecking order theory takes into account the rational outlook of managers on current and future financial costs, which leads to their desire to maintain a low level of debt at times when bigger investments are expected, as well as potential growth of a company (Baker and Martin, 2011). If the right balance between current and future costs of funding is well maintained by keeping the low level of leverage, the company's internal sources will be used. This implies negative sign between leverage and growth.

The most commonly used ratio taken as a measure of business growth is the ratio of company's market value to its total assets (market to book ratio).

Average stock return

Along with market to book, this variable is used as a proxy for growth. Welch (2004) states that stock return volatility (appreciation in the stock price plus paid dividends) significantly impact capital structure changes. In the situation of sudden price appreciation (stock run-ups), managers will be motivated to issue shares, which is in accordance with market timing theory. Based on this theory, it is important to monitor the market and choose the right moment to buy or sell stocks. Stock price changes have resulted to have a prominent effect on capital structure decisions (Uysal, 2007; Titman, 2002; Hovakimian et al., 2001; Welch, 2004; Baker and Wurgler, 2002). Historical increase in prices may proxy for future market performance. Kayhman and Titman (2007) discuss that their paper gives and comprehensive analysis (comparing to other empirical evidence) of capital structure determinants, because besides cash flows and investment expenditures, they test how stock price histories affect capital structure choices.

Accordingly, it could be concluded that higher stock returns are negatively correlated with leverage. A negative relationship between stock returns and leverage is proved in situation of low adverse selection costs (Lucas and McDonald, 1990). These costs are low if equity is issued by good quality companies. Amongst various factors, market will recognize the

type of company by the type of market signal (high quality company is going to send dissipative signals).

On the other side, static trade-off theory (Kraus and Litzenberger, 1973) assumes that managers will be motivated to increase leverage if it is currently low, even if stock prices are high. In a situation when the company in underleveraged, managers could be motivated to additionally increase debt in order to rebalance the cost of financing distress and benefits of interest tax shields. This implies positive correlation between leverage and stock returns, which has low support in vast empirical evidence. Stock return is commonly defined as average adjusted percentage annual stock return over one to three years.

Profitability

In terms of the static trade-off theory, profitable companies can move their capital structure towards debt for several reasons. Firstly, as profitability grows, the cost of potential bankruptcy is reduced. Secondly, the chance of reducing the tax base, by subtracting the cost of interest, motivates a company to issue debt. Finally, Jensen's (1986) hypothesis on free cash flow brings us to a conclusion that only debt prevents managers of profitable companies from excessive and uneconomical spending, which is regarded as the agency problem between managers and shareholders. These observations imply a positive correlation between profitability and debt.

As opposed to the interdependence defined in a fore mentioned way, there is also the position of the pecking order theory (Myers, 1984; Myers and Majluf, 1984). The hierarchy within the financing of companies, retained earnings have priority as a source of finance. Accordingly, we conclude that the relationship between profitability and debt is negative.

Profitability can be described as the ratio between either operating margin (EBITDA) and total assets, or operating margin and sales revenue (Uysal, 2007; Titman and Wessels, 1988).

Product uniqueness

Companies that manufacture and sell products unique in their form and function ought to have a specialized production and distribution chain: from consumers, to workers and suppliers. Specialized production requires specified fixed assets, particularly in the production process (specially designed machines for the production of unique products). Such fixed assets have low liquidity and marketability. For these reasons, it is expected for product uniqueness to be negatively correlated with leverage (trade-off theory)[1].

The most commonly used measures are: the ratio of research and development costs to total assets; ratio of research and development costs to sales revenue; selling expenses over sales and quit rates (Titman and Wessels, 1988).

Cash flow volatility

Volatility of cash flows or earnings can increase the cost of bankruptcy or financial distress. Large fluctuations of cash flows impose stricter conditions in bond or credit market (higher interest rates). Also, large earnings fluctuations unable investors to accurately predict future earnings growth (De Angelo and Masulis, 1980). In this sense, having in mind the aforementioned theories of capital structure, we notice that volatility and debt are negatively correlated (higher financial distress and information asymmetry

[1] The view of pecking order theory is not so clear-cut, but we can expect from the assumptions that unique products are made and sold by highly profitable companies, which decreases information asymmetry and makes debt issuance attractive. For that reason it can be presumed that according to this theory there is a positive sign between uniqueness and leverage.

costs). The measure that best describes this attribute of the company is the standard deviation of percentage changes of operating income (Titman and Wessels, 1988).

Taxes

Taxes are an important factor to be considered in the analysis of capital structure, i.e. in determining the effect of leverage on the value of a company (De Angelo and Masulis, 1980). Given the fact that the sum of interest expenses are subtracted from revenues, leading to tax base reduction and decreasing of the gross income result, companies might be motivated to borrow more in order to maximize their value, especially when tax rates are high (positive relation). These are the so-called tax savings generated by debt issuances. However, savings can be generated through the nondebt-tax shields, as well. If a company has a high amortization costs, or the costs of research and development, it may also decrease tax base, consequently leading to the reduction of borrowing (Fama and French, 2002). Namely, this is the reason why nondebt-tax shields are in negative correlation with leverage. The research results are in accordance with the trade-off theory[1].

Nondebt-tax shields can be measured by the ratio of depreciation over total assets or investment tax credits over total assets. The impact of taxes can be measured by incorporating the effective tax rate in a model (the ratio of tax over gross margin).

The industry classification

The industry classification represent an important factor in debt/equity choice, considering that production process, sales, the type of company or belonging to specific industry itself must determine the level of leverage. The survey of Harris and Raviv (1991) and Graham and Harvey (2001) has shown that the pharmaceutical, food and electrical industries commonly have lower leverage, while textile, dairy and construction industry tend to have a high leverage. Therefore the industry effect, when possible, should be included in estimation procedure of target debt ratio (as a dummy variable, unobservable fixed effect etc.).

TABLE 1. EXPECTED CORRELATION BETWEEN CAPITAL STRUCTURE DETERMINANTS AND LEVERAGE ACCORDING THE TWO MAIN CAPITAL STRUCTURE THEORIES

Factors	Trade-off theory	Pecking Order Theory
Tangibility	+	-
Size	+	-
Growth opportunities	-	+
Profitability	+	-
Expected Inflation	+	+
Industry median growth/leverage	-/+	

Source: Frank and Goyal, 2009.

Note: Under Pecking order industry has and indirect effect and it is not regarded as a core capital structure factor.

Apart of these main determinants, it is very important to take into consideration debt rating, debt market conditions, legal environment and macroeconomic conditions. Dynamic trade-off theory is testing the deviation and adjustment of debt ratio or leverage from or toward an optimal point. The results of various empirical studies confirm that deviations from target or optimal capital structure and adjustment speed are dependent on

[1] As well known, pecking order theory is not trading off benefits of debt and equity through taxes. It prefers financing hierarchy determined by information asymmetry.

macroeconomic conditions and specific country environment (De Jong et al., 2008; Huang and Ritter, 2004; Deesomsak et al., 2004; Drobetz et al., 2007). Specifically, as concluded by Hackbarth et al. (2006), firms should adjust their capital structure often, but in smaller amounts in expansion comparing to recessions.

Even though there is many important determinants affecting capital structure, most empirical researches applies the *core model of leverage,* which consists of most important capital structure factors. The reasoning behind this model is the fact that these variables/factors are explaining over 30% of variations in leverage (Frank and Goyal, 2009) (Table 1).

This model is widely applied with minor deviations in determinants selection. For example the assets can be replaced by sales and vice versa, as both categories represent growth. Additionally, expected inflation represents one of the main determinants in Frank and Goyal core model. Still, variations in leverage cannot be in high percentage explained by the change in inflation rate. This gives a possibility to replace inflation by taxes, or to add cash-flow volatility or product uniqueness inside the model. The model has to be specified according the specific characteristics and the aim of the research.

TABLE 2. CORRELATION SIGNS BETWEEN LEVERAGE AND ITS DETERMINANTS - RESULTS FROM SELECTED EMPIRICAL STUDIES

Factors	Frank and Goyal (2009)	Kayhan and Titman (2007)	Uysal Vahap (2007)	Fan, Titman and Twite (2003)	Goyal, Lehn and Račič (2002)	Hovakimian, Opler and Titman (2001)	Shyam-Sunder and Myers (1999)	Titman and Wessels (1998)	Rajan and Zingales (1995)	Jensen, Solberg and Zorn (1992)	Kim and Sorensen (1986)
Tangibility	+	+	+	+	-	+	+		+	+	
Size	+	+	+	+	+	+		-	+		
Growth opportunities	-	-	-	-	-	-			-		-
Profitability	-	-	-	-	-	-	-	-	-	+	
Volatility							-			-	+
Taxes				-							-

Source: Baker and Martin (2011) with minor author's corrections.

Note: Determinants found to be significant in more than one empirical study are shown in table. Empty cells mean that these determinants either were statistically insignificant or not tested by model.

The Table 2 gives and overview of signs between estimated determinants coefficients and leverage, derived from selected empirical studies.

Data and methodology

Sample selection and descriptive statistics

Target leverage ratio will be estimated analysing annual panel data of companies in Western Europe covering period from 2003 to 2010. The data was generated from Bloomberg Annual Files. Companies which met following criteria were included in the sample:

- Actively trading shares in observation period;
- Companies which domicile region was Western Europe;
- Companies which do not operate within financial sector and regulated utilities;
- Types of securities traded are common shares;

- The value of sales in fiscal year 2010 is greater than or equal to 50 million euros[1].

After following these criteria, I end up with 921 large companies (on average, 70% of our sample represent companies that performed M&A). In order to assess the target leverage ratio, following fundamental indicators were tested in the model[2]:

- Book leverage (BL), defined as Total Liabilities over Total Assets;
- Tangibility (TA), defined as Tangible Assets over Total Assets;
- Market to Book (MB), defined as Total Market Value over Total Assets;
- Sales are the natural logarithm of Sales, Revenue or Turnover;
- Profitability, defined as EBITDA over Total Assets;
- Product uniqueness (PU), defined as R & D Expenditures over Total Assets;
- Total return or average stock return (TR).

Analysis refers to panel data due to the fact that panel data sets for economic research possess several major advantages over conventional cross-sectional or time-series data sets. Therefore, observations in panel data involve at least two dimensions: a cross-sectional dimension, and a time series dimension. In our example, the comparison is made through fundamental indicators observed by 921 companies, in the period of 8 years. Table 3 reports the summary statistics of firms in our sample.

TABLE 3. SUMMARY STATISTICS OF 921 COMPANIES FOR THE 2003-2010 BLOOMBERG SAMPLE

Value	BL	TA	MB	Log Sales	Profitability	PU	TR
Number of companies	921	921	921	921	921	921	921
Number of company's' year observations	7048	7048	7048	7034	7048	7048	6508
Average	0.599	0.755	1.378	9.229	0.145	0.020	26.526
Median	0.604	0.832	1.072	9.192	0.128	0.000	21.404
Standard deviation	0.205	0.251	1.635	0.687	0.137	0.057	61.771
Variance	0.042	0.063	2.674	0.472	0.019	0.003	3815.652
Skewness	2.426	-1.544	15.848	0.053	18.566	15.073	4.235
Kurtosis	34.14	5.084	458.177	3.427	1060.428	507.582	56.879
Coefficient of variation	0.342	0.332	1.187	0.074	0.945	2.856	2.329
Q1	0.485	0.650	0.748	8.776	0.092	0.000	-4.724
Q3	0.713	0.944	1.603	9.698	0.179	0.020	49.348
Interquartile difference	0.228	0.295	0.855	0.922	0.087	0.020	54.072

Source: Author's calculations.

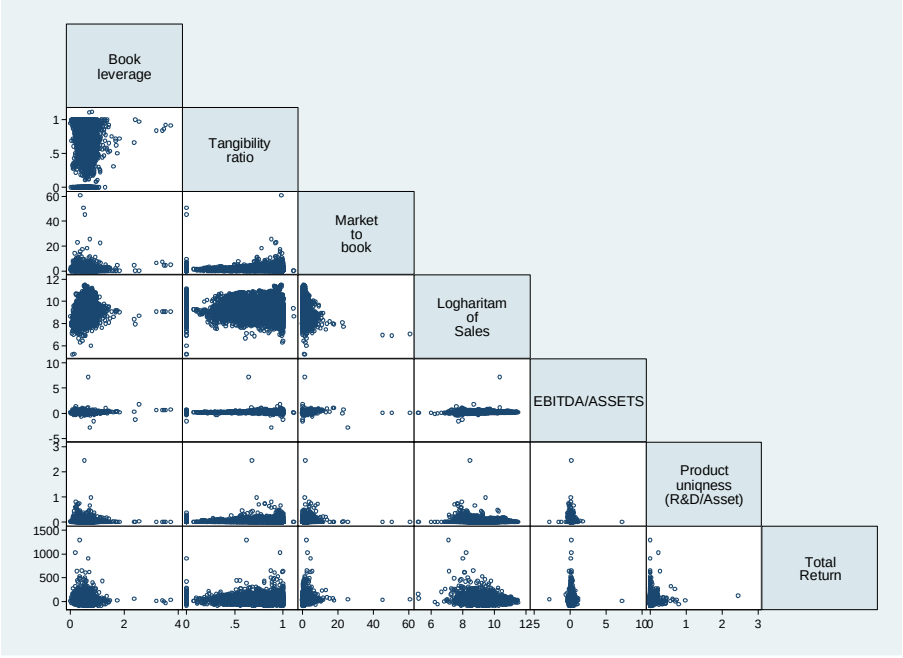
The book leverage, defined as sum of all current and non-current liabilities divided by total assets, on average amounts 0.599 with high standard deviation of (0.205). Large variance around the mean could imply that a group of companies potentially deviate from target debt ratio. As previously mentioned, large companies are prone to significant changes in capital structure, especially in process of corporate restructuring These adjustments in capital suggest that the sample consists of companies which are underleveraged or overleveraged (Hovakimian et al., 2001; Uysal, 2007). Mean values of explanatory variables TA, MB, Log Sales, Profitability, PU and TR are 0.755, 1.378, 9.229, 0.145, 0.020 and 26.526 respectively.

[1] Based on the rules adopted by the European Commission in year 2005 which are still in force, the company is defined as small and medium sized (SME's) if its annual income from sales is less than or equal to 50 million euros. These companies are excluded from the sample because of two reasons:

- We wanted to focus on financially stable companies, which are most probably large companies;
- A negligible proportion of small companies would, through extreme values in the model, create the effect of "noise" (noisy variables).

[2] Data definition is given in Appendix.

FIGURE 1. CORRELATION MATRIX OF BOOK LEVERAGE AND EXPLANATORY VARIABLES



Source: Author's calculations.

Figure 1 presents correlation matrix of dependent and independent variables. The highest correlation (0.3268) is found between profitability and market to book, and between book leverage and sales or size (0.2856). These results can lead us to conclusion that companies with high growth perspectives (high market value) are highly profitable companies, with maintained financial slack - internal sources (pecking order theory). Still, the positive correlation between leverage and size implies that larger companies, according to trade-off theory, are more prone to increase debt. Nevertheless, the assumptions of both theories will be discussed after the regression estimation procedure.

Target leverage ratio estimation procedure

Capital structure theories and results from empirical research suggest that companies have targets related to debt ratio. This target is determined by trade-off between costs and benefits of debt versus equity. As already mentioned, results from survey conducted by Graham and Harvey (2001) show that targets exist in range of being strict (10%), somewhat tight target (34%), to flexible (37%) in US. European evidence shares the same results. Bancel and Mittoo state that about 75% of companies have target debt-to-equity ratio. Brounen et al. (2006) conclude that over the two-thirds of firms have some target debt ratios, in range of being strict (10%), more somewhat tight to flexible. This means that target suggested by traditional trade-off theory exists, being in range of strict to flexible. The flexibility of ratio leads to conclusion that companies deviate from target leverage ratio according to various theoretical reasons: information asymmetry, market timing, free cash-flow etc. (Kayhan and Titman, 2006).

Consistent with previous research and the idea behind capital structure determinants (Donaldson, 1961; Myers, 1984; Rajan and Zingales, 1995; Titman and Wessels, 1998; Hovakimian et al., 2001; Kayhan and Titman, 2006; Uysal, 2007), we will estimate target

or optimal leverage ratio, regressing book leverage of company *i* on a vector of explanatory variables[1].

$$\text{Book leverage}_i = \alpha + \beta_1 \text{Tangible Assets}_i / \text{Total Assets}_i + \beta_2 \text{Market to Book}_i + \beta_3 \text{Log Sales}_i + \beta_4 \text{Ebitda}_i / \text{Total Assets}_i + \beta_5 \text{R\&D}_i / \text{Total Assets}_i + \beta_6 \text{Average Stock Return} + \varepsilon_i \quad (1)$$

According to Uysal (2007) and Fama and French (2002), book leverage is used because:

- Mechanical relationship between market leverage and determinants which include market values (e.g., market to book). Increase in market value will create spurious correlation between variables scaled by market value, increasing both left and right side of regression (Parsons and Titman, 2009);
- Regressions including market-based leverage can lead to confusing results considering underleveraged and overleveraged firms. This because some firms could be identified as underleveraged due to steep runups of stock prices;
- Book values of leverage are suitable in testing pecking order and trade-off theories assumptions.

Even though the model and its variables are consistent with previously mentioned research, recent empirical evidence (Lemmon et al., 2008; Chang and Dasgupta, 2011; Flannery and Rangan, 2006) shed some light on the reliability of these factors as variables, when estimated using OLS or Tobit regression. The argumentation is given in time-invariant characteristics of unobservable firm-specific factors, which explain most of the cross-sectional variations in capital structure and potential deviation from target capital structure (Matemilola et al., 2013). These characteristics are firm's industry, managerial skills, managerial abilities etc. This is why the estimation procedure of target capital structure should shift from time cross-section analysis to analysis of panel data.

Therefore, the aim of this paper is to analyse the impact of variables that vary over time. For this reason in the first phase I applied Fixed-Effects Panel Method (FE). FE removes the effect of time-invariant characteristics of company, so the net effect of independent on the dependent variable could be assessed without bias (Baltagi, 2013). As each company is different, its error term and the constant should not be correlated with the others. FE model is defined as:

$$Y_{it} = \beta_{it} X_{it} + \alpha_i + u_i \quad (2)$$

Where α_i (i=1….n) is the unknown intercept for each entity, Y_{it} is the dependent variable for entity i at time t, X_{it} represents independent variable, β_{it} is the coefficient of X_{it} and u_{it} is the error term.

The Hausman test also supports the use of the Fixed-Effects. In order to test the reliability of Fixed-Effects Model, Hasuman test (Hausman, 1978) was used. The basis of test is the comparison between the parameter estimates of the Fixed-Effects and the Random-Effects model (Greene, 2012, Wooldridge, 2002). H0 assumes that unique errors (u_{it}) are not correlated with the regressors. If exist a correlation, than Fixed-Effects will be used.

[1] According to Uysal (2007) the regression included R&D Dummy, which took the value of 1 if Bloomberg reported R&D expenses as missing. Because of high correlation with other explanatory variables, this one was omitted by regression.

TABLE 4. HAUSMAN SPECIFICATION TEST RESULTS

Variables	(b) Fixed	(B) Random	(b-B) Difference	sqrt (diag(V_b-V_B)) S.E.
Tangibility	-0.032282	-0.0341958	0.0019132	0.0012451
Market to book	0.0013497	0.0009259	0.0004238	0.0003208
Logarithm of sales	0.0235831	0.05033	-0.0267469	0.0053424
Profitability	-0.0172787	-0.0261362	0.0088575	0.0021997
Product uniqueness	0.0185282	-0.0259601	0.0444883	0.0104003
Total return	-0.0000818	-0.0000728	-9.03e-06	2.40e-06
χ^2 (6) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 46.34				
Prob>chi2 = 0.0000				

Source: Author's calculations.

According to results, the null hypothesis is rejected, therefore indicating the use of FE model. The results of this model are given in Table 5.

TABLE 5. REGRESSION ESTIMATES OF THE TARGET LEVERAGE RATIO USING FE

VARIABLES	FIXED EFFECTS
Tangibility	-0.0323***
	(0.00624)
Market to book	0.00135
	(0.00125)
Logarithm of sales	0.0236***
	(0.00793)
Profitability	-0.0173
	(0.0118)
Product uniqueness	0.0185
	(0.0348)
Total return	-8.18e-05***
	(1.95e-05)
Constant	0.401***
	(0.0732)
Observations	6,486
R^2-within	0.010
R^2- between	0.0873
R^2- overall	0.0713

Source: Author's calculations.

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

According to the FE results, only tangibility, size and average stock return were statistically significant. Additionally, sings of remaining determinants coefficient estimates were generally not consistent with previous research. Post-estimation of FE results indicated the presence of heteroscedasticity and first-order autocorrelation (Table 6), which is why the results were subject to bias.

Therefore the regression was estimated applying Feasible Generalized Least Squares Method (FGLS). This model allows estimation in the presence of AR(1) autocorrelation within panels and cross-sectional correlation and heteroscedasticity across panels (Baltagi, 2013).FGLS estimator is defined as (Baltagi, 2013):

$$\beta_{FGLS} = (X'\Omega X)^{-1}X'\Omega y \quad (3)$$

Where X represents independent variable, Y dependent variable and Ω covariance matrix of unique errors.

TABLE 6. TESTING FOR AUTOCORRELATION AND HETEROSCEDASTICITY

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
F (1,869) = 536.768
Prob> F = 0.0000
Modified Wald test for group wise heteroscedasticity in fixed effect regression model
H0: $sigma(i)^2 = sigma^2$ for all i
χ^2 (883) = 6.6e+31
Prob>χ^2 = 0.0000

Source: Author's calculations.

As FGLS is based on calculation of panel-specific residual variance structure (Wooldridge, 2012, p. 425), we could presume that will absorb the fixed effects for the panel variable specified (when data is set as panel). Potentially, including dummy variables for firm-specific factors could inflate the chi square statistic. This is why I estimated the model including industry and time dummies (controlling for industry effect and changes in tax rates and macroeconomic changes over years (Uysal, 2007)), as well the model without these dummy variables. The results are shown in Table 7.

TABLE 7. REGRESSION ESTIMATES OF THE TARGET LEVERAGE RATIO USING FGLS

VARIABLES	FGLS (1)	FGLS (2)
Tangibility	-0.0143***	-0.00910**
	(0.00330)	(0.00362)
Market to book	-0.00941***	-0.00426***
	(0.00114)	(0.00100)
Logarithm of sales	0.0657***	0.0702***
	(0.00301)	(0.00311)
Profitability	-0.0759***	-0.0749***
	(0.00874)	(0.00866)
Product uniqueness	-0.0875***	-0.0593***
	(0.0226)	(0.0191)
Total return	-6.25E-05***	-2.86E-05**
	(1.02E-05)	(1.15E-05)
Constant	0.0239	-0.0242
	(0.0287)	(0.0294)
Observations	6,482	6,482
Number of variables	879	879
Panels	Heteroscedastic	Heteroscedastic
Correlation	Common AR(1) coefficient for all panels (0.7888)	Common AR(1) coefficient for all panels (0.7471)
Estimated covariances	879	879
Estimated autocorrelations	1	1
Wald χ^2 (6)	843.33	3596.43
Prob> χ^2	0.0000	0.0000

Source: Author's calculations

Note: Standard errors in parentheses; *** P<0.01, ** P<0.05, * P<0.1; Model 2 includes industry and year dummies.

Comparing model 1 and model 2 we can conclude that the coefficient results are similar, especially in terms of sign and correlation with target leverage ratio. Each determinant in both models is statistically significant and coefficients differing only on second or third

decimal. Still, if we compare tangibility, in the first model it is significant on 1% level, whilst increasing the possibility of error on 5% in the second model. The same results are obtained when comparing total return. The most important difference is the Wald statistics, differing from 843.33 in the first model to 3596.43 in the second model. As noted before, the inclusion of dummies in FGLS did not significantly impact the results, but inflated the chi square statistics. In the section of results discussion, the model 1 will be considered.

In order to compare FGLS results with the results of main empirical research and methods applied in capital structure analysis, the target leverage ratio was estimated using Ordinary Least Squares and Tobit regression with double censoring (Uysal, 2007; Kayhan and Titman, 2006; Hovakimian et al., 2001; Rajan and Zingales, 1995). The regression is estimated using a Tobit specification where the predicted value of the leverage ratio is restricted to be between zero and 1[1]. The control for industry effects, changes in tax rates and macroeconomic changes over years, industry and year dummies were included in regression. Final results of OLS and Tobit regression were obtained excluding year dummies, as they were statistically insignificant and not affecting the results[2]. The following table gives the results of OLS estimation.

TABLE 8. REGRESSION ESTIMATES OF THE TARGET LEVERAGE RATIO USING OLS

VARIABLES	OLS (1)	OLS (2)
Tangibility	-0.0142	-0.0284***
	(0.00934)	(0.00931)
Market to book	-0.00200	-0.00723***
	(0.00167)	(0.00149)
Logarithm of sales	0.0721***	0.0617***
	(0.00366)	(0.00362)
Profitability	-0.0602***	-0.0682***
	(0.0185)	(0.0180)
Product uniqueness	-0.211***	-0.216***
	(0.0425)	(0.0436)
Total return	-7.60e-05**	
	(0.0622)	
Constant	-0.0577	0.0654*
	(0.0354)	(0.0347)
Observations	6,486	7,026
R^2	0.206	0.183

Source: Author's calculations

Note: Standard errors in parentheses; *** P<0.01, ** P<0.05, * P<0.1;

Model 2 excludes variable Total return.

Comparing model 1 and model 2 we can again conclude that the coefficients are similar, especially in terms of sign and correlation with target leverage ratio. Additionally, tangibility and market to book are not statistically significant in the model 1. I use two proxies for growth opportunities: market-to-book ratio and stock return. According to Uysal (2007), total stock return is important determinant, as stock price movements may proxy for market performance. Still, I decided to exclude total return in model 2, as market to book is mostly applied as a proxy for growth opportunities in capital structure research. The results changed significantly and tangibility and market to book, as well as the rest of variables, were statistically significant.

Instead of OLS, analysis of capital structure determinants has also been conducted using Tobit regression in order to correct for the censoring of the dependent variable. I obtain

[1] Leverage ratio by definition, varies in range of 0% to 100%.

[2] Results obtained with year dummies included were the similar.

similar results as in OLS and FGLS regression, concerning coefficients and their signs of correlation.

TABLE 9. REGRESSION ESTIMATES OF THE TARGET LEVERAGE RATIO USING TOBIT REGRESSION

VARIABLES	TOBIT
Tangibility	-0.0162**
	(0.00795)
Market to book	-0.00529***
	(0.00143)
Logarithm of sales	0.0716***
	(0.00311)
Profitability	-0.110***
	(0.0157)
Product uniqueness	-0.186***
	(0.0362)
Total return	-5.34e-05*
	(3.10e-05)
Constant	-0.0474
	(0.0302)
Observations	6,486
LR χ^2 (74)	2019.13
Prob> χ^2	0.0000

Source: Author's calculations.
Note: Standard errors in parentheses; *** P<0.01, ** P<0.05, * P<0.1.
Obs. Summary : 1 left-censored observation at book leverage<=0; 6409 uncensored observations; 76 right-censored observations at book leverage>=1

Even though the results obtained are similar using FGLS, OLS and Tobit regression, we should be cautious in choosing appropriate methodology. OLS is not efficient, as it does not exploit the autocorrelation in the composite error term over time (Wooldridge, 2012, p. 811). Additionally, recent research (Zhu, 2013; 2010) emphasizes spurious ratio problem, which can lead to biased results considering t-statistics, R-squared, especially when applying multiple ordinary least squares (OLS) in both cross-sectional and panel settings.

As previously noted, having in mind the importance of time-invariant characteristics of unobservable firm-specific factors (industry, managerial skills), which explain the most of the cross-sectional variations in capital structure, FE methodology would be the most appropriate. But FE estimator is unbiased only when idiosyncratic errors are serially uncorrelated and homoscedastic. Feasible GLS estimation can exploit and solve within-cluster correlation and heteroscedasticity (Wooldridge, 2012, p. 493), which was the case in this paper.

Results and discussion

Tangibility

The regression results (Table 7) show negative and statistically significant relation between book leverage ratio and tangibility (-0.0143, p-value less than 0.001). The negative sign could be explained by the assumptions of pecking order theory (Myers and Majluf, 1984; Titman and Wessels, 1988) which states that profitable companies tend to finance investments from internal sources. Such companies tend to have lower levels of leverage. Booth et al. (2001) argue that profitable companies tend to use internal funds instead of borrowing. Another explanation of these authors lays in fact that in process of

substitution of long-term for short-term debt, the amount of total debt decreases with increase in tangible assets. Nivorozhkin (2002) and Cornelli et al. (1996) concluded that the negative relationship of leverage with the tangible assets was driven by the lack of long-term debt financing, as well by the fact that companies in Central Eastern European transition countries had much lower leverage comparing to G7 countries.

In this context, as our example consists of large companies from WE region, I must point out the macroeconomic conditions as important factor, considering that the time period of sample analysis includes the period of crisis (2003-2010). As stated by Lauk (2014), European Central Bank stimulated short-term funding in last decade. According to this author, companies were largely issuing Commercial Papers (short-term debt), refinancing long-term with short-term debt etc. Refinancing can happen especially when firms expect the deterioration of cash-flows over time (nearly before and after crisis), as equity holders would like to decrease cost of debt by changing its maturity structure (He and Milbradt, 2015). Cassar and Holmes (2003), Australian evidence, highlighted the importance of distinguishing between long and short forms of debt. High proportion of short-term debt results in negative correlation between leverage and fixed assets. Consistently with previously mentioned research (Booth et al., 2001; Jõeveer 2006; Berk, 2006; Bauer, 2004; Nivorozhkin, 2002;Cornelli et al., 1996), tangible assets and leverage (especially short-term) are found to be negatively correlated.

De Fiorey and Uhligz (2010) argued that financial policy in Western Europe should shift from banks to capital markets. During crisis and post crisis-period were characterized by higher interest rates and lower bank credit activities (Malinić et al., 2013). This meant shifts from bank loans and bonds to internal funds or issuance of equity, possibly leading to negative relation between tangibility and book leverage. Finally, the sample in this paper consists of companies from Western Europe countries, which are heterogenic considering economic development (e.g., UK, Germany, France comparing to Italy, Spain). Deesomsak et al., (2004), argued that actually the diversity of countries in the sample gives the opportunity to assess the effects of different environments on capital structure decisions, which significantly determines corporate financing decisions.Capital structure choices are made differently in each country, depending on the level of progress in capital market development, availability of various financing sources, corporate governance, legal stability and management quality etc. ((Thalassinos and Kiriazidis 2003; Thalassinos et al., 2006).Considering legal environment, Bancel and Mittoo (2004), analysing 16 European countries concluded that country's institutional structure, especially the quality of its legal system significantly influence the determinants of capital structure and debt issuance. De Jong et al. (2008) derived the same conclusion conducting the international study. Authors argue that country-specific factors are important in determining leverage choice around the world. All these facts can represent the potential cause of negative relation between tangibility and leverage.

Market to book

Growth opportunities of a firm significantly impact target capital structure. Nevertheless which measure of leverage is used, book or market, market to book represents one of the most efficient explanatory variables of leverage. By definition it's explaining the value of assets in place. Higher market over book values means good perspective and investment opportunities relative to firm's assets. Expected growth in cash-flow from future investments affects firm's market value (Parsons and Titman, 2009). Additionally, expected good growth opportunities will probably lead to good investment opportunities, which are followed by maintenance of financial slack. Companies want to prevent debt overhang problem, which can decrease their possibility of exploiting good investment opportunities (Myers, 1977). Consequently, the growth is negatively correlated with leverage. On the other side, Chen and Zhao (2006) argue that higher market-to-book ratios face lower cost of debt, which implies higher leverage. They suggest that future research should focus on its robustness, comparing high and low growth companies.

Consistent with estimates found in previous studies (Frank and Goyal, 2009; Uysal, 2007; Kayhan and Titman, 2006; Deesomsak et al., 2004; Hovakimian et al., 2001; Rajan and Zingales, 1995), market to book has a negative effect on target leverage ratio (-0.00941, p-value less than 0.001), consistent with trade-off and market timing theory. This implies that highly market valued companies prefer to use internal fund or more probably issue equity (overpriced). Considering that most of companies form our sample represent acquirers, it is reasonable for firms with good investment opportunities to adjust capital structure by decreasing leverage. Negative relationship between these two variables is consistent with market timing (Baker and Wurgler, 2002), with managers tendency to 'time' the market. Reducing leverage is logical in periods of perceived favourable equity market value. The negative correlation between market to book and target leverage ratio is one of the most empirically documented result.

Size

As previously mentioned, trade-off theory and pecking order theory have different assumptions about the sign between company's size and leverage. Larger companies will face lower risk of default, have better reputation and are associated with lower debt-agency costs (lower information asymmetry). This implies higher debt capacity (Frank and Goyal, 2009; Uysal, 2007; Kayhan and Titman, 2006; Deesomsak et al., 2004; Goyal et al., 2001; Hovakimian et al., 2001; Cornelli et al., 1996; Rajan and Zingales, 1995). On the contrary, larger companies have more retained earnings and lower information asymmetry, which allows them to issue more equity - pecking order (Chen, 2004; Titman and Wessels, 1988; Kim and Sorensen, 1986; Kester, 1986).

The regression results show positive and statistically significant relationship between size, measured by logarithm of sales, and target book leverage (0.0657, p-value less than 0.001). The results are consistent with trade-off theory. Presumably, sample companies which are large have less volatile cash-flows, which imply lower costs of financial distress, easy access to capital markets and higher leverage ratio.

Profitability

The regression estimates show statistically significant and negative correlation between profitability and target leverage ratio (-0.0759, p-value less than 0.001). The result is consistent with previous studies which support pecking order theory assumptions (Frank and Goyal, 2009; Uysal, 2007; Kayhan and Titman, 2006; Cassar and Holmes, 2003; Goyal et al., 2001; Hovakimian et al., 2001; Cornelli et al., 1996; Rajan and Zingales, 1995; Myers, 1984). Highly profitable companies prefer the hierarchy in financing, exploiting retained earnings and internal sources.

The opposite sign would imply higher leverage with higher profitability, according to Jensen (1986) hypothesis of free cash-flow and trade-off theory. Higher leverage will decrease agency costs. Additionally, higher profitability induces lower financial distress costs, therefore adjustment of capital structure toward debt increase.

Product uniqueness

The regression coefficient of -0.0875 (p-value less than 0.001) demonstrates the negative and statistically significant relationship between product uniqueness and target leverage ratio. Uniqueness of the product depends of innovation, which is inevitably related to R&D expenses. According to Titman and Wessels (1998), unique products require specific production and distribution process, as well as specific assets. These specific assets are hardly collateralized because of their low liquidity. Additionally, uniqueness in production requires, a part of high R&D expenses, other expenses, such as advertising. Highly levered companies are not able to finance these activities. High R&D expenses are mostly related to high growth and profitable companies, which shows the consistency of negative

relationship of leverage and profitability, as well as leverage and product uniqueness (Frank and Goyal, 2009; Uysal, 2007; Kayhan and Titman, 2006; Hovakimian et al., 2001). The result is consistent with trade-off theory.

Total return (average stock return)

Total return represents average annual stock return. Along with market to book, this variable is a proxy for growth. Higher values of both variables should be associated with lower target book leverage. According to Hovakimian et al. (2001), stock return is an important determinant of financing choices. Increase in stock prices, will according to financing hierarchy, lead to equity issuance. Therefore, the results of this paper are consistent with previous, generating negative correlation between target leverage ratio and average stock return (-6.25e-05, p-value less than 0.001). According to pecking order and especially market timing, managers will be reluctant in issuing equity when it is underpriced and they do "time the market" (Uysal, 2007; Baker and Wurgler, 2002).

Conclusion

This paper analyses determinants of capital structure decisions based on sample of 921 large Western European companies, in period of 2003-2010. The aim of the research was to focus on determinants of capital structure in developed countries of Western European region from the beginning of 21st century, with sample consisting of large companies involved in M&A activities. Considering that on general, companies have target debt ratios, scaled from fixed to flexible (Brounen et al., 2006; Bancel and Mittoo, 2004; Graham and Harvey, 2001), I applied the estimation procedure of target book leverage ratio on its determinants, to test the predictions of trade-off and pecking order theories. Capital structure decisions depend on specific individual characteristics of companies, which is why in the first phase of analysis Fixed-Effects methodology was applied. In order to control for heteroscedasticity and first-order autocorrelation, the regression finally was estimated applying Feasible Generalized Least Squares Method (FGLS). In the interest of comparing the results, the estimation was performed applying standardly used methodology in the estimation of target leverage ratio, OLS and Tobit regression. Considering the importance of time-invariant characteristics of unobservable firm-specific factors (industry, managerial skills), which explain the most of the cross-sectional variations in capital structure, the estimates of these models could be subject to bias. Feasible GLS estimation can absorb specific effects and solve within-cluster correlation and heteroscedasticity.

The results confirmed statistically significant and negative correlation between target leverage ratio and tangibility, market to book, profitability, product uniqueness and total return (average stock return), and statistically significant and positive correlation between target leverage ratio and size (measured by sales). These results are consistent with both trade-off and pecking order predictions. Correlation signs of tangibility, profitability and total return are in accordance with pecking order theory predictions, whilst signs of market to book, size and product uniqueness are in accordance with trade-off theory predictions. The negative sign of total return demonstrates that companies do «time" the market (Baker and Wurgler, 2002), which is in accordance with market timing theory predictions. As noted by Titman (2002), companies are significantly focusing and analyzing changes in market conditions and the implications of these changes on how firms should be financed.

As discussed in the paper, we obtained negative relationship between tangibility and target leverage ratio. Apart of all theoretical explanations, specific country impacts, money and capital market conditions and the effects of crisis (limited access to debt and high interest rates) presumably had significantly influenced the correlation sign. Additionally, as Drobetz et al. (2007) state, the anticipated growth of economy during recovery process

will motivate companies to issue equity (decreasing leverage) because stock prices are expected to rise. They document that especially large and faster growing firms adjust more readily, have greater financial flexibility, especially in periods of favourable macroeconomic conditions (recovery). Rise in average stock return will result in equity issuance (market timing).

It is important to notice that the results suggesting the mixed evidence of both theories are consistent with empirical evidence from Graham and Harvey (2001), Brounen et al. (2006) and Bancel and Mittoo (2004) survey of corporate practice in finance. Additionally their results demonstrate that finance theory «may be gaining ground faster among larger companies" (Graham and Harvey, 2001), which is a support to objectivity of results of this paper.

Potential limitation of the research can be found in lack of specific data and availability of data for longer period of time analysis. This is important in context of applying different approaches in testing capital structure choices (variables in changes, Zhu, 2013). Also, estimations could include market leverage, separately long and short term debt, non-debt tax shields, inflation rates as macroeconomic indicators (even though industry and year dummies were included to control for industry effect and changes in tax rates and macroeconomic changes over years). But still, considering large sample of 921 companies analysed in period of eight years (which includes financial crisis), Western European region not enough researched and given that various applied methodologies obtained similar results (same correlation signs between leverage and explanatory variables) consistent with previous research, we can conclude that the regression estimates generated unbiased and objective results.

Recalling the high deviation of book leverage from its mean (0.205) and considering M&A activities, large variance around the mean could imply that a group of companies deviate from target debt ratio. These deviations (leverage deficit) in context of debt equity choice were analysed by Hovakimian et al. (2001), and related to M&A by Uysal (2007) in USA. Future research should focus on deviations from target capital structure and its impact on corporate decisions and restructuring in Europe (developed and developing countries), as well as market's reactions to them.

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