



**The Causality Effect between Capital Structure
and Stock Returns using a SEM Approach –
Evidence from the European Stock Market**

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Abstract

Capital structure and stock returns are two of the most studied topics in finance and nowadays they are still grabbing a lot of attention in the financial management community. The main aim of this study is to examine the relationship between these two variables that, due to their special cause-effect relationship, have been studied separately, losing some of the effects about the interactions between capital structure and stock returns, also we will try to find out their common determinants.

We use a model that captures the relation between the capital structure and stock returns by using a Structural-Equations Model allowing us to see the causality effect between the two variables. This model will be applied on the listed European non-financial companies, for 2006, 2009 and 2012.

Our results prove that capital structure and stock returns are mutually determined and inversely related, but this relation is almost offset and tends to stabilize within a range in the long-run. Our study also shows that the significant common determinant between capital structure and stock returns is the size of a company. The main determinants of capital structure are size, profitability, expected growth and stock returns. On the other hand, the key determinants of stock returns are size, momentum, long-term reversal and the leverage level, i.e., the capital structure.

Keywords: Capital Structure, Stock Returns, Structural Equations Model

JEL Codes: G12, G32

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Acronyms

SEM – Structural Equations Model

EBITDA – Earnings before Interests, Taxes, Depreciation and Amortization

EBIT – Earnings before Interests and Taxes

CFA – Confirmatory Factor Analysis

CS – Capital Structure

SR – Stock Returns

LT – Long-term debt

BVA – Book-value of assets

MVA – Market value of assets

IGP - Inventory plus gross plant and equipment

TA – Total assets

FA – Depreciated fixed assets

RD – Research and development

Sa – Sales

SE – Selling expenses

CE – Capital Expenditures

GTA – Growth of total assets

MTB – Market-to-book ratio of assets

ME – Market value of equity

OI – Operating Income

CFO – Cash flow of operational activities

LTR – Past long term stock returns

BE – Book-value of equity

EPS – Earnings per share

TR – Turnover (Liquidity)

CS – Capital Structure

SR – Stock Returns

AS – Asset Structure

G – Expected Growth

UN – Uniqueness

S – Size

PR – Profitability

VOL – Volatility

1. Introduction

Since Modigliani and Miller (1958), it has been developed many studies that have examined firm's capital structure choices and its implications. These studies include some conclusions regarding some of the capital structure theories, the determinants of the capital structure choices and how the capital structure's changes affect the stock returns (Titman and Wessels, 1988; Bradley *et al*, 1984; Rajan and Zingales, 1995).

On the other side we have some authors that postulate that companies do not issue and repurchase debt and equity to offset the effects of stock returns, as consequence, the debt-to-equity ratios of the companies follow closely the movements in their stock prices (Welch, 2004) and that the debt-to-equity ratio is one of the risk premium of stock returns (Bhandari, 1988).

Nevertheless, capital structure, its determinants and impacts are still a puzzle in the financial literature (Myers, 1984).

The main conclusions that we can take from this extent research concerning the determinants of the capital structure and stock returns are that, according to Yang *et al* (2009), on one hand, the most common determinants of capital structure are the stock returns, expected growth, uniqueness, collateral value of assets (asset structure), size, profitability and volatility. On the other hand, the most typical determinants of stock returns are the leverage, expected growth, size, profitability, long-term reversal, momentum, value and liquidity.

The main objective of this study is also to examine the relationship between capital structure and stock returns and its common determinants. However, contrary to previous studies that have been studied that relationship separately, losing some of the effects arising from the interactions between them, this study, analyses the effect of the changes in the capital structures on the stock returns and the effects of the stock returns on the capital structure choices simultaneously.

With the purpose of studying this relation we will chose a model that represent the characteristics of the European companies and the main determinants that can influence the capital structure and the stock returns in order to capture all the cycle around issuing and repurchasing debt and equity to analyse the relationship between these two

endogenous variables. This type of approach was only used in very specific studies where the models were tailored for a specific country.

In the first section we present the literature review, next on the second section we analyse the data sample and the methodology applied. On the third section we explain and interpret the empirical results while on fourth section we conclude.

2. Literature Review

2.1. Capital Structure

We cannot talk about capital structure without mention Modigliani and Miller (1958), considered the fathers of the basis of modern thinking on capital structure. They showed that, under a certain number of assumptions, the choice between equity and debt mix is irrelevant for the company market value, so, the capital structure of a company does not affect their value.

They came to the conclusion that there was no relationship between investing and financing decisions, the internal and external financing were perfect substitutes, the choice between equity and debt was irrelevant and the company market value was not related with the debt maturity structure. In order to reach these conclusions, Modigliani and Miller created a “perfect world” where exists perfect competition between all agents, there are no market frictions in demand and supply (no taxes, no agency, transaction and bankruptcy costs), there are no restrictions to financing and to debt, the agents have homogeneous expectations and there are no arbitrage opportunities. With all of these assumptions the value of a company levered is equal to the value of a company unlevered, which means that the capital structure is irrelevant.

So, the Modigliani and Miller model, in spite of having a lot of assumptions impossible to achieve in the real world, was able to explain how the capital structure is irrelevant under those assumptions. And then, with the relaxation off some of those assumptions we can realize how the companies’ capital structure reacts to the real world environment.

In order to explain some of the choices made by the managers there are some capital structure policy models. The two most study are the trade-off model and the pecking order, along with these two theories the Market-Timing theory also assumes some importance in explaining the choices of companies regarding their capital structure.

The trade-off model assumes that the costs and benefits of debt vary with the amount of debt (Robichek and Myers, 1966). According to this theory there is an optimal level of debt that minimizes the cost of capital and maximizes the firm’s value. According to Bancel e Mittoo (2004) the companies chose their optimal capital structure in order to balance benefits and costs of funding. For Smart *et al* (2007) managers decide the

capital structure based on the tax shields and the agency costs among equityholders and debtholders and they predict that companies weight the tax shields and the financial distress costs.

Shyam-Sunder and Myers (1994) postulate that the static trade-off it's based on the existence of an optimal level of debt financing that is attained when the present value of the interest tax shields is higher or equal than the present value of the financial distress costs. The trade-off it's the choice between adding debt and the bankruptcy risk. In accordance with this theory, when a company finds its optimal capital mix they make efforts to maintain to that debt-equity ratio, because that is the mix that maximizes the companies' value.

The pecking-order theory it's based on the preposition that the changes in the financing mix are determined by the need from external financing. For Smart *et al* (2007) this theory it is based on a grounding rule, managers are the ones that are better informed about the company (asymmetric information) and are the ones to decide about the financing that the company needs. Myers (2001) argues that there is an order of preference in the use of the financial sources due to adverse selection problems. First managers prefer to use retained earnings (internal financing) and only when they need more funds they prefer external financing. When external financing is required debt is preferred over equity.

The market-timing theory proposed by Smart *et al* (2007) reflects the fact that the companies tend to issue equity when the stock prices are high and choose debt financing when the stock prices are low. Consistent with this theory Baker and Wurgler (2002) found that leverage and market value are highly negatively correlated and that the current capital structure is extremely related with historical market values.

There are still more theories and models that try to measure the effect of choices in the capital structure like the neutral mutations (Miller, 1997) where companies tend to maintain their past pattern in financing the company, the stakeholder theory (Cornell and Shapiro, 1987) where its suggested that the drive of a business is to create as much value as possible for all the stakeholders, not only shareholders and debtholders, the windows of opportunity (Jay Ritter, 2003) that it's based the relative financing costs due

to market inefficiencies to choose between the sources of financing, among others but none has the relevance of the previous ones.

2.2. Capital Structure and Stock Returns

2.2.1. Capital Structure Determinants

Titman and Wessels (1988) believed that companies select their capital structure depending on characteristics that determine the costs and benefits of choosing between debt and equity.

Stock returns are one of the determinants of capital structure choice because it may explain the companies' equity issuance. Baker and Wurgler (2002) found empirical evidence that companies with low amounts of debt tend to raise equity financing only when their valuations are high, and companies with high leverage levels do exactly the opposite by raising equity when their valuations are low. Thus, the stock returns have a negative relationship with the leverage of the company.

According to Myers (2001), the expected growth is also a determinant of capital structure. For this author the value of a company is composed by the assets in place and the growth opportunities (real options). The existence of real options in a company causes agency costs between shareholders and debtholders, shareholders will confiscate wealth from debtholders by waiving projects with positive net present values. In order to minimize the agency and underinvestment problems, companies with higher real options are likely to have a lower debt ratio. Titman and Wessels (1988) measures the expected growth, ex-post, as the percentage change of total assets in order to check whether the expected growth impacted the capital structure. Alternatively Bevan and Danbolt (2002) used the market to book ratio of assets.

Other determinant is the uniqueness of the company. Titman and Wessels (1988) believed that companies that produce a unique product suffer from high financial distress costs, because they are more specialized in one operation becoming more difficult to sell or transfer assets to other operations in case of liquidation. For these authors, uniqueness is inversely related to the debt ratio. To measure this characteristic the authors used the costs in research and development over sales—they assumed that in a unique company research and development are very important—and selling expenses

over sales—they assume that marketing and advertisement expenses are higher in a unique company than in a company that sells a standard product.

Titman and Wessels (1988) also proposed the asset structure of a company as a determinant factor in the capital structure choice because companies with safe and larger tangible assets can use those assets as collateral in debt contracts and face lower bankruptcy costs. According to the trade-off theory those firms can have higher amounts of debt. In order to measure this effect the authors used the ratio of inventory plus gross plant and equipment to total assets and the ratio of depreciated fixed assets to total assets as proxies for the asset structure of the firm.

Size is another, and one of the most common, determinants of capital structure because large firms tend to be more diversified and have a lower probability of going bankrupt. These companies have also access to debt at a lower cost because they usually have a higher rating. Titman and Wessels (1988) and Yang *et al* (2009) used as a measure of size the logarithm of sales, the logarithm of total assets and the logarithm of market value of equity and found a positive relation between size and debt level.

According to the pecking order theory (Myers, 1984) companies prefer internal to external financing, and in the external financing debt is preferred to equity. From this we can infer that a company more profitable will use less external financing, creating a negative relation between profitability and leverage. However, on the other hand we can see profitability as an indicator of agency costs according to the free cash-flow theory (Jensen, 1986) and good way to solve this problem is to increase the amount of debt in order to discipline the managers since they have to pay and realising the cash flow in hands and a positive relationship between profitability and leverage is expected. Previous studies have used operating income over sales and over total assets (Titman and Wessels, 1988), EBITDA over total assets (Bevan *et al*, 2002) and cash-flow from operating activities over total assets (Rajan and Zingales, 1995) to measure profitability.

The volatility of earnings is also considered as determinant of capital structure since a larger variance in earnings can increase the probability of bankruptcy thus a negative relationship between the variance of earnings and leverage is expected, since it may indicate the presence of financial distress costs. To study the impact of volatility in the capital structure the standard deviation of the first differences in the EBIT to total assets

ratio was used by Wald (1999) and Yang *et al* (2009), who also used the standard deviation of the first differences in the ratio of operating income divided by total assets.

2.2.2. Stock Returns Determinants

Previous studies have identified several determinants on stock returns, such as the leverage level, the expected growth, the size and profitability of the company, the long-term reversal of the shares price, the momentum and the value and liquidity of shares.

Leverage is a determinant of stock returns. According to Bhandari (1988) the expected stock returns are positively related to the debt-to-equity ratio and so the debt-to-equity ratio can be seen as one of the risk premium of stocks. Yang *et al* (2009) used the long term debt to book value of total assets and the long term debt to market value of total assets as a measure of the debt level of companies. The use of long term debt instead of total debt is explained by the stability of this type of debt that is issued less times and can be used as a measure of “continuation” in a company (Wald, 1999).

Haugen and Baker (1996) showed that higher expected growth opportunities have a positive impact on stock returns: In their study, the expected growth was measured by percentage change of total assets.

According to Banz (1981) and Fama and French (1992) small firms tend to earn higher average stock returns than large ones, which represent a negative relation between size and stock returns (“size effect”).

The profitability of a company has a positive relationship with the stock returns, which means that companies with higher profitability tend to earn higher stock returns (Haugen and Baker, 1996).

Bondt and Thaler (1985) mentioned that investors overreact to unexpected and dramatic events and so, portfolios of prior long-term losers outperform portfolios of prior long-term winners. Yang *et al* (2009) also concluded that the long-term reversal was an important determinant in stock returns by using the past five years’ average stock return.

However, in the short-term, Jegadeesh and Titman (1993) found that investors buying past winners and selling past losers would earn positive and abnormal returns over three to twelve month holding periods (“momentum effect”).

Rosenberg, Kenneth and Ronald (1985) identified that high book-to-market equity companies have earned higher average stock returns when compared to low book-to-market equity ones. Also Fama and French (1992) created a model (Three Factor Model) where size, market beta and book-to-price are used as explainable variables of stock returns. In order to measure the impact of *value* on the stock returns Yang *et al* (2009) used the book-to-market ratio and the earnings per share to price.

Finally, several researchers showed that stocks with lower liquidity earn higher returns as compensation for the liquidity risk (e.g., Haugen and Baker, 1996). Also, Rouwenhorst (1999) stated that small stocks and value stocks are, on average, less liquid which may simple be the compensation for the liquidity risk that they bear.

2.2.3. Relationship between Capital Structure and Stock Returns

As we mentioned before, the determinants of capital structure and stock returns have been mainly studied separately. Yang *et al* (2009) used a structural-equation model, using a multi-equation approach, to appraise the relationship between the capital structure and stock returns. The authors choose some of the determinants that they thought were the best ones specifically to the Taiwan Stock Market, as they are presented in Figure 1.

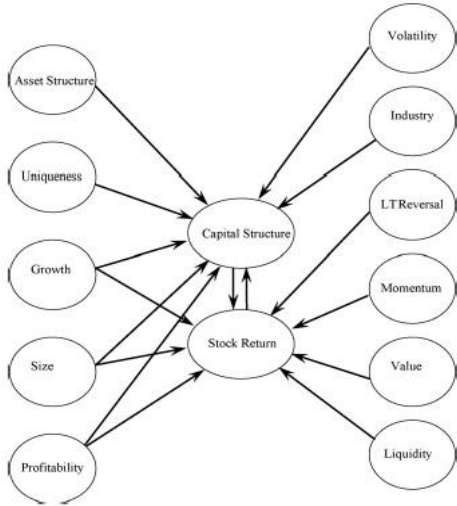


Figure 1 - Path Diagram (source: Yang *et al*, 2009)

The authors conclude that for the companies listed in the Taiwan Stock Market, the volatility has no impact on the capital structure and the size and the momentum has no

impact in the stock returns. An increase in debt increase the stock returns and an increase in the stock returns has a negative effect on the debt level of the companies. The expected growth and the profitability impact both capital structure and stock returns. These variables have a negative impact on the leverage and a positive impact on the stock returns. Uniqueness and industry classification have an inverse relation with the leverage and the asset structure has the opposite effect. Regarding the stock returns, they are positively related with the value of the company and have a negative relation with the liquidity.

2.2.4. Summary

Tables 1 and 2 represent a summary of the expected impact of the determinants of both capital structure and stock returns have according to the literature reviewed.

Variables	Capital Structure Theories and Effects		
	Trade-off Theory	Pecking Order	Market Timing
Stock Returns			-
Expected Growth	-		
Uniqueness	-		
Asset Structure	+		
Size	+		
Profitability	+	-	
Volatility	-		

Note: (+) The larger the variable, the higher the debt ratio should be. (-) The larger the variable, the lower the debt ratio should be

Table 1 - Relationship between variables and capital structure

Variables (Phenomena)	Stock Returns
Leverage (Leverage Effect)	+
Expected Growth (Market Efficiency)	+
Size (Size Effect)	-
Profitability (Market Efficiency)	+
Long-term reversal	-
Momentum	+
Value (Book-to-Market Anomaly)	+
Liquidity (Turnover Effect)	-

Table 2 - Relationship between variables and stock returns

3. Methodology and Data

3.1. Data

In order to measure the relationship between the capital structure and the stock returns in the European market, 3,876 non-financial listed companies were selected using the Datastream database. The sample includes companies from the following countries: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.

We decide to analyse that relationship between capital structure and stock returns for the years 2006 (before the financial crisis) 2009 (the first year where the financial crisis effect heavily non-financial companies) and 2012 (supposedly a year when companies have already adjusted to the effects of the financial crisis).

3.2. The Model

The model we used to answer our research question it's based on the model used by Yang *et al* (2009) and it's called a Structural-Equation Model (SEM).

SEM has become all over the years, one of the best techniques for researchers across disciplines, especially in social sciences. Nevertheless, the problem on how the model represents the data and reflects the theory (model fit) it's still a disagreement point between researchers.

Known the complexity of the structural equations models, it's usual that the model propose has a poor fir but going against the underlying theory by changing indices it's risky (Hooper, D. *et al*, 2008).

The SME is used in the literature to appraise, test and estimate causal relations by using a combination of statistical data (proxies for the main variables) and, qualitative causal assumptions between the variables that we are trying to prove the causal relationship. A very important reminder is that, SEM is more wide-ranging than a simple regression, because a variable can act as dependent and independent variable. Also, the SEM explores direct, indirect and total effects between the variables and multivariate relationships.

This method of data analysis provides a measurement model and a structural model. The measurement model is the first one to be calculated and comprises 21 proxies (coefficients) in order to enhance 10 latent constructs. The 21 proxies and the 10 latent variables are described in Table 3. In order to appraise de validity of the coefficients in explaining each latent variable we apply the CFA (Confirmatory Factor Analysis) method.

The second model to be estimated is called the structural model where we include the two endogenous variables (capital structure and stock returns) to be explained by the 11 latent variables that we already estimate in the measurement model.

The proxies that we used are the ones that the literature reveals as the strongest ones to explain each of the latent variables. We use (t) to represent the measuring year that will be 2006, 2009 or 2012. The expected growth is measured in (t+1), size, profitability, value and liquidity are measured in (t-1), volatility is measured between (t) and (t-3), long-term reversal is measured between (t) and (t-5) and momentum is measured by the stock returns in the past one quarter.

Endogenous Latent Variables									
η_1	η_2								
Capital Structure (t)	Stock Returns (t)								
LT/BVA LT/MVA	Rit								
Exogenous Latent Variables									
ξ_1	ξ_2	ξ_3	ξ_4	ξ_5	ξ_6	ξ_7	ξ_8	ξ_9	ξ_{10}
Asset Structure (t)	Uniqueness (t)	Expected Growth (t+1)	Size (t-1)	Profitability (t-1)	Volatility (average)	Long Term Reversal (average)	Momentum (Past 1Q)	Value (t-1)	Liquidity (t-1)
IGP/TA FA/TA	RD/Sa SE/Sa	CE/TA GTA MTB	LnSa LnTA LnME	OI/Sa OI/TA EBITDA/TA CFO/TA	$\sigma(\Delta\text{EBIT/TA})$ $\sigma(\Delta\text{OI/TA})$	Past L return	Rit-1	BE/ME EPS/SR	Turnover

Table 3 – Variables and Coefficients

Note: LT/BVA: Long term debt/Book value total assets, LT/MVA: Long term debt/Market value total assets, Rit: Stock Returns, IGP/TA: (Inventory plus gross plant and equipment)/Total assets, FA/TA: Depreciated fixed assets/Total assets, RD/Sa: Research and development/Sales, SE/Sa: Selling expenses/Sales, CE/TA: Capital Expenditures/Total assets, GTA: Growth of total assets measured by the percentage change of total assets, MTB – Market to book value of assets, LnSa: Logarithm of Sales, LNNTA: Logarithm of Total assets, LNME: Logarithm of Market value of equity, OI/Sa: Operating

Income/Sales, OI/TA: Operating Income/Total assets, EBITDA/TA: EBITDA/Total assets, CFO/TA: Cash Flow of operating activities/Total assets, $\sigma(\Delta(\text{EBIT/TA}))$: Standard deviation of the first differences in the ratio - EBIT/TA, $\sigma(\Delta(\text{OI/TA}))$: Standard deviation of the first differences in the ratio - OI/TA, Past L Return: Past 5 years stock return as long term return for each stock, BE/ME: Book to Market equity, EPS/SR: Earnings per share/Stock Returns, Turnover: Trading volume/outstanding shares, Rit-1: Past one quarter's stock return to measure the past short term return.

The structural model is comprised by the following structural equations:

$$\eta_1 = \beta_{12}\eta_2 + \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{14}\xi_4 + \gamma_{15}\xi_5 + \gamma_{16}\xi_6 + \zeta_1 \quad (1)$$

$$\eta_2 = \beta_{21}\eta_1 + \gamma_{23}\xi_3 + \gamma_{24}\xi_4 + \gamma_{25}\xi_5 + \gamma_{27}\xi_7 + \gamma_{28}\xi_8 + \gamma_{29}\xi_9 + \gamma_{2.10}\xi_{10} + \zeta_2 \quad (2)$$

The equation (1) measures the impact on capital structure (η_1) that is determined by stock returns (η_2), asset structure (ξ_1), uniqueness (ξ_2), expected growth (ξ_3), size (ξ_4), profitability (ξ_5), volatility (ξ_6) and an error term (ζ_1).

The equation (2) measures the impact on stock returns (η_2) that is determined by capital structure (η_1), expected growth (ξ_3), size (ξ_4), profitability (ξ_5), long-term reversal (ξ_7), momentum (ξ_8), value (ξ_9), liquidity (ξ_{10}) and an error term (ζ_2).

The path diagram of the structural model on SPSS AMOS is presented in Appendix A.

4. Empirical Results

Table 4 represents the estimation of the measurement model by loading the factors (coefficients) for each latent variable. These estimates were generated based on an aggregated year (2006, 2009 and 2012) sample. As we can see the most part of the coefficients explain the latent variables, but there are some such as capital expenditures over total assets and book to market equity that are not good choices to measure the latent variables since their impact is not relevant. Regarding that, we've made the choice to keep them anyway based on the background theories that support them.

Coefficients (proxies)		Latent Variables									
		ξ1 Asset Structure	ξ2 Uniqueness	ξ3 Expected Growth	ξ4 Size	ξ5 Profitability	ξ6 Volatility	ξ7 Long- Term Reversal	ξ8 Momentum	ξ9 Value	ξ10 Liquidity
AS1	IGP/TA	1.000									
AS2	FA/TA	-0.002 ***									
UN1	RD/Sa		1.000								
UN2	SE/Sa		0.897 ***								
G1	CE/TA			0.000							
G2	GTA			-1.528 ***							
G3	MTB			1.000							
S1	LnSa				1.174 ***						
S2	LnTA				1.148 ***						
S3	LnME				1.000						
PR1	OI/Sa					-13.118 *					
PR2	OI/TA					-1.179 ***					
PR3	EBITDA/TA					-3.533 ***					
PR4	CFO/TA					1.000					
VOL1	$\sigma(\Delta\text{EBIT}/\text{TA})$					680.587					
VOL2	$\sigma(\Delta\text{OI}/\text{TA})$					1.000					
LTR	Past L return						1.000				
M	Past S return							1.000			
V1	BE/ME								0.000		
V2	EPS/SR								1.000		
TR	Turnover										1.000

Table 4 - Measurement Model

With the purpose of measuring the extent to which two or more variables fluctuate together we computed a correlation matrix (Appendix B). A positive correlation indicates the range to which those variables increase or decrease in parallel; a negative correlation indicates the range to which one variable increases as the other decreases.

Our model was estimated using both the market leverage ratio (long term debt to market value of assets) and the book leverage ratio (long term debt to book value of assets) as proxies for the capital structure.

4.1. Capital Structure measured by LT/MVA

Table 5 presents the results of our SME estimation using the market leverage ratio as dependent variable (proxy for the capital structure).

Dependent Variables (t)	η_1	η_2	ξ_1	ξ_2	ξ_3	ξ_4	ξ_5	ξ_6	ξ_7	ξ_8	ξ_9	ξ_{10}
	Capital Structure (t)	Stock Returns (t)	Asset Structure (t)	Uniqueness (t)	Expected Growth (t+1)	Size (t-1)	Profitability (t-1)	Volatility (average)	Long-Term Reversal (average)	Momentum (Past 1Q average)	Value (t-1)	Liquidity (t-1)
2006												
Capital Structure		0.041	0.014	-0.023	-0.002	0.102 ***	0.064	-0.042				
Stock Returns	-0.001				0.000	0.004 ***	0.003		-0.005 ***	0.998 ***	0.000	-0.001
2009												
Capital Structure		0.939 ***	0.000	0.04	0.003	0.094 ***	0.004	-0.006				
Stock Returns	-0.974 ***				0.008	0.107 ***	0.008		1.072 ***	-0.066	-0.004	0.002
2012												
Capital Structure		2.760 ***	-0.004	-0.056	-0.007	0.260 ***	0.015	0.011				
Stock Returns	-1.724 ***				-0.026	0.425 ***	0.012		0.913 ***	-0.055	0.002	0.021

Table 5 - Estimation of structural coefficients

The structural equations are:

$$\eta_1 = \beta_{12}\eta_2 + \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{14}\xi_4 + \gamma_{15}\xi_5 + \gamma_{16}\xi_6 + \zeta_1$$

$$\eta_2 = \beta_{21}\eta_1 + \gamma_{23}\xi_3 + \gamma_{24}\xi_4 + \gamma_{25}\xi_5 + \gamma_{27}\xi_7 + \gamma_{28}\xi_8 + \gamma_{29}\xi_9 + \gamma_{2.10}\xi_{10} + \zeta_2$$

*** Significant at 0.001 level

** Significant at 0.01 level

* Significant at 0.05 level

4.1.1. Capital Structure and Stock Returns

Based on the underlying theory and previous studies, our results show that leverage¹ and stock returns have an inverse relationship between them but only for 2009 and 2012. However, for the year 2006 the results suggest that there was no relationship between the capital structure and the stock returns. This result can eventually be justified by the period of huge euphoria present in the financial markets in the years before the financial crisis. This euphoria has a result, a generalize increase on stock prices regardless the fundamentals of a company.

The results for 2009 and 2012 indicate that the higher the stock returns, the higher the debt ratios of the firms. Although this is not in accordance with the market timing theory, it supports the pecking-order theory since this result can be due to an information asymmetry. Managers prefer to use debt financing to equity financing, due to some information asymmetry between them and shareholders, so when the stock price increases they use the ‘good moment’ of the company, and so the lower risk perceived by creditors, to increase debt when they need funding.

The leverage increases, however, will have a negative impact on the stock returns since a higher leverage will increase the probability of failure (increase of bankruptcy costs) which will result in an increase of interests with a negative impact on the EPS. Moreover, shareholders will also demand a higher rate of return since in the worst case scenario (company goes bankrupt), the stockholders are the last to be paid, if at all. These two facts will led to a decrease of the stock price.

¹ Capital Structure (CS) is measured by the market leverage ratio (LT/MVA) and the book leverage ratio (LT/BVA) and so during this study an “increase” in the capital structure means a leverage increase.

4.1.2. Asset Structure

According to our results the asset structure² of a firm has no impact either on capital structure or on stock returns in all years (2006, 2009 and 2012) we have analysed. The coefficients associated to asset structure are zero or very close to zero and are not statistically significant.

These results are contrary to the predictions of the trade-off theory since according to that theory fixed assets (and inventory) act like collateral in debt issue and so companies with higher value of those assets will face lower bankruptcy cost and so would have more debt.

4.1.3. Uniqueness

Regarding the uniqueness³, our results show a negative relation for 2006 and 2012 (-0.023 and -0.056, respectively) and a positive relation (0.04) for 2009 between uniqueness and leverage. However all coefficients are not statistically significant. These results are contrary to previous studies (Titman and Wessels (1988) and Yang *et al* (2009)) that found a negative relationship between uniqueness and leverage.

Once again our results regarding uniqueness are also not consistent with the trade-off theory since firms with unique business and unique assets are more specialized in one operation and so face higher liquidation costs as will be more difficulty to sell or transfer assets to other operations in case of liquidation. Given that and according to the trade-off theory those companies would be less leveraged.

² Asset structure (AS) is measured by the ratio inventory plus gross plant and equipment to total assets (IGP/TA) and the ratio fixed assets to total assets (FA/TA).

³ Uniqueness (UN) is measured by the ratio research and development expenses to sales (RD/Sa) sales expenses to sales (SE/Sa).

4.1.4. Expected Growth

The expected growth⁴ (real options) in our model has no statistical significance and is not conclusive in determining both the leverage of a company and the stock returns.

4.1.5. Size

Our results show a positive and significant relation between size⁵ and the leverage of the company, for all the three years in analysis. On Table 5 we have the estimates for 2006, 2009 and 2012, and we reached to positive estimates for size, 0.102, 0.094 and 0.260 respectively. These results are consistent with the capital structure theories that predict that larger firms being more diversified and having lower probability of failure would have more debt than smaller firms. Moreover larger firms have more facility to finance itself due to better credit ratings and having access to the bond market than smaller companies.

However, contrary to theories predictions that size should have a negative impact on stock returns (Banz, 1981) as size is risk factor and so investors in smaller companies would take more risk and should be rewarded for that, our study found a positive and significant impact throughout the years (0.004, 0.107 and 0.425 for 2006, 2009 and 2012, respectively).

⁴ Expected Growth (G) is measured by the ratio capital expenditures over total assets (CE/TA), the growth of total assets (GTA) and the market-to-book ratio of assets (MTB).

⁵ Size (S) is measured by the logarithm of sales (LnS), the logarithm of total assets (LnTA) and by the logarithm of market value of equity (LnME).

4.1.6. Profitability

Profitability⁶ in our results has no significant impact in determining both stock prices and leverage.

Even though the results are not statistically significant they are positive throughout the years both for the leverage level and for the stock returns and it's in accordance with the underlying theory. For instance, the agency costs related to the free cash flow theory (Jensen, 1986) where managers with huge amounts of cash flow in companies' balance sheet tend to overinvest in projects that don't have positive net present values destroying value to shareholders and others stakeholders. In order to avoid agency costs, debt can be a solution since it's a contractual obligation to the firm and force the managers to pay interests and principal payments, reducing the cash flow available. Regarding the stock returns a profitable company earns higher returns (Haugen and Baker, 1996).

4.1.7. Volatility

According to the theory, variance of earnings represents a higher probability of failure, so volatility and leverage should be negatively related. In our findings we didn't find any evidence that the volatility⁷ of earnings influence the capital structure, the results were not conclusive and not statistically significant.

⁶ Profitability (PR) is measured by the ratio operation income over sales (OI/Sa), by the ratio operating income over total assets (OI/TA), by the ratio EBITDA over total assets (EBITDA/TA) and by the ratio of operating cash-flow to total assets (CFO/TA).

⁷ Volatility (VOL) is measured by the standard deviation of the first differences in the ratio - EBIT/TA $\sigma(\Delta(\text{EBIT/TA}))$ and by the standard deviation of the first differences in the ratio - OI/TA $\sigma(\Delta(\text{OI/TA}))$.

4.1.8. Long-Term Reversal

The literature found evidences that most people overreact to unexpected and dramatic news (De Bondt and Thaler, 1985). Portfolios of prior long-term losers outperform prior long-term winners.

By using the past five years' average stock returns we should expect a negative relationship between long-term reversal and stock returns. For 2006 we have statistically significant estimates (-0.005) which is in accordance with the overreaction effect. For 2009 the estimate was 1.072 and in 2012 we have the same relation between long-term reversal and stock returns with a significant estimate of 0.913.

Summing up, our study only found evidences of this market anomaly in the long-run for the period before the financial crisis.

4.1.9. Momentum

Another market anomaly is the momentum effect that suggests a strategy that buys well performed stocks in the short-term and sells poorly performed stocks. Jegadeesh and Titman (1993) found a positive relationship between the momentum effect and the stock returns. As for the long-term reversal our results only show a positive and statistically significant results for 2006 (0.998) proving the existence of momentum only before the financial crisis.

4.1.10. Value

According to Rosenberg *et al* (1985) and Fama and French (1992) the higher the value⁸ of a company, higher the stock returns. Our research didn't found any evidence that value influence stock returns since in all the years the results are not conclusive and not statistically significant.

⁸ Value is measured by the ratio book to market of equity (BE/ME) and by the ratio earnings per share over stock returns (EPS/SR).

4.1.11. Liquidity

Liquid stocks have lower expected returns. In our study we didn't find any evidence that liquidity is a determinant of stock returns, for all the years in review the results are not conclusive and not statistically significant.

4.2. Capital Structure measured by LT/BVA

On Table 6, we show the estimations of the structural coefficients in each year, using the book leverage ratio as dependent variable.

Dependent Variables (t)	η1	η2	ξ1	ξ2	ξ3	ξ4	ξ5	ξ6	ξ7	ξ8	ξ9	ξ10
	Capital Structure (t)	Stock Returns (t)	Asset Structure (t)	Uniqueness (t)	Expected Growth (t+1)	Size (t-1)	Profitability (t-1)	Volatility (average)	Long-Term Reversal (average)	Momentum (Past 1Q average)	Value (t-1)	Liquidity (t-1)
2006												
Capital Structure		0,056 ***	-0,031	-0,175 ***	-0,012	0,078 ***	0,564	0,019				
Stock Returns	-0,015 ***				0,000	0,005 ***	0,004		-0,005 ***	0,999 ***	0,000	-0,001
2009												
Capital Structure		-5,832 ***	0,143 ***	5,804 ***	-0,039 *	0,047 **	-0,207 ***	-0,001				
Stock Returns	9,590 ***				-0,399 ***	-0,170 **	-0,233 **		5,585 ***	-7,166	0,011	-0,026
2012												
Capital Structure		0,000	0,034 **	-0,006	0,002	0,038 **	0,873 ***	0,012				
Stock Returns	0,002				0,000	0,006	-0,001		0,847 ***	-0,05	0,000	-0,003

Table 6 - Estimation of structural coefficients

The structural equations are:

$$\eta_1 = \beta_{12}\eta_2 + \gamma_{11}\xi_1 + \gamma_{12}\xi_2 + \gamma_{13}\xi_3 + \gamma_{14}\xi_4 + \gamma_{15}\xi_5 + \gamma_{16}\xi_6 + \zeta_1$$

$$\eta_2 = \beta_{21}\eta_1 + \gamma_{23}\xi_3 + \gamma_{24}\xi_4 + \gamma_{25}\xi_5 + \gamma_{27}\xi_7 + \gamma_{28}\xi_8 + \gamma_{29}\xi_9 + \gamma_{2.10}\xi_{10} + \zeta_2$$

*** Significant at 0.001 level

** Significant at 0.01 level

* Significant at 0.05 level

4.2.1. Capital Structure and Stock Returns

When measured by the book value of the leverage ratio is possible to see an opposite relationship between capital structure and stock returns but only for the years 2006 and 2009.

Contrary to the market leverage results, this new result indicates for 2006 statistically significant coefficients for both capital structure and stock returns (0.056 and -0.015, respectively). These results mean that the higher the stock returns, the higher the leverage level of the firms. However we need to notice that when using the book value of leverage the positive effect that an increase of stock price has in the market value of equity is not incorporated in the leverage ratio. Therefore the increase on stock returns (exponential during the period before the crisis) and the fact that managers prefer debt instead of equity financing, due to some information asymmetry, as predicted by the pecking order theory, led to an increase in debt that was not followed by an increase on book value of equity since the net income of companies tend to decrease with the higher interest paid.

On the other hand, when the debt increases, the stock returns tend to decrease. This can be explained, once again, as the result of too much debt in a company's balance sheet that increase the probability of failure, so if a company in the worst case scenario goes bankrupt, the stockholders are the last to be paid, if at all. Also, with the increase of debt the interests will increase, making the EPS fall, decreasing the stock returns. These facts are consistent with the trade-off theory that predicts that a company increases debt to a certain point where the costs and the benefits of financing are balanced we can reach to an optimal capital structure where the value of the company is maximized.

In 2009 we have statistically significant results between leverage and stock returns, but this year the relationship is reversed when compared to 2006. In 2009 when the stock returns increase, the debt level decrease (-5.832), and when the debt increase, the stock returns increase (9.590), which is in accordance with the market-timing theory because, companies with high stock prices prefer to issue equity than debt.

Even when measured by the book value of the leverage ratio we reach the same conclusions than we've reached when we used the market value, which means that opposite effects between leverage and stock prices almost offset each other, creating a

circle of opposite impacts that can reach stability between the debt levels and the stock prices, as we said before.

4.2.2. Asset Structure

In 2009 we can see that an increase in the asset structure (0.143) leads to an increase in the debt level. For 2012 we can verify that the values have the same positive impact on the capital structure representing a coefficient of 0.034.

The asset structure of a company is a determinant of leverage ratio because companies with safe and larger tangible assets can use those assets as collateral in debt contracts and face lower bankruptcy costs.

4.2.3. Uniqueness

In 2006 we see that uniqueness was negatively and significantly related with the leverage level of a company when measured by the book value (-0.175). This result is consistent with Titman and Wessels (1988) that believed that companies that produce a unique product suffer from high financial distress costs, because they are more specialized in one operation.

For 2009, the results have a positive and significant impact on the debt level (5.800). The higher the uniqueness, the higher the leverage level, can only be explained by the financial crisis, where the access to debt financing became restrictive and uniqueness could have been a good distinctive factor between companies.

4.2.4. Expected Growth

In our study expected growth in 2009 affects negatively the capital structure and the stock returns.

The expected growth, as real options can originate agency costs that can lead to a lower debt ratio. Also, real options are intangible assets and cannot provide higher collateral, which means that an increase of debt is not likely to happen. Our results for 2009 reflect that negative relation between expected growth and debt level (-0.039).

Regarding the impact on stock returns, the expected growth in 2009 was -0.399. This result is not in accordance with the underlying theory that postulates that expect growth has a positive relation with stock returns.

4.2.5. Size

Our results show a positive and significant relation, for all the three years between size and leverage. The coefficients estimated were 0.078 for 2006, 0.047 for 2009 and 0.038 for 2012 and are all statistically significant. This is consistent with the fact that larger companies usually have a lower credit rating and so, being the debt less expensive, are able to raising more debt than companies with lower credit ratings.

Theories that consider (small) size as a risk factor predict a negative relationship between size and stock returns, but our results are not conclusive about that relationship. In 2006 we have a positive impact on stock returns (0.005) while in 2009 we have a negative impact of -0.170. Moreover, the coefficient for 2012 is not statistically significant.

4.2.6. Profitability

Our findings do not have consistent results for the significant years (2009 and 2012). In 2009 we have significant coefficient of -0.207 and this result is in accordance with the pecking-order theory where managers prefer internal financing than external financing. However, in 2012 the coefficient is positive which support the free cash-flow theory (0.873).

Regarding the stock returns a profitable company earn higher returns but in 2009 we cannot prove this relationship, our coefficient estimated is negative and statistically significant (-0.233).

4.2.7. Volatility

In our study we didn't find any evidence that the volatility of earnings influence the capital structure when measured by the book leverage ratio, in all the years the results are not conclusive and not statistically significant.

4.2.8. Long-Term Reversal

For 2006 we have statistically significant estimates as represented on Table 6 (-0.005) which is in accordance with the overreaction effect.

In 2009 and 2012 we have positive and significant estimates for long-term reversal. In 2009 the estimate for LTR is 5.585, and 2012 is 0.847.

In our study we didn't found consistent and significant results that support the overreaction effect.

4.2.9. Momentum

In 2006 we have positive and significant results about the impact of momentum in stock returns (0.999), proving the existence of the momentum effect in that year.

4.2.10. Value

In our research we didn't found any evidence that value influence stock returns, in all the years the results are not conclusive and not statistically significant.

4.2.11. Liquidity

In our study we didn't find any evidence that liquidity is a determinant of stock returns. Throughout the years in review the results are not conclusive and not statistically significant.

5. Conclusions

In this dissertation, we studied the causality effects and the common determinants of capital structure and stock returns. To do that, we had to apply a structural equations model to measure the impacts of the latent variables on both capital structure and stock returns. We use a sample of 3,876 European listed non-financial companies, using the book value of the leverage ratio and stock returns or the market value of the leverage ratio and stock returns as endogenous variables and other 10 latent variables (exogenous) for the years 2006, 2009 and 2012. We had chosen those three years to study also the impact of the financial crises in the study, and we decided to use the European companies in order to have a broader sample and more robust results.

Firstly, we find that stock returns are a main determinant of capital structure and the debt level is one of the key determinants of stock returns. We also show that these two key topics in finance have an inverse relation between them, but this opposite relation offsets itself and these two variables tend to reach a balance condition where they remain stable in the long-run.

Secondly, we find that the main determinants for capital structure are size, profitability, expected growth and stock returns. Expected growth is negatively related with the debt ratio. On the other hand, size and profitability are positively related with the leverage level of a company. Asset structure and uniqueness although showed some significant results, they are not conclusive. Volatility, in our study, didn't have a significant impact on determining capital structure.

Thirdly, we find that the main determinants of stock returns are size, momentum, long-term reversal, and debt level. Size and momentum are positively related with stock returns while long-term reversal was significant all over the year sample but didn't prove the existence of over-reaction on stock returns.

Finally, with this study we showed the inverse relationship between capital structure and stock returns, the main determinants for each one of them and that the common significant determinant of capital structure and stock returns that is the size of a company.

“There is no universal theory of the debt-equity choice, and no reason to expect one”

Stewart Myers (2001)

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Appendixes

Appendix A

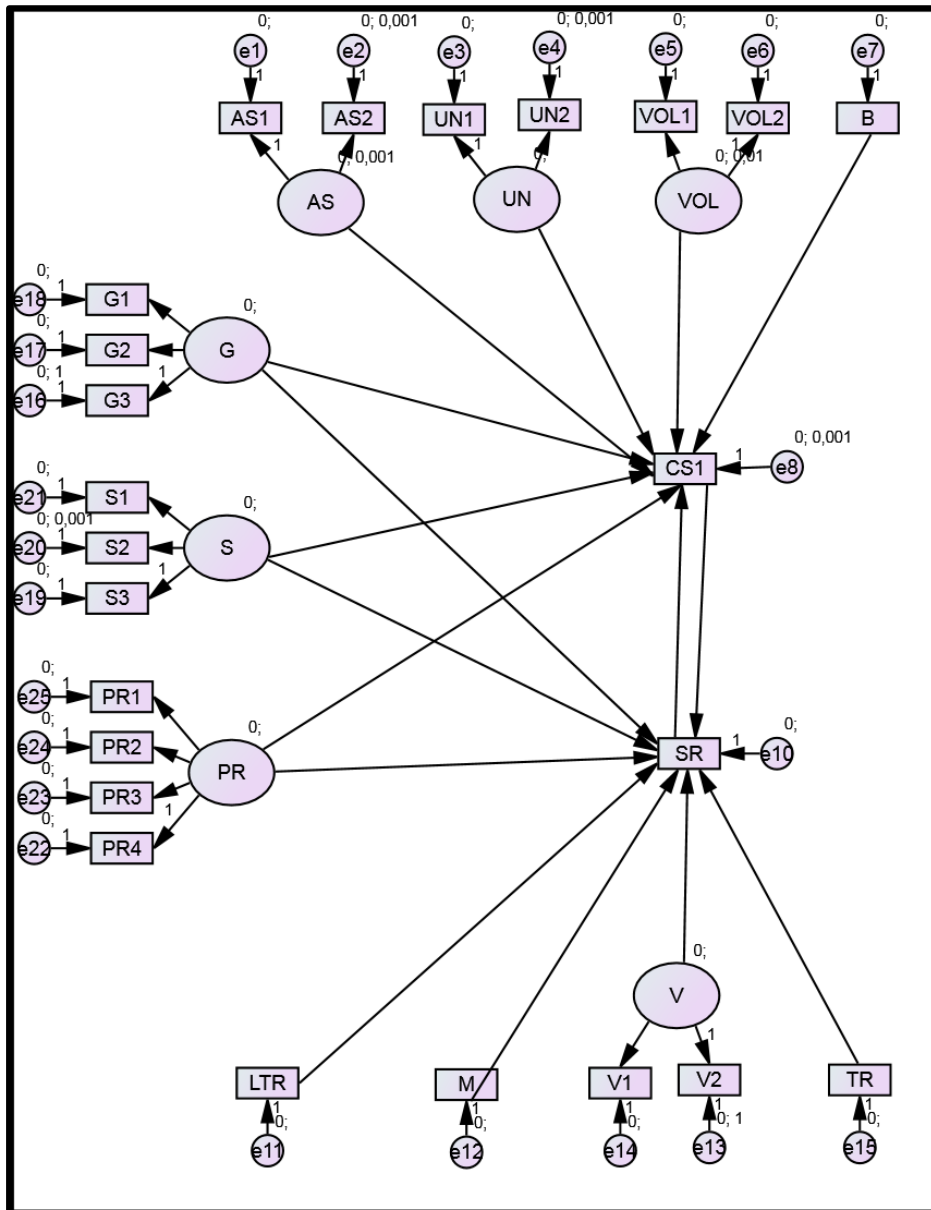


Figure 2 - Path Diagram developed in SPSS AMOS (CS1)

Note: AS1 (IGP/TA), AS2 (FA/TA), UN1 (RD/Sa), UN2 (SE/Sa), VOL1 ($\sigma(\Delta\text{EBIT}/\text{TA})$), VOL2 ($\sigma(\Delta\text{OI}/\text{TA})$), G1 (CR/TA), G2 (GTA), G3 (MTB), S1 (LnSa), S2 (LnTA), S3 (LnME), PR1 (OI/Sa), PR2 (OI/TA), PR3 (EBITDA/TA), PR4 (CFO/TA), V1 (BE/ME), V2 (EPS/SR) and from e1 to e26 are the residuals of estimation.

Appendix B - Correlation Matrix

		Correlations																								
	Mean	Std. Deviation	CS1	CS2	AS1	AS2	UN1	UN2	G1	G2	G3	S1	S2	S3	PR1	PR2	PR3	PR4	VOL1	VOL2	LTR	V1	V2	TR	M	
CS1	0.19	4.02	1.00																							
CS2	0.20	0.26	,047**	1.00																						
AS1	1.03	8.85	0.01	-0.01	1.00																					
AS2	0.95	0.33	-0.01	0.00	-,046**	1.00																				
UN1	203.94	5.908,05	0.00	-0.02	-,032*	0.00	1.00																			
UN2	241.45	5.205,61	0.00	-,024*	0.00	0.00	,965**	1.00																		
G1	65.78	3.465,28	0.00	-0.01	0.00	0.00	0.00	0.00	1.00																	
G2	-39.720,62	718.158,52	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00	1.00																
G3	2.026,84	49.769,32	0.00	0.01	0.00	0.00	0.00	0.00	0.00	-,121**	1.00															
S1	11.67	2.82	0.00	,177**	-,029**	,044**	-,083**	-,098**	-0.01	-,119**	,061**	1.00														
S2	11.82	2.61	-,043**	,222**	-,028**	,039**	-,045**	-,052**	-0.01	-,124**	,069**	,911**	1.00													
S3	11.52	2.45	-0.02	,077**	-,036**	,040**	-0.01	-0.02	0.00	-,135**	,070**	,821**	,906**	1.00												
PR1	-4.49	154.33	-,075**	0.02	-,072**	,120**	-0.02	-0.02	0.00	0.00	,066**	,037**	0.01	1.00												
PR2	-0.06	1.78	-,115**	,024*	-,061**	0.00	-0.02	-0.02	-0.01	-0.01	0.00	,102**	,120**	,082**	,026*	1.00										
PR3	0.04	5.06	-,258**	0.01	-,041**	,035**	-,075**	-,084**	0.00	0.00	0.00	,039**	,040**	,024*	,021*	,186**	1.00									
PR4	0.17	8.29	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-,036**	-,023*	-0.01	-,036**	-,031**	-,036**	1.00								
VOL1	12.64	473.96	0.00	-0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	-,029**	-,039**	-,029**	0.00	0.00	0.01	0.00	1.00							
VOL2	0.13	0.87	,077**	-,062**	,355**	-,138**	0.01	0.02	0.00	0.01	-0.01	-,155**	-,161**	-,113**	-,158**	-,111**	-,241**	0.02	0.02	1.00						
LTR	153.08	7.710,80	0.00	-0.01	0.00	0.00	0.00	0.00	0.02	0.00	-0.01	0.00	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00					
V1	0.13	0.46	0.00	,322**	0.00	0.00	-0.01	-0.01	0.00	0.01	0.00	,082**	,088**	-,045**	0.01	0.01	-0.01	0.00	-0.01	-,028**	0.00	1.00				
V2	2.04	78.86	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00			
TR	203.886,56	1.525.639,00	0.00	,055**	0.00	0.00	0.00	0.00	0.00	0.00	-,045**	,172**	,182**	,207**	,214**	0.00	0.01	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	1.00	
M	26.211,88	2.292.699,78	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	,507**	0.00	0.00	0.00	1.00

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).