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# THE EFFECT OF CAPITAL STRUCTURE ON THE VALUE OF FIRM. A STUDY OF TURKEY NON-METAL MINERAL PRODUCTS INDEX

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## ABSTRACT
**Purpose -** This study aims to examine the effect of capital structure on firm specific variables such as stock performance, growth, profitability. The study also aims to investigate relationship between GDP, inflation and capital structure of firms in a macro view.
**Methodology -** To apply our study, we use eight main companies of Turkey Non-Metal Mineral Products Index which are carrying out its operations in cement industry. To represent firm value, growth and, profitability, we use stock price, sales and EBITDA margin, respectively. We retrieve our data from Rasyonet on a quarterly basis from 2000 to 2018.
**Findings -** Our regression analysis shows that leverage generally does not have any significant relationship with examined variables. Also, we could not find any relationship with debt ratio and inflation for our companies.
**Conclusion-** Investment purpose debt increase is mostly observed in recent years, so it takes time to see result of it.

**Keywords:** Capital structure, Debt ratio, Turkey Non-Metal Mineral Products Index
**JEL Codes:** G32

## 1. INTRODUCTION

The relationship between firm value and capital structure is a common debate in finance literature. Researchers have been investigating whether there is optimal point of capital structure or not. There are different types of capital structure strategies to implement and also there are various results of them over firm value and operating performance. According to our literature screening, the most important variable which stand out are stock performance, growth, and profitability. Therefore, this study aims to examine the effect of capital structure on firm specific variables such as stock performance, growth, profitability. Another variables to add is that macro variables play a role in capital structure decisions. Adding to the micro analysis we recorded, the study also aims to investigate relationship between GDP, inflation and capital structure of firms in a macro view.

Between the years 2000-2018 where capital flow was increased mostly with global development. Turkey's growth also expanded in this period. Here, Turkey's growth is generally linked to construction for this reason especially when looked at the macro point of view we believe the cement industry may be a good influence and represent Turkey's Growth. Therefore, we chose Turkey Non-metal Index. To represent firm value, growth and, profitability, we use stock price, sales and EBITDA margin, respectively. Firstly, we retrieve our data from Rasyonet on quarterly basis from 2000 to 2018. We apply ADF test to our data and to make them stationary we use first difference if it is necessary. We applied OLS method to examine relations between our variables. İn line with the literature, the data and methodology part construct my hypothesis.

## 2. LITERATURE REVIEW

There are lots of studies about capital structure, but the theory of capital structure is started with the groundbreaking work of Modigliani and Miller (1958). They found that the market value of a firm is irrelevant with the company's financing decisions. According to MM's paper, leverage does not have significant effect on the cost of capital. Another attractive work came with Myers's (1984) paper which showed that firms may increase their value by leveraging themselves to optimal capital structure. Titman and Wessels (1988) examined the theory of capital structure with empirical research which evaluates some determinant's effect on debt level such as growth, uniqueness, non-debt tax shields, collateral value, size, profitability, volatility and industry classification. The paper supported that Uniqueness and high transaction cost due to firm size have negative relationship with debt level. Also, the paper does not find any conclusion about effect on debt level arising from future growth and other variables. Harris and Raviv (1991) studied capital structure theories in the context of agency costs, asymmetric

information, product/input market interactions, and corporate control considerations (but excluding tax-based theories). Harris and Raviv (1991) resulted that increasing leverage causes also increase in stock price in solid firms due to two exogenous factors which are lower default rate and lower cost of debt. Similar to Harris and Raviv (1991), Masulis (1983) found that movements in stock prices are positively correlated to movements in leverage, and movements in firm values are positively correlated to movements in firm debt level. Hatfield, Cheng, and Davidson (1994) tests Masulis (1983) theory that optimum debt level exists, and firms can change its value by converging that optimal debt level. Hatfield, Cheng, and Davidson (1994) could not find any reasonable result to Masulis's (1983) argument. Hatfield, Cheng, and Davidson (1994) shows that the market does not concern consistence of firm's leverage ratio and the industry's leverage ratio. Booth, Aivazian, and Demirguc (2001) investigated capital structure theory with regards to different institutional structures and finds out that country specific factors exist in applying capital structure theory due to different institutional structures. Menon (2016) resulted an inverse relationship between debt to equity ratio and stock price in its Oman example. Titman and Wessels (1988) suggested large firms would be more diversified so their probability of default should be lower compared to small firms. In other words, large firms should be more leveraged. Titman and Wessels (1988) used the natural logarithm of sales as indicator of size. Titman and Wessels (1988) also used operating income to sales to gauge profitability. Dinçergök (2017) concluded that there are different effects of leverage over firm specific variables based on two different theories which are pecking order and trade-off. According to the trade-off theory, expected relationship between leverage and profitability is positive. On the other hand, leverage should impact profitability negatively based on the pecking order theory. Many paper examined the capital structure's effect over firm specific variables, but Korajczyk and Levy (2002) also investigate capital structure effect in a macro view. The paper researched firms target capital structures as a function of macroeconomic environment and firm-based variables. They supported that unconstrained firms schedule their issues eurhytmical with good economic conditions, but constrained firms do not. Chen and Boness (1975) reported that uncertain inflation has an effect over the cost of capital through specific project because market of risk and the systematic risk of project are affected by uncertain inflation. Concordantly, investment decisions change with uncertain inflation. Suryanto and Kesuma (2013) resulted that GDP does not have any influence over stock price. But, GDP may affect investors' expected return.

## 3. DATA AND METHODOLOGY

To apply our study, we use eight main companies of Turkey Non-Metal Mineral Products Index which are carrying out its operations in cement industry. We retrieve our data from Rasyonet on quarterly basis from 2000 to 2018.

Firm value: we use stock price like Harris and Raviv (1993), Masulis (1983) who found positive relationship between leverage and stock performance. In this sense, we expect to find the same result.

Growth: Similar to Titman and Wessels (1988), we use the natural logarithm of sales as indicator of growth. Titman and Wessels (1988) resulted a relation between long term debt to book value of equity.

Profitability: Following Titman and Wessels (1988) literature, we use earnings before interest taxes depreciation and amortization to sales to gauge profitability. We expect a negative relationship between profitability and debt ratio.

Inflation: Concordantly to Chen and Boness (1975), we expect negative relationship between debt ratio and inflation due to higher inflation accompanies by higher cost of debt.

Gross Domestic Product: Mahmud and Qayyum (2003) found that there is a positive relationship between GDP and leverage.

**Table 1: Data Definitions**

| **Concepts and Variables used in the Analysis** | | | |
|---|---|---|---|
| **Concept** | **Variable** | **Definition** | **Abbreviation** |
| Firm Value | Stock Price | Price of a single share | DLP |
| Leverage | Financial Debt to Equity | Total financial debt/Equity | DLD_E |
| Size | Sales | Log(Sales) | DLS |
| Profitability | EBITDA Margin | EBITDA/Sales | DLE |
| Macro variable | Inflation | Inflation | DLI |
| Macro variable | GDP | Gross Domestic Product | DLGDP |

## 4. EMPIRICAL RESULTS

From the table below, one can find correlation coefficients and significance level of our variables. Firstly, we find significant relationship between firm value and debt to equity for two out of eight firms. Contrary to Harris and Raviv (1993) and Masulis (1983), our coefficients are negative. For the rest of our firms, coefficient of stock price and debt to equity is still negative but insignificant. Secondly, we could not find any significant relation between sales and debt to equity except two firms. For those two firms, direction of relation is different. Therefore, it is hard to indicate an acceptable result for sales and debt to equity relation. Thirdly, we examine the relationship between EBITDA margin and debt to equity, the result is significant for only one firm and similar with Titman and Wessels (1988). Finally, we study the effect of inflation over debt to equity. It was significant over two firms. Concordantly to Chen and Boness (1975), we found negative relationship between debt ratio and inflation due to higher inflation accompanies by higher cost of debt. Unlikely to Mahmud and Qayyum (2003) we could not find any significant relationship between GDP and leverage ratio. Unfortunately, our results mostly are insignificant even in 10% significance level.

**Table 2: Regression Results**

| DEPENDENT | STOCK PRICE | SALES | EBITDA MARGIN | DEBT/EQUITY | DEBT/EQUITY |
|---|---|---|---|---|---|
| INDEPENDENT | DEBT/EQUITY | DEBT/EQUITY | DEBT/EQUITY | INFLATION | GDP |
| AFYON | -0.01 | 0.06 | 0.03 | -12.94 | -1.39 |
| *Prob.* | *55%* | *34%* | *63%* | *11%* | *0.34%* |
| ASLAN | -0.10 | 0.02 | 0.04 | 1.19 | 1.09 |
| *Prob.* | *0%* | *69%* | *80%* | *63%* | *0.12%* |
| CIMSA | -0.04 | -0.02 | 0.08 | -0.25 | -0.91 |
| *Prob.* | *22%* | *72%* | *9%* | *92%* | *0.27%* |
| BOLUC | -0.02 | 0.02 | -0.07 | 4.61 | -4.02 |
| *Prob.* | *40%* | *68%* | *33%* | *30%* | *0.03%* |
| BSOKE | -0.15 | 0.20 | 0.20 | 1.48 | -0.14 |
| *Prob.* | *0%* | *3%* | *28%* | *77%* | *0.85%* |
| BTCIM | -0.05 | -0.08 | 0.14 | -1.68 | -0.34 |
| *Prob.* | *21%* | *7%* | *34%* | *48%* | *0.66%* |
| BUCIM | 0.00 | -0.03 | -0.04 | -6.58 | -0.01 |
| *Prob.* | *92%* | *75%* | *68%* | *1%* | *0.99%* |
| AKCNS | -0.04 | 0.03 | 0.07 | -1.54 | -0.36 |
| *Prob.* | *26%* | *59%* | *30%* | *51%* | *0.65%* |

## 5. CONCLUSION

This study aims to examine the effect of capital structure on firm specific variables such as stock performance, growth, profitability. The study also aims to investigate relationship between macro variables and capital structure of firms in a macro view. First of all, our firm's sales growth and GDP are consistent each other. Therefore, we have already expected to see increase in leverage, so firms would exploit from growing environment through expanding its operations. Increasing leverage for our firms are observed in specific periods. Any other purpose but investment should be eliminated. In other words, in a growing period, our firms naturally would be appreciated. Also, it is hard to observe effect of an investment in a short period, so we may say we have a time constraint.

Our regression analysis shows that leverage mostly does not have any significant relationship with examined variables. Also, we could not find any relationship with debt and inflation for our firms. Also, we could not observe a relation between GDP and leverage. The results are compatible to Modigliani and Miller (1958) findings that leverage is immaterial to value of firm.

For further study, we need to compare leverage of our firms and global peers to gauge optimal level of leverage. Also, we may change our sector, so we may have healthier data because our data is limited with only 18 years. In addition, investment purpose debt increase is observed in recent years, so it takes time to see result of it.

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