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**DETERMINANTS OF CAPITAL STRUCTURE  
AN EMPIRICAL STUDY OF AMERICAN COMPANIES**

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August 31<sup>st</sup> 2016

## **Abstract**

This study investigates the factors that potentially have impact on capital structure decisions of American firms, and identify the key determinants of the capital structures of these firms. The paper also explores the capital structure theories and how they explain capital structure decisions of firms worldwide and in the U.S. The sample includes 1,500 U.S. firms, which covers 90% publicly-traded companies in the U.S. during post-financial crisis time, from 2010 to 2016. Using panel data techniques with fixed-effects model and random-effects model, firms' characteristics are tested if they explain for leverage ratios. The explanatory variables represent the factors that potentially determine capital structure: business risk, profitability, firm size, growth opportunities, tangibility of assets, non-debt tax shields.

This study finds that the most reliable and important factors that determine the use of debt by American listed firms are firm size (+), tangibility of assets (+), profitability (-). Besides, the moderately influential factors of leverage includes: business risk (+/-), non-debt tax shield (+/-) and growth opportunities (+/-). The study finds evidences which are consistent with pecking-order theory' prediction of a positive relationship between asset tangibility and financial leverage and a negative relationship between profitability and financial leverage. The finding moderately supports trade-off theory's prediction of negative relationship between non-debt tax shield and leverage, business risk and leverage. The trade-off suggestion of a positive relationship between asset tangibility and financial leverage are also confirmed by this study. Finally, agency's prediction of a negative relationship between growth opportunities and leverage is moderately supported by a negative and insignificant relationship found in this study.

## **Acknowledgement**

In the last three months, I have been lucky to receive great support from many people who have helped to make this study possible.

At first, I would like to extend the most sincere gratitude to Dr.Cormac Mac Fhionnlaoich, UCD Michael Smurfit Graduate Business School, for providing supporting during the process of conducting this research. Dr.Cormac Mac Fhionnlaoich has shown great support in guiding me through this project, providing detailed comments and thoughtful suggestions in my completion of the project.

Furthermore, I would like to send my appreciation to Irish Aid, The UCD Michael Smurfit Graduate Business School staff and lectures, and ICOS for giving the scholarship and support me during my academic year in Ireland.

I also would like to place on the record my sincere gratitude to my IDEAS Fellows, in particular, Pham Khanh Linh, for his guide on data solving and Nguyen Thi Phuong Thao for her company and encouragement.

Last but not least, I would like to show my great appreciation family and friends for their support and constant care for me on the way to my completion of the master program.

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## 1. INTRODUCTION

Capital structure is one of the most important decisions of every company. A false decision in capital structure can lead a firm to severe difficulties. Managers always want to find a suitable capital structure policy to meet their goals. Researchers, from another aspect, are curious to know how firms choose of sources of financing, do they have target structure and what factors affect firms' decisions. That is the reason makes the capital structure to become one of the most important fields of corporate finance. Modern corporate capital structure theory originated by Modigliani and Miller's (1958) with irrelevance theorem. The idea of the theory is that in an efficient market with the absence of taxes, agency costs, bankruptcy, and asymmetric information, how a firm is financed does not affect its value. Since the value of the company depends neither on its dividend policy nor its source of capital, the Modigliani, and Miller theorem is often called capital irrelevance principle. This theory is considered to lay stones for many followers to study capital structure.

However, it is clear that Modigliani and Miller's assumptions are unrealistic and hard to happen in the real market. Following Modigliani and Miller (1958), several other theories have been developed on the topic of capital structure. The trade-off theory states that companies choose an amount of debt finance and equity finance base on the balance of benefit and financial cost. The pecking order theory focusses on asymmetric information with considering that the cost of finance increases with asymmetric. Therefore, firms will choose to internal financing as the first priority, then debt and equity as a "last resort". Another stream of research was initiated by Ross (1977) on how the choice of a firm's capital structure can signal information to outside investors about the company, i.e. issuing large debt levels is a signal of higher quality of the firm.

With regards to empirical work, many studies were done to find an answer to the capital structure puzzle. Concerning to U.S firms, one of the earliest attempts to extend empirical study on capital structure was conducted

by Titman and Wessels (1988). A large set of data of U.S. companies between 1974 and 1982 was used to examine theoretical determinants of capital structure. Following this, Rajan and Zingales (1995) investigated the determinants of capital structure decisions on a broader scope in G-7 countries with more focus on U.S firms.

It can be clearly seen that both theoretical and empirical work has made progress in investigating which factors influence capital structure decisions. Yet, Titman and Wessels (1988), Rajan and Zingales (1995), and Harris and Raviv (1991) agreed on the fact that, while progress has been made from the initial work of Modigliani and Miller in 1958, the empirical work was lagging behind and doing very little to identify empirical findings of capital structure in practice. While theoretical work had identified a large number of potential determinants of capital structure, empirical studies have not frequently considered various contexts outside the G-7 countries.

In recent years, empirical studies on capital structure determinants have been largely extended to different developed and developing countries including Malaysia, (Pandey, 2001), India (Joy Pathak, 2010), Portugal (Vergas, Cerqueira, Brandão 2015), Sweden (Han-Suck Song, 2005). They pointed out both similarities and discrepancies in what factors influence firm financing decisions across different contexts.

By updating data, applying the methodology used for the panel data that has been improved upon and updated with a thorough analysis of different models and using four kinds of leverage ratios, the study wants to find out which factors are important in the capital structure decisions of U.S in recent time, especially after the financial crisis time.

## 2. LITERATURE REVIEWS

### 2.1. Modigliani-Miller theorem

Fifty-eight years ago (1958), two economists Franco Modigliani and Merton Miller proposed Modigliani-Miller theorem on the capital structure which plays an essential role in modern corporate finance. Before them, no widely-accepted theory of capital structure has existed. The theorem states that in a perfect market without taxes, asymmetric information, bankruptcy cost, and agency costs, the way in which a firm raise its capital makes no influence on its value. This suggests that the valuation of a firm is irrelevant to its capital structure, so the theorem is also called capital structure irrelevance principle.

The assumptions of the theory are based on an efficient market. First, there are no taxes. Second, there is no transactions costs and bankruptcy costs. Third, the information is symmetric, all investors are rational and have the same access to information. Fourth, the costs of debt are the same for everyone and last, debt financing do not affect firms

The fact is that it is very hard to find a perfect market. In reality, corporations do business in a market containing transaction costs, borrowings costs, taxes, asymmetric information and agency costs. By relaxing some assumption in Modigliani-Miller theory, some alternative theories were proposed to address these imperfections.

### 2.2 Tradeoff theory

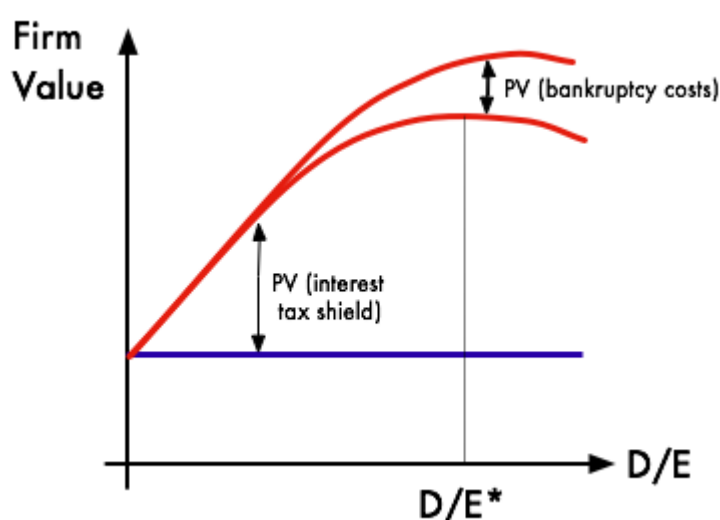
#### *The Static tradeoff theory*

The basic idea of trade-off theory is that that firms follow an optimal capital structure to maximize value by offsetting the cost of the additional unit of debt by its benefit. Baxter (1967) and Kraus and Litzenberger (1973) stated that a taxable corporation should consider an increase in its debt level until there is a balance between the marginal value of tax shield and the present value of any financial distress costs occurred.

#### *Trade-off model with bankruptcy costs*



When firms borrow, they get a tax advantage as interest is deductible for income tax. Besides, firms have to incur bankruptcy cost of debt. Companies using leverage need to pay interest on their borrowings. This changes companies' earnings and cash flow. The more firms borrow, the higher probability of bankruptcy increases. The trade-off theory predicts that firms choose an optimal capital structure to balance tax benefits and cost of debt. Companies substitute debt with equity or versus while maximizing the company's value.



#### *Trade-off model with agency costs*

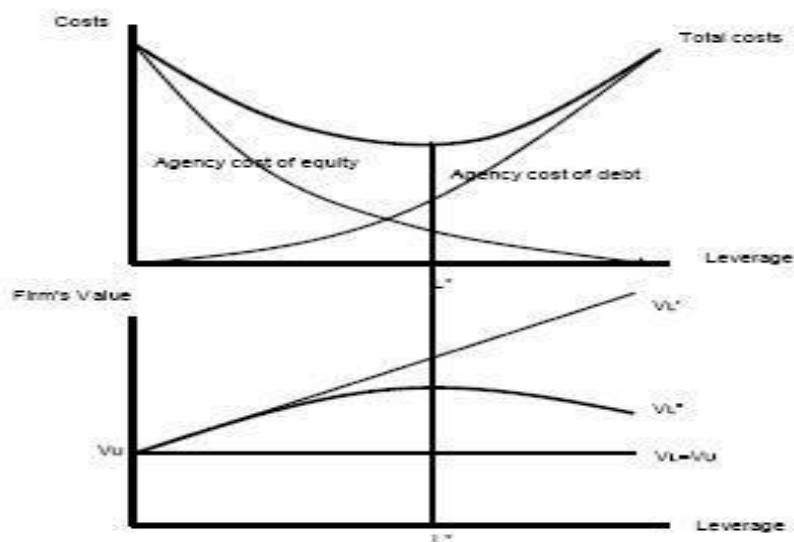
Jensen and Meckling (1976) notice that debt had been used widely before the appearance of subsidies tax on interest payment, given that there must be other important factors of capital structure that have not been recognized. Two kinds of agency costs were suggested that is the gap between shareholders and managers and conflict between shareholders and creditors.

Agency cost between shareholders and managers: This type of agency costs appear when there is a separation between ownership and management. When shareholders lose control, sometimes managers have opportunities to put their benefits above shareholders. Instead of always making decisions to maximize the market value of the firms, managers may make the inefficient allocation of capital. For example, managers may pursue growth and size at

the expense of profitability and value by investing in unprofitable projects. Some managers prefer managing a bigger, and more influential firms have less incentive to act for benefits of shareholders. If increasing using debt, firms have to pay interest payment and by that reduce free cash flow within the firms. As a result, there is a deterioration of liquidity that allows managers to take part in projects that the profit maximization (Jensen, 1986).

Agency cost between shareholders and creditors: The shareholder's attempt to engage in new projects that generate more benefits for shareholder while posing higher risks to the firm's creditors. If the risky capital investment project is successful, shareholders will gain more rate of return. Lender's benefit does not change because the interest rate is fixed. If the project fails, the creditors are forced to share in the loss. The reduction in value of debt due to risky projects is called agency cost of debt financing.

Jensen and Meckling (1976) suggested that firms can find optimal capital structure point where the total cost of agency is minimized.



### *Dynamic Trade-off theory*

There are abundant studies supports this static trade-off theory such as Myers (1993); Andrade and Kaplan (1998); Graham (2000); Hovakimian, Kayhan, and Titman (2012). Graham and Harvey (2001) find that 81% of CFOs