Title: The Determinants of Capital Structure: An Empirical Study on Singapore Publicly Listed Companies

Objectives:

1. What are the significant capital structure determinants of firm-level, sector-level and country-level for Singapore listed firms?

2. What are the significant capital structure determinants of firm-level, sector-level and country-level in each sector for Singapore listed firms? Do they differ across sectors?

3. Is the behavior of each sector explained by capital structure theories?

Abstract

This study mainly acknowledges that capital structure determinants vary across sectors due to the nature or behaviour of each sector. The sample consists of a balanced panel dataset for 300 non-financial Singapore firms from 2001 to 2012 and an unbalanced panel dataset for 815 non-financial Singapore firms. Several variables of capital structure determinants covering firm, sector and country-level are included in analysis. Based on pooled OLS and fixed effect analysis, a few fascinating issues are visible from the overall sample. In general, the significant relationship between firm, sector and country-level capital structure determinants, and all types of leverage across sectors, provides evidence that the nature of each sector tends to influence the mechanism between leverage and capital structure determinants indirectly. Secondly, the size of magnitude of each significant variable varies greatly across sectors, and this shows the impact of each variable in the process of leverage determination. In other words, the different sizes of coefficients imply the different degrees of economic significance of each determinant on capital structure decisions. Since total debt is largely controlled by short-term debt, a few variables react similarly to leverage. These analyses also highlight a great divergence between the overall sample and the sectors' outcomes. The *chronology of the importance of each variable on leverage is discernible across sectors. Finally, the impact of sectorial behaviour is clearer on firm-level and sector-level determination than on the country-level variables. However, it is undeniable that the firm-level variable consistently maintained as the primary determinants in determining a firm's leverage.*

In sum, the overall analysis revealed that the orientation between capital structure determinants and leverage is highly influenced by the sector characteristics, which are embedded indirectly, and control the direction of relationships and the degree of significance.

Keywords: *Capital Structure Determinants, Singapore, Trade-off Theory, Pecking Order Theory, Market Timing Theory.*

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G5: Group of Five, five developed countries consisting of US, UK, France, Germany, and Japan

G7: Group of Seven, seven developed countries consisting of US, UK, France, Germany, Italy, Canada and Japan

GDP Gross Domestic Product

HH Index Herfindahl–Hirschman Index

MM: Modigliani and Miller

NPV Net Present Value

OLS: Ordinary Least Squares

FE: Fixed Effect

1 INTRODUCTION

1.1 BACKGROUND

A mass of theoretical and empirical literature on capital structure has been developed since the seminal paper by Modigliani and Miller (MM) (1958). The trade-off theory hypothesizes the existence of optimal capital structure by balancing the benefit of tax shield (MM 1963; Miller 1977; DeAngelo and Masulis 1980) against the costs of financial distress (Baxter 1967; Kraus and Litzenberger 1973; Stiglitz 1972; Kim 1978) and agency cost (Jensen and Meckling 1976). In a subsequent study, Myers and Majluf (1984) challenged the idea of trade-off theory by arguing that there is a pecking order among the financing sources utilized by firms due to information asymmetry between insiders and outsiders. It is asserted that firms are normally dependent on their internal funds as their main source of financing, but as the internal reserves reduce, they will rely on debt financing and subsequently external equity as a last resort. Nevertheless, Baker and Wurgler (2002) further argued that the pecking order is greatly influenced by the market conditions. The market timing theory hypothesizes that capital structure depends on past equity market timing attempts. In general, a number of researchers have tested the validity of these theories which vary across different countries. None of the capital structure theories is universal, but each of the theories is conditional (Myers 2003).

Based on the prominent capital structure theories, many empirical studies have been conducted on capital structure determinants at the firm level across different economies. In the beginning, the majority of the capital structure studies focused on the financing behavior of firms across the United States (Jalilvand and Harris 1984; Titman and Wessels 1988; Harris and Raviv 1991; Myers 2001; Hovakimian et al. 2001; Lemmon et al. 2008). Soon after, the focus was diverted to other developed nations as Rajan and

Zingales (1995) found the applicability of similar determinants of capital structure across G7 countries. The identification of the fundamental determinants is strongly associated with the institutional factors. Conversely, Wald (1999) found differences across countries mainly due to institutional differences. This argument is supported by Antoniou et al. (2008) with the findings confirming the variations of capital structure determinants across G5 countries. Furthermore, numerous studies were conducted on the specific non-US developed countries (Marsh 1982; Ozkan 2001; De Miguel and Pindado 2001).

Additionally, Demirguc-Kunt (1992) observed great variation in firms' financing patterns between developed and developing countries. Differences are noticeable on a few aspects such as the level of capital market development, quality of accounting practices, institutional settings, and corporate governance that indirectly influence the capital structure choices. As a result, the outcomes of developed economy studies could not be generalized across developing nations. However, Booth et al. (2001) confirmed the homogeneity of the determinants across 10 developing countries regardless of the institutional differences. They argued that the underlying variables are comparable with the US and UK. In contrast, Deesomsak et al. (2004) found big differences across Australia, Singapore, Thailand and Malaysia, as the capital structure decision highly depends on the firm-specific factors as well as the market-related factors, e.g., the economic and institutional environment, corporate governance practices, exposure to capital markets and the level of investor protection. Similarly, a few studies provide some insights on firms across emerging markets and developing countries by concentrating on specific regions (Gurcharan 2010; Sbeiti 2010; Mat Nor et al. 2011).

Another strand of the empirical literature concentrates on individual country studies within the emerging markets (Wiwattanakantang 1999 (Thailand);

Pandey 2001; Pandey and Chotigeat 2004 (Malaysia); Chen 2004; Zou and Xiao 2006 (China); Shan and Khan 2007 (Pakistan); Chakraborty 2010 (India)). These investigations further substantiate the uniqueness of the capital structure decisions and practices that vary across nations due to their different business environments. Recently, most of the studies have included the country-level determinants in their model as the impact is noticeable on the capital structure decision making.

Moreover, another direction of the literature provides evidence on leverage differences across industries and similarities within an industry with respect to the financial structure (Hamada 1972; Bowen et al. 1982; Bradley et al. 1984; Gershon and Rhee 1984; Harris and Raviv 1991). Ferri and Jones (1979) further argued that the similarities are mainly due to several factors, i.e., types of products, cost of materials, technology and skilled labor which finally lead to similar amounts of business risk. Furthermore, Brander and Lewis (1986) proposed other industry-specific factors, e.g., competition on price, quantity, advertising, and research and development, which contribute towards the variations across sectors or industries that affect the ultimate decisions on capital structures. MacKay and Phillips (2005) found that the impact of industry factors on leverage is discernible across individual firms within a particular industry. Firms tend to rely on the changes made by their peers in their particular industry.

1.2 Justification of the study

Despite of the importance of the industrial effect, the prior literature indicates that the firm-fixed effect becomes more influential than the industry-fixed effect. This argument is disputable as other factors that are related to the industry which are not captured in the industry-fixed effect may affect the leverage determination. In addition, MacKay and Phillips (2005) proposed that the intra-industry variation in capital structure in competitive industries is well explained by industry-specific factors other than industry-fixed effects. However, they concluded that the firm-fixed effect is greater than the industry-fixed effect.

In the context of emerging nations, the importance of industry or sector on capital structure is under-explored. In general, most of the studies remove the industry-fixed effects by including industry dummy variables, and a few studies even tend to ignore the importance of industry in their model specification. In addition, researchers face difficulties in constructing the industry-specific variables due to data availability for emerging markets.

Recently, a small number of studies have diverted their attention to sector or industry analysis solely on the individual industry (Hung et al. 2002; Shanmugasundram 2008; Mahmod and Zakaria 2011; Baharuddin et al. 2011). This indirectly provides insights about the nature of a particular industry and its impact on the decision making of capital structure. Given the previous discussion, the argument between firm-fixed effect and industry-fixed effect is inconclusive across emerging markets.

Moreover, De Jong et al. (2008) emphasized the indirect impact of country-level determinants on leverage in conjunction with firm-level determinants. Likewise, Kayo and Kamura (2011) found that the mechanism between leverage and firm-level determinants is indirectly influenced by both industry-level and country-level variables, but this study did not take institutional settings within emerging markets into account. There are enormous institutional differences, so the impact of sectorial behavior on capital structure determinants of firm-level, sector-level and country-level may differ across these markets. Besides, the unique behavior of each sector varies within and between countries.

Recent empirical evidence highlights the role of sectors or industries in explaining the pattern of a firm's financing, particularly among emerging markets. This evolution started from the late 1990s noticeably in the aftermath of the Asian financial crisis, and the sector effects rather than the country effects are gaining explanatory power across the Asian markets, (L'Her et al. 2002; Wang et al. 2003). The power of firm-fixed effect may be attributable through sectorial behavior as the impact of the sector or industry is captured indirectly through the firm-level determinants.

Additionally, the relationship between leverage and capital structure determinants of firm-level, sector-level and country-level may vary across sectors due to the nature of each sector within a country. This impact of sector characteristics on capital structure determinants is subject to further investigations. Therefore, this study tests the differences of significant capital structure determinants across sectors.

1.2.1 Reasons for choosing Singapore

Firstly, while the majority of the research results have been derived from the experience of western developed economies (Hodder and Senbet 1990; Rajan and Zingales 1995; Wald 1999; Ozkan 2001; Chui et al. 2002; Bevan and Danbolt 2002), little work has been done to further the knowledge of capital structure within the Southeast Asian area. The 1997 Southeast Asian financial crisis affected the region's capital markets severely with outflows of foreign investments as international investors became concerned with the higher risk in the affected countries.

Secondly, as mentioned, the explanatory power of the sector effect is amplified across Southeast Asian countries as a result of the 1997 financial crisis. It is justified to choose a Southeast Asian country as research target. Additionally, Singapore is a special country as it is the only developed nation in Southeast Asia, and it is also an emerging market.

Thirdly, this will be the first capital structure determinants study solely conducted on Singapore. Deesomsak et al. (2004) did a comparative study on selected countries in Asia-Pacific region, namely Singapore, Thailand, Malaysia and Australia, but it was based on over 10 years old historical data in last century (1993~2001). Whether the latest data in 21st Century have changed addresses my interest. Furthermore, they did not allow industry difference and year difference in regressions. Their focus was the capital structure difference between the selected four countries pre- and post-Southeast Asian financial crisis. In addition, their only estimation method was Cross-sectional Lagged Average (CLA). They did not involve other estimation methods like pooled OLS and fixed effect. Whether their results are unbiased and trustable is also a motivation of this study.

1.3 Aim and Objectives

The aim of this study is to examine the determinants of capital structure for the Singapore publicly limited companies.

In order to achieve the aim, the objectives include:

1) What are the significant capital structure determinants of firm-level, sector-level and country-level for Singapore listed firms?
2) What are the significant capital structure determinants of firm-level, sector-level and country-level in each sector for Singapore listed firms? Do they differ across sectors?
3) Is the behavior of each sector explained by capital structure theories?

1.4 Structure of the study

The remainder of the thesis is organized as follows. Chapter 2 provides an extensive literature review on capital structure theories and determinants derived of firm-level, sector-level and country-level. Chapter 3 outlines the methodologies employed in this study. Chapter 4 illustrates the findings of the significant capital structure determinants across sectors in Singapore. Finally, Chapter 5 concludes the research findings and discusses limitations and future research recommendations.

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