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The Effect of Capital Structure on the Firm Value of Listed Companies in Thailand

By

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Abstract

Purpose

The objective of this research is to examine the relationships between capital structure providence and firm value based on the secondary financial data of the SET50 in Security Exchange in Thailand (SET) between 2010 to 2021.

Theoretical Framework

This conceptual framework is based on the traditional capital structure theory of Modigliani and Miller (M&M Theory) and the trade-off theory.

Design/Methodology/Approach

The study focuses on the short- and long-term impact of the capital structure providence on firm value. The short-term impact is assessed by firm liquidity, while the long-term impact is based on sustainability and growth. A regression analysis is used to test the relationship between capital structure providence and firm value.

Findings

The results support a negative relationship between capital structure providence and firm growth and sustainability, suggesting that capital structure providence has a negative long-term impact on firm value.

Research, Practical And Social Implications

This finding encourages practitioners to be prudent regarding the financing between debt and equity, as the capital structure providence can affect firm value in the long-term.

Original Value

This research studies the impact of capital structure providence on firm value based on the return on total assets. More specifically, the effect on firm value is based on short-term (firm liquidity) and long-term (firm growth and sustainability) measurements.

Keywords: Capital structure providence; Firm value; Firm liquidity; Firm growth; Firm sustainability; The probability of survival; Altman's Z-score

Introduction

Sufficient funds are necessary when firms wish to expand, develop, grow, or even to simply survive in all conditions. However, in business financial management, a firm must obtain funds from two major sources: “Debt” and “Equity”. Traditionally, capital structure theory posited that the choice between debt versus equity financing has no material effect on the value of the firm or on the cost or availability of capital (Modigliani & Miller, 1958). This theory is now widely accepted but others have shown that the type of financing can impact firm value. Accordingly, the theories of optimal capital structure were developed that focus on different factors. For example, the tradeoff theory focuses on taxes, while the pecking order theory emphasizes differences in information, and the free cash flow theory emphasizes agency costs (Mayer et al., 2001). Harris and Raviv (1990) have identified a large number of potential determinants of capital structure based on the debt contract that can have important implications for determining capital structure, such as the bankruptcy provision, convexity of payoffs of levered equity, the effect of debt on managerial equity ownership, and the relative insensitivity of debt payoffs to firm performance. The leverage-increasing transactions reflect reductions in business risk and increases in target debt ratios. Furthermore, research also demonstrates the relationship between the management’s confidence in the level and safety-of future earnings. The most telling evidence against the static trade-off theory is the strong inverse correlation between profitability and financial leverage. That is, within an industry, the most profitable firms borrow less, and the least profitable borrow more. For instance, Kester (1986) found that return on assets is the most significant explanatory variable for actual debt ratios in an extensive study of debt policy in United States and Japanese manufacturing corporations. Similarly, Baskin (1989) showed that higher profits mean more dollars for debt service and more taxable income to shield that it indicates the higher target debt ratios.

The pecking order theory explains that no well-defined target debt ratio exists because the attraction of interest tax shields and the threat of financial distress are assumed to be second order. Therefore, debt ratios change when an imbalance of internal cash flow occurs, net of dividends, and real investment opportunities arise. Thus, the highly profitable firms with limited investment opportunities work to a low debt ratio. By contrast, firms where investment opportunities outrun internally generated funds are driven to borrow more and more. This theory provides an immediate explanation for the negative intraindustry correlation between profitability and leverage. That is, firms generally invest to keep up with industry growth. Then, rates of real investment will be similar within an industry while given sticky dividend payout, the least profitable firms in the industry will have less internal funds for new investment and will end up borrowing more. Additionally, there are long-standing concerns about corporations that rely too much on internal financing to avoid the "discipline of capital markets." Thus, the pecking order theory neatly explains why equity issues reduce stock price, but plain-vanilla debt issues do not. If the probability of default is low, then the managers’ information advantage is not a major concern to potential buyers of a debt issue. Accordingly, the model allows for the possibility that, at any point in time, a firm’s observed leverage may not be optimal, and firms differ in their speed of adjustment towards the optimal capital structure, which itself may be changing over time for the same firm (Banerjee et al., 1999). Furthermore, firms typically have capital structures that are not at the target, and they adjust very slowly towards the target (Banerjee et al.,1999).

Thus, at present, it is unclear whether funding via debt or equity is better for the firm. The current research will explore how the capital structure effects the firm value and will test the impact on firm value in both the short- and long-term. For the short-term, the investigation

will focus on the market value movements day-by-day over a year. For the long-term, we will focus on the growth of the company that could be maintained for several years. We also assess the sustainability of the firm and its ability to survive in the future. This research discloses how the capital structure encourage a firm to be upper its value differently related to time periods that future is risky.

Theories and Hypotheses

Modigliani and Miller (M&M Theory) and Trade-off theory

Modigliani and Miller's (1958) theory is regarded as the original theory of capital structure. This theory states that the firm value is calculated as the present value of its future earnings and its underlying assets, which is independent of its capital structure. Others have shown that firm value increases through three kinds of strategy; operational strategy, investment strategy, and especially financial strategy (Rappoport, 1998). The financial strategy is largely responsible for capital structure, which supports value maximization achieved primarily by business and investment strategies. The trade-off theory is based on Modigliani and Miller (1963), which is an adjustment of their famous seminal work that proposes the optimal capital structure as being a compromise between the benefit of debt, in terms of corporate tax advantage, and the cost of debt, in terms of the financial distress caused by the risk of bankruptcy (Kraus and Litzenberger, 1973) and agency costs (Jensen & Meckling, 1976). Booth et al. (2001) found that capital structure decision making is affected by similar variables in developed countries. Indeed, Mayer et.al (2001) showed that the investments from external sources as debts allows a firm to obtain tax advantages, which encourages Chief Financial Officers (CFOs) to gather funds by creating more debt. Abor (2005) specifies that obtaining external sources of funds from debt may raise by advantageous to a firm, but it should be limited.

Tobin's Q value indicates the market value of a firm based on its assets with the replacement cost (Summers et al., 1981) and the value of shares in the hand of equities and liabilities. It reflects the firm value that is calculated from the expectation of future investment caused by the decision making in capital structure (Chung & Pruitt, 1994). Therefore, M&M theory and Trade-off theory can be used to explain how the capital structure should impact a firm's future investment and the firm's short- and long-term value.

Firm Liquidity and Capital Structure Providence

Various studies have shown that firm liquidity affects firm performance. For instance, Fang et al. (2009) demonstrated that firm liquidity improves performance as it allows the firm to control risk, at least to some extent. Similarly, Cheung et al. (2015) showed that liquidity is a result of good corporate governance that keeps investors happy. Therefore, firm liquidity will push higher prices and, thus, increase the firm's value (Chakravarty and Sarkar, 1999). As such, firm liquidity can create better firm value (Du et. al, 2016; Zuhroh, 2019; Chia et. al, 2020). Brockman and Chung (2003) also confirm that firm liquidity is significantly affected by investor protection. Thus, capital structure can affect a firm's decisions regarding investments in the short and long term assets. This was one of the messages of Myers' (1977) original analysis of the corporate borrowing decision. Indeed, problems related to debt overhang (i.e., levered equity's disincentive to invest in positive NPV projects) could be overcome with 'financial slack', thus establishing an important incentive for maintaining liquid asset holding (Myers,1977).

However, for illiquidity assets, Amihud and Mendelson (1986) propose that investors require a return premium to compensate for illiquidity costs and this premium differs depending on the individual investors' holding periods. This premium usually exceeds the expected

illiquidity costs because of funding constraints and investor client. Some studies predict a positive relation between expected returns and illiquidity costs. But illiquidity costs have a number of dimensions that are hard to capture in a single measure, including fixed costs, variable costs, price impact costs that increase in the traded quantity, and opportunity costs. Amihud and Mendelson (2010) propose that illiquidity costs of asset portfolios can be reduced by liquidity-motivated portfolio diversification. This is particularly important for mutual funds that are subject to unexpected redemptions and need to liquidate their holdings. Furthermore, Amihud and Mendelson (2010) also show that, for a given number of securities in the fund portfolio, the optimal fund size is a decreasing function of the price impact of its constituent securities. This implies, for example, that a fund of illiquid securities should typically be of a smaller size. Thus, financing for illiquidity is not more important than liquidity assets and recent developments in capital markets raise the value of liquidity for some investors. Liquid securities are in greater demand by high-frequency traders, consistent with Amihud and Mendelson's (2010) prediction. Accordingly, capital structure providence could impact firm liquidity, as stated in the following hypothesis:

H_1: The more optimal the capital structure providence, the higher the firm's liquidity.

Firm Growth Through Capital Structure Providence

Growth is defined as the differential outcome between (at least) two points in time (Delmar et al., 2003; Penrose and Penrose, 2009). When estimating a firm's growth, various time periods are used, with the most common periods being 1-, 3-, or 5-years (Delmar et al., 2003). Growth can be measured using several factors, including sales levels, profitability, number of employees, and market share (Gilbert et al., 2006; Shepherd and Wiklund, 2009; Storey, 1994). Some have argued that sales growth is the most effective growth variable as it translates easily across countries and industry contexts. It is also the metric of choice for entrepreneurs (Delmar et al. 2003; Hoy et. al, 1992). However, Shepherd and Wiklund (2009) argue that employment growth is the metric that shows the best concurrent validity. Indeed, others have also shown that the firm size has a positive correlation with firm survival (Audretsch and Mahmood, 1995; Mata and Portugal, 2002; Shalit and Sankar, 1977). This lead to the next hypothesis of the study, which is stated below:

H_2: The more optimal the capital structure providence, the more likely that a firm will experience higher growth.

Firm Sustainability through Capital Structure Providence

The value of a firm must be assessed in both the short- and long-term. In the short-term, the emphasis is on firm liquidity and the liquidity assets. However, in the long-term, the firm must focus on growth, improvement, and development in order to ensure the firm's sustainability (Tsoukas, 2010). To be sustainable, a firm must be able to successfully compete with and block rival firms to create its long-term value (Narver and Slater, 1990). This has significant implications for the strategic decision-making process of the firm as the sustainability challenge often requires the revision of current management practices (Schrettle et al., 2014). For example, the decisions must take into account the context of the firm, assess the competences of the firm, and anticipate further developments to define successful strategies, including the CFO's decision on capital structure (Schweiger et al., 1986; Iaquinto and Fredrickson,1997; Ferrier, 2001). A positive relationship between a firm's sustainability and its value may exist because firms that report their sustainability initiatives may attract more investors, which increases firm value (Janggu et al., 2014).

In this study, firm sustainability refers to firm survival in all situations and crises. In the long-term, the survival of the business is a consequence of financial development based on budget allocations as well as market development (Tsoukas, 2010). For long term survival, a business must consistently discover and implement additional value for its customers, which necessitates a range of appreciate tactics and investments (Narver and Slater, 1990). A firm must focus on its competitiveness and profitability in order to survive. Thus, strategic decisions are defined in terms of the actions taken, the resources committed, or the precedents set (Mintzberg et al., 1976). These decisions are infrequent and are made by the top leaders of an organization that critically affect firm health and survival (Eisenhardt and Zbaracki, 1992). Therefore, firm sustainability should be a consequence of an appropriated capital structure that can be defined as the following hypothesis.

H_3: The more optimal the capital structure providence, the better the firm's sustainability.

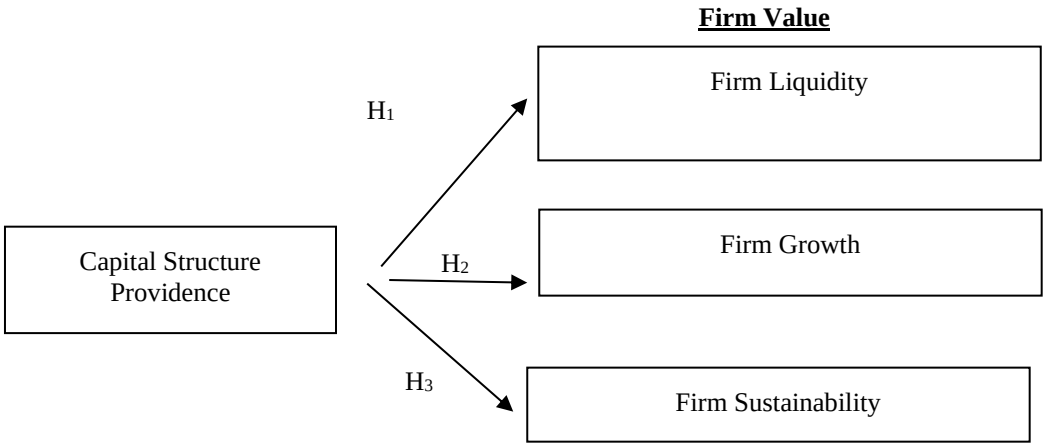

Figure 1: *The conceptual model on relationship of Capital Structure Providence and Firm Value*

Methods

Sample Selection and Data Collection Procedures

Financial data was collected from the SET50, which includes the leading firms in Thailand during 2010 and 2021 on the Securities Exchange of Thailand. Companies in the SET50 are large and have been operating for long time periods. The SET50 firms are therefore considered to be the leading firms. These leading firms have also been selected from each industry and therefore they cover all industries that have been traded in Securities Exchange in Thailand (SET). Moreover, the SET50 is also sufficiently large sample to represent the listed companies in Thailand. The fiscal year of 2021 was selected as the end of the sample period to ensure that there was at least one year of post stock performance data. However, 4 companies were removed from the SET50 due to mergers and acquisitions during 2010 and 2021. Firms in the SET50 are considered highly successful thus, the decision making in the capital structure in SET50 firms could be suitably used to test the effect of this structure on firm value.

Variables Measurements

The variables used in this research are outlined in detail in the following sections.

Dependent variable

There are various measures of leverage, which can be classified as accounting-based measures, market-value measures and quasi-market value measures. However, when selecting

a measure of leverage, it is useful to keep in mind that the theoretical framework for the relationship between leverage and performance is based on market values of leverage. Therefore, market values of leverage may be difficult to obtain, and are often applied as proxies. Rajan and Zingales (1995) discuss various accounting-based measures of leverage and their informational content. They suggest that the choice of measure should be based on the objective of the analysis. For instance, the ratio of total liabilities to total assets can be considered as a proxy for what is left for shareholders after liquidation, but it is not a good indication of the firm's risk of default in the near future. Also, since total liabilities include such balance sheet items as accounts payable, which are used for transaction purposes rather than for financing, it may overstate the amount of leverage. Consequently, this measure can be improved by subtracting accounts payable and other liabilities from total assets. In addition, the measure contains liabilities that are not related to financing, e.g., pension liabilities, which underestimates the size of leverage. The ratio of total debt to capital, where capital is defined as total debt plus equity, is assumed to solve this problem and can be seen as the best accounting-based proxy for leverage (Rajan and Zingales, 1995).

Since Modigliani and Miller published their seminal paper in 1958, capital structure has generated great interest among financial researchers. It has been argued that, in efficient markets, the debt-equity choice is irrelevant to the value of the firm and benefits of using debts will compensate with decrease of companies' stock. Prior to the MM theory, the conventional perspective believed that using financial leverage increases company's value. In this respect, there is an optimized capital structure that minimizes capital costs. In a subsequent paper, Modigliani and Miller (1963) showed that, under capital market imperfection where interest expenses are tax deductible, firm value will increase with higher financial leverage. Models based on impact of tax suggest that profitable companies should have more debts as these firms have greater need for tax management in the corporation's profit. However, increasing debt results in an increased probability of bankruptcy. Hence, the optimal capital structure represents a level of leverage that balances bankruptcy costs and benefits of debt finance. Additionally, trade-off theory suggests that the firm's optimal capital structure will involve a tradeoff between the effects of corporate and personal taxes, bankruptcy costs and agency costs, etc. (Jensen and Meckling, 2019).

In order to measure the indebtedness of a company, authors of previous empirical studies such

as Rajan and Zingales (1995) have used different classical measures of the capital structure. The broadest among them, which usually overestimates the level of leverage, is the ratio between the total capital from which the value of the equity was subtracted and the total assets. Also, the pecking order theory predicts a negative correlation between the profitability of a company and its total level of debt based on the idea that companies first turn towards internal financing resources (for instance, the profit) (Myers and Majluf, 1984). Even though the trade-off theory establishes a positive correlation between these variables, given that a higher profitability implies a higher income that can be exempt from taxes (Kraus and Litzenberger, 1973), most empirical studies have indicated a negative influence of the profitability on the capital structure (Mazur, 2007). By contrast, Titman and Wessels (1988) argue that the size of a company and the extent to which it is indebted are positively correlated, such that large companies have more diverse activities and therefore, less risk of bankruptcy. This allows larger companies to reach and maintain a higher level of debt.

The asset structure of a firm reflects the weight of each asset type held by the company in its total assets. Among the financial indicators that measure how a company distributes its

assets we distinguish between the liquidity and the tangibility. The size of the company and its asset turnover are explanatory variables positively correlated with the level of debt. The total assets' turnover is an indicator of efficiency which reflects how many times the capital invested in the total assets rotates in order to achieve the company's turnover (Robert and Hunter, 1995; O'Brien and Vanderheiden, 1987). Accordingly, the fact that a company possesses fixed tangible assets can be considered by its creditors as a guarantee that they will be able to recover their funds in the case of financial distress experienced by the borrower corporation. Therefore, increasing the percentage of tangible assets in the total assets will be perceived by investors as a positive measure and extending the level of debt in this situation would be something perfectly normal (Nivorozhkin, 2005). Regarding to the pecking order theory, firms with high liquidity levels can use this liquidity to finance their investments. Therefore, the liquidity of a company should exercise a negative impact on the debt ratio (Ozkan, 2001). The explanatory variable with the strongest influence on the level of debt of a company is the profitability, followed by the asset turnover. Therefore, in the current research, we used a firm profitability formula to measure a firm's capital structure, as follows:

Capital structure

$$= \frac{\text{EBITs}}{\text{Total assets}}$$

The EBIT represents the firm's earnings before interest and taxes while the Total assets reflect the firm investment in both current and fixed assets.

Independent variables

The independent variables are described in the following sections.

Firm Liquidity

The corporate finance literature has emphasized the reasons why tapping capital markets may be relatively costly compared to retaining earnings. Hence, the literature on real options has focused on the option value of waiting to invest. Thus, it is maintaining liquid assets that they will be that other veins of the corporate finance literature have pointed toward possibly unfavorable effects of liquid asset holding. This is an implication of asset substitution problem, which was first identified by Jensen and Meckling (1976). Indeed, if levered equity holders have an incentive to engage in increasing the riskiness of assets, they can implement this only if the firm's assets are sufficiently liquid. The positive and negative aspects of corporate liquidity have been studied together by Myers and Rajan (1998). They showed that asset liquidity bestows a benefit in the sense that it makes it possible for the firm to seize unforeseen opportunities or to survive during periods of poor business conditions. However, liquidity has a disadvantage as it makes it difficult for firm insiders to commit to a given course of action. The analysis assumes that assets in place generate cash flows at dates t_1 and t_2 that allows insiders to undertake non-contractible asset transformations at dates t=0.5 and t=1.5 (Myers and Rajan, 1998). The values of transformed assets are supposed to be appropriated entirely by firm insiders to the detriment of the firm's creditors. Thus, asset liquidity is the proportion of the asset value that is retained upon transformation, which shows that the debt capacity of the firm is typically non-monotonic. That is, firms with 'excessively liquid' can raise less debt than can a 'less liquid' firm. Myers and Rajan's model is very stylized, and their analysis is incomplete in many respects. However, they clearly identify a conflict of interests between debtholders and shareholders in regard to the degree of liquid asset holding. Morellec (2001) provided an interesting analysis of the implications of liquidity that develops the asset transformation

theme. He considers a dynamic model of a levered firm whose net revenue, given a capital stock, follows a geometric Brownian motion where the firm benefits from leverage because of the tax shields they bestow. Furthermore, he studies the firm closure decision of a levered firm and obtains closed-form expressions for the values of debt and of equity. He then considers the possibility that the firm can liquidate a fraction of the assets of the firm prior to closing the firm entirely. Consequently, he shows that shareholders will generally do so and that given a level of nominal debt, this partial asset sale increases the value of equity and reduces the value of debt. Thus, asset liquidity (i.e., the capacity to engage in asset sales) must reduce the value of the firm and the debt capacity of the firm can also result in underinvestment relative to the illiquid asset benchmark case.

Kim et. al, (1998) present a theory of the choice of liquid assets when outside finance is costly. Briefly, the motivation for holding liquid assets is the creation of financial slack, which will allow firm insiders to pursue future attractive investment opportunities. Furthermore, they study this issue in a three-period model that begins with time zero, a firm with a fixed amount of funds available. Representing X allocates these funds to an illiquid investment with a risky return, a liquid investment with a (low) riskless return, and dividends. At t_1, given the returns to initial investments, the shareholders issue, at a cost, an amount of debt and choose a level of risky fixed investment. At time t_2, returns are paid out as a dividend and the firm is dissolved. In this scenario, we see that the motivation for holding liquid assets is to avoid issuing costly debt at time t_1. Moreover, Kim et al (1998) explore their theory in an empirical study of U.S. industrial firms from 1975 to 1995. Their measure of liquidity is the ratio of cash and marketable securities to the book value of assets. They consider explanatory variables measuring growth opportunities, such as cash flow volatility, debt ratio, cash flow, and bankruptcy risk. Overall, they find a positive relationship between growth opportunities and liquidity, and a negative relationship between leverage and corporate liquidity for which their theoretical analysis offers no explanation. Similarly, Opler et. al (1999) provide an empirical analysis of corporate holding of liquid assets in U.S. non-financial firms during the 1952-1994 period. Their results are similar to those of Kim et al. (1998) as they find a positive relationship with respect to growth opportunities (measures by market to book ratio or by R&D spending) and a negative relation between debt and corporate liquidity. However, Opler et al. (1999) find that cash flow enters positively, whereas Kim et al (1998) find a negative relation with cash flow.

Liquidity plays an increasingly important role in empirical asset pricing, market efficiency, and

corporate finance. Identifying high quality proxies for liquidity based on daily data would permit liquidity to be studied over relatively long timeframes and across many countries. A number of studies have proposed liquidity measures derived from daily return and volume data as proxies for the liquidity and transactions costs experienced by investors. A handful of studies (Lesmond et al. 1999; Lesmond, 2005; Hasbrouck, 2006) have tested whether a few of the available liquidity proxies based on an annual or quarterly basis from daily return data are related to annual or quarterly liquidity computed from transactions data. Chordia et.al (2000) show that various spread measures vary systematically while Goyenko (2006) finds that various effective spread measures are priced. Similarly, Sadka (2003), Acharya and Pedersen (2004), Pastor and Stambaugh (2003) and Fujimoto and Watanabe (2022) also show that various price impact measures are priced. Furthermore, Hasbrouck (2006), Korajczyk and Sadka (2006), and others test the pricing of both effective spread and price impact measures while Bekaert et. al, (2005) test the pricing of both effective spread and price impact measures in emerging markets where liquidity concerns may be more

pronounced. All the above-mentioned studies use monthly liquidity estimates. Reliable monthly effective spread and price impact measures going back in time and/or across countries are needed in order to determine if these asset pricing relationships hold up across time and space.

In the market efficiency literature, De Bondt and Thaler (1985), Jegadeesh and Titman (1993, 2001), and many others have found trading strategies that appear to generate significant abnormal returns. But there was a growing need in corporate finance research for useful monthly liquidity measures. Accordingly, Pham (2003), Dennis and Strickland (2003), Cao et. al (2004), Lipson and Mortal (2004), Schrand and Verrecchia (2004), Lesmond et. al (2005), and many others have examined the impact of corporate finance events on stock liquidity. Similarly, Heflin and Shaw (2000), Lerner and Schoar (2004), and many others examine the influence of liquidity on capital structure, security issuance form, and other corporate finance decisions. As mentioned, liquidity measures over time would expand the potential sample size of this literature and liquidity measures across countries would greatly extend the potential diversity of international corporate finance environments that have been analyzed. Jensen and Moorman (2010) suggest that market-wide liquidity increases, which is especially beneficial for illiquid securities. As a result, the improved liquidity and funding conditions reduce the returns required for holding illiquid securities. Illiquid stocks experience relatively large price increases when monetary conditions become expansive. Thus, in this research, we measure the illiquidity in firm based on Amihud's model, which states that an illiquid security could encourage a firm to improve its liquidity from larger price increases. In Amihud's model, he develops a price impact measure which represents the "daily price response associated with one dollar of trading volume." Specifically, he uses the following ratio:

Illiquidity

$$= \frac{|r_t|}{\underline{Average[\ ]}\ (Volume_t)}$$

where r_t is the stock return on day t and Volume t is the dollar volume on day t. The average is calculated over all positive-volume days, since the ratio is undefined for zero volume days (Amihud, 2002).

Firm growth

Penrose (1959) was the first to offer a theory of firm growth that specifically focuses on growth rates based on the expansion of assets and employment ("human and other resources") in the context of industrial firms. Since then, there has been relatively few studies examining the growth process. Two recent quantitative studies attempt to unpack the complicated nature of the potential relationships. In one study, Chandler et al. (2009) use transaction cost economics reasoning to determine when firms experiencing sales growth will add employees. They reveal two very diverging paths taken by these firms depending on the munificence of the environment. Thus, they suggest that the decisions regarding the growth of the firm in terms of employees are very different depending on environmental characteristics. In the other study, the authors use the resource-based view to examine the relationship between profit and sales growth and find that growth can actually have very negative consequences for profitability (Davidsson et al., 2009). Together, the studies show that the "how" is not an entirely predictable process and that firms can grow in many different ways. The ability of the firm to grow is thanks to its productive opportunity set.

In this research, we employ total assets data in financial statement and calculated the growth at two points of time, one year apart. The formula for measuring the firm growth is as follows:

Growth

$$= \frac{(\text{total asset}_1 - \text{total asset}_0)}{(\text{total asset}_0)}$$

Based on the formula, firm growth is calculated based on total assets$_0$, which refers to the total asset of firm at the time of beginning the fiscal year, and total assets$_1$, which is the total asset of the firm at the end of the fiscal year.

Firm Sustainability

It has previously been shown that there is a positive impact of firm sustainability performance on firm value because the migration of environmental and social responsibility into corporate strategies and practices reduces firm risk and promotes long-term value creation (Yu and Zhao, 2015). However, a firm capital structure also impacts firm sustainability, and this could be represented by debt ratio. Alternatively, based on the debt ratio, a firm could alter its optimal debt levels, operate at the higher efficiency of sustainability with access to cheaper capital, and help manager maximize firm value (Lindkvist and Saric, 2020). Therefore, capital structure is one of the financial factors that influences the sustainable firm growth, and this has been confirmed by a study investigating Russian firms during 2012-2018 (Badokina et al., 2021). The main objective of firm sustainability is to substitute the primary target of increasing the sustained value of the enterprise from the value creation. Therefore, the measurement of firm sustainability should refer to both a time and scope dimension (Gunther, 2016). The time dimension must meet the needs of the present without compromising the ability of future generations (Gleibner et al., 2022). Additionally, the scope dimension must ensure that both organizations and individuals adequately address all three goals, which are social, ecological, and financial sustainability (Elkington, 2004). In the current research, firm sustainability is defined as financial sustainability.

Financial sustainability is also important for risk management (Lenssen et al. 2014), especially for the strategic and holistic risk governance approach (Stein & Wiedemann, 2016; Hiebl et al, 2019; Hiebl, 2019). To date, risk management has been assessed in terms of its contribution to firm value (Grace et al., 2015; McShane et al., 2011). However, firm value only partially records risk management goals because it does not incorporate risk-limitation goals. Accordingly, Gleibner et al. (2022) recently proposed a measurement concept for financial sustainability that is derived from the general understanding of the term. They assume long-term oriented, risk-averse economic agents with an affinity towards sustainability and examine how high financial sustainability affects stock returns. Thus, the measurement of firm sustainability should be based on four conditions: (1) firm growth, (2) the company's ability to survive, (3) an acceptable overall level of earnings risk exposure, and (4) an attractive earnings risk profile. For firm growth, we have already proposed as the medium term of affection as second hypothesis. For the long-term, we focus on a method of estimating the probability of insolvency (rating forecast) and, in the simplest case, a financial indicator system is required to measure the company's probability of survival as an aspect of financial sustainability. To simplify matters, no qualitative influencing factors are considered. For the validation of the four proposed conditions in the empirical study, a basic

logistical function based on the previous research findings. For the research project, the work of Bemmann (2007) is used, which comprises two indicators—the equity ratio (ER) and the total return on capital employed (ROCE)—to estimate the probability of insolvency.

The probabilities of survival

$$= \frac{0.265}{1+e^{-0.41+7.42(ER)+11.2(ROCE)}}$$

To measure sustainability, Altman's Z-score is widely acceptable. Altman's Z-score is known as the measurement of a firm's future position. Valaskova et al. (2021) indicates that a firm's activities should represent the firm's sustainability. Beaver (1966) first used a distress prediction calculation through ratio analysis and applied a univariate analysis, which is traditional method for interpretation of financial ratios. Later, a statistical tool based on multivariate discriminant analysis has been used with five ratios to measure a firm's failure, called "Altman's Z-score" (Altman, 1968). Altman's Z-score was found to be the most significant variable to explain the distress position of firms and has become widely used to measure a firm's distress (Affes and Hentati-Kaffel, 2019). Over the years, Altman's Z-score model has been updated, most recently in 1983 (Altman, 1983). In this last update, the market value was replaced by the book value of equity, which has been shown to increase the accuracy of the model to 96% (Affes and Hentati-Kaffel, 2019). Accordingly, in this study we measure firm sustainability based on the Z-score of firm failure by applying Altman's Z-score. Altman's Z-score model also incorporates the five variables based on financial ratios that cover the measurement of a firm's level of earnings risk exposure and a firm's attractive risk profile. Altman's z-score is presented in the following formula:

Altman's Z-score

$$= 0.717X_1 + 0.847X_2 + 3.107X_3 + 0.420X_4 + 0.998X_5$$

Where X_1 = Working capital/Total assets, X_2 = Retained Earnings/Total Assets, X_3 = Earnings before interest and taxes/Total assets, X_4 = Book value of equity/Total Liabilities, X_5 = Sales/Total assets (Altman, 1983).

Statistics

This research employed several statistical analyses such as factor analysis, correlation analysis, and simple regression analysis. The models of the relationships are depicted below:

Eq. 1: $CSP = \alpha_1 + \beta_1 FL + \beta_2 FG + \beta_3 FS_1 + \varepsilon$

Eq. 2: $CSP = \alpha_1 + \beta_4 FL + \beta_5 FG + \beta_6 FS_2 + \varepsilon$

Results

Descriptive Statistics and Correlations Matrix

Descriptive statistics and correlations among variables are shown in Table 1. Based on the model equation, the correlation matrix reveals significant relationships between the dependent and independent variables such that capital structure providence positively correlated with firm liquidity ($r = .268$, $p < .1$), and negatively correlated with firm growth ($r = -.457$, $p < .01$) and firm sustainability ($r = -.425$, $p < .01$)

Table 1: *Correlations*

		CSP	FL	FG	FS1PS	FS2AZ
	Mean	.0453	.0682	9.6369	.0547	.5595
	S.D.	.0406	.0810	9.6844	.1192	.5405
CSP	Capital Structure Providence	1				
	Sig. (2-tailed)					
FL	Firm Liquidity	.268	1			
	Sig. (2-tailed)	.072				
FG	Firm Growth	-.457**	-.126	1		
	Sig. (2-tailed)	.001	.404			
FS1PS	Firm Sustainability – The Probability of Survival	-.425**	-.130	.055	1	
	Sig. (2-tailed)	.003	.390	.719		
FS2AZ	Firm Sustainability - Altman's z-score	-.007	-.004	-.285	-.129	1
	Sig. (2-tailed)	.963	.977	.055	.394	

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

Table 2. *The standardization of coefficient value from simple regression analysis of firm value*

	Capital Structure Providence CSP Model 1.	Capital Structure Providence CSP Model 2.
Constant	.063**	.063**
Firm Liquidity: FL	.166 .181	.208 .126
Firm Growth: FG	-.415** .001	-0.471** .001
Firm Sustainability – The Probability of Survival: FS1PS	-.380** .003	- -
Firm Sustainability – Altman's z-score: FS2AZ	- -	-.140 0.313
R-Squared	.396	.272
N	46	46

Simple Regression Analysis

We conducted simple regression analyses by comparing capital structure providence with firm liquidity, firm growth, and firm sustainability in terms of the probability of survival and Altman's z-score, as shown in Table 2. Regarding Model 1, the results show a negative standardized coefficient between firm growth and firm growth (β_2 =-.415, $p < .01$) and with firm sustainability as the probability of survival (β_3 =-.380, $p < .01$). These results indicate that capital structure providence has a significant, negative influence on firm growth (Hypothesis 2) and also negatively impacts firm sustainability (Hypothesis 3). However, the results also show that capital structure providence does not impact firm liquidity, which is inconsistent with Hypotheses 1. To further test our hypotheses, we also tested the dependent variables of

firm liquidity, firm growth, and firm sustainability with Altman's z-score in Model 2. The results indicated that capital structure providence is also significantly negatively related to firm growth (β_5 =-.471, $p < .01$), which supports Hypothesis 2. The results from Model 2 also confirm the results from Model 1 that the capital structure providence has a negative relationship with firm growth but not firm liquidity. Additionally, the results from Model 2 indicates that capital structure providence negatively affects the firm sustainability based on the probability of survival, but not firm sustainability based on the Altman's z-scores

Discussion and Limitations

In this research, we show that the capital structure does not affect the firm value in the short-term, based on its liquidity. The impact of the firm's capital structure may be determined by the firm age. Indeed, previous research shows that a stronger relationship between capital structure and firm value may be detected in older firms compared to younger firms (Akoten, Sawada, and Otsuka, 2006; Oliner and Rudebusch, 1992). Also, older firms may be more sustainable as they are able to take more risks than younger firms (Le, 2012; Myer, 2001). Thus, these findings are consistent with prior studies indicating that the ability to determine firm value in the short-term as firm liquidity may depend on the age of the firm.

The results also revealed that capital structure has a negative effect on long-term firm value as measured by firm growth. Firm growth depends on a firm's profitability (Ali and Smith, 2006; Hand, 2009), which is a result of the firm's assets management (Finlay et al. 2010) and cash management (Dodge, Pettit, and Bates, 1994). However, our measurement of the capital structure is based on return on total assets and a large investment in total assets may create less profitability in the long term. Fazzari et al. (1988) and Hoshi et al. (1991) provide evidence that the investment is related to the availability of internal funds. Therefore, large investments may be caused by high leverage capital structure. As a result, a firm would face higher interest rate expenses that affects the firm's profitability in the long term. It is clears that the capital structure may affect the firm's future growth.

Capital structure was also shown to have a negative effect on firm value regarding sustainability based on the probability of survival. Probability of survival refers to likelihood that a business will still exist in several years. Several authors have related investment to leverage. First, Whited (i992) showed that investment is more sensitive to cash flow in firms with high leverage than in firms with low leverage. Cantor (1990) also demonstrated that investment is more sensitive to earnings for highly levered firms. Finally, Opler and Titman (1994) show that sales growth is lower for firms in the three highest deciles of leverage, but especially so within distressed industries. Thus, a high leverage may cause a low chance of survival in long-term since the level of leverage can vary in individual industries.

Lastly, our results show that the capital structure is not related to firm value regarding sustainability based on the Altman's Z-score. As mentioned, in 1968, Edward Altman published what has become the best-known predictor of bankruptcy. This predictor is a statistical model that combines five financial ratios to produce a product called a Z-score. Altman cautions that his model has limitations in its applicability to different business entities and the prediction accuracy may vary (Altman, 1993). Our results are based on the SET50, which is a mixture of industries and various businesses. Thus, the results of Altman's model may not be fully applicable to all the businesses included in the SET50. Nevertheless, Altman's model has been used in several industries to predict bankruptcy, including the service industry, manufacturing industry, publicly listed companies, and banks. Indeed, all three revisions of

Altman's equation have been successfully used in the literature with high constructive predictability. Thus, it is likely that Altman's Z-score model can be applied to modern economy to predict distress and bankruptcy one, two & three years into the future (Anjum, 2012).

Conclusion

This research provides novel insights regarding the relationship between capital structure providence and firm value. Overall, the results indicate that capital structure providence could be a critical element of firm growth and firm sustainability in terms of the probability of survival. The findings suggest that a firm's CFO must understand the optimal capital structure in order to secure the long-term value of the firm, including return on assets and on sale which would also lead to firm growth. This manuscript therefore contributes to the ongoing discussion on the effects of capital structure providence on a firm.

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