The International Journal of Business and Finance Research
Vol. 11, No. 1, 2017, pp. 13-35
ISSN: 1931-0269 (print)
ISSN: 2157-0698 (online)

IBFR
www.theIBFR.com

CAPITAL STRUCTURE POLICY: EVIDENCE FROM TAIWAN

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ABSTRACT

Capital structure literature shows that, in static tradeoff theory, a firm's target leverage is related to its size and profitability. However, it remains unclear as to whether target leverage even exists. Assuming that it does, two key questions arise. First, how does the company adjust to the target? Second, is there a contradiction between pecking order theory and static tradeoff theory? This study classifies a sample of companies listed on the Taiwan Stock Exchange into four quadrant clusters by the average method based. The classification is based on factors related to firm size and profitability to determine whether firms in these clusters engage in different financing policies. This study explores whether pecking order or static tradeoff theory are conducted through independent and conventional four-factor joint testing. Results show the target-adjustment model is more efficient than the pecking order model. In addition, I conduct robustness checks by the quartile method. The results show the large firms with low profitability and no financing gaps adhere to both the pecking order and target-adjustment models. These results provide support for the hypothesis that financing policies employed by companies listed on the Taiwan stock market vary as a function of the quadrant in which they are classified.

JEL: G32

KEYWORDS: Capital Structure, Financing Deficit, Pecking Order Theory, Static Tradeoff Theory

INTRODUCTION

Modigliani and Miller (MM) (1958) proposed their well-known arbitrage theory for the capital structure of any business. By their theory, firms can emphasize or deemphasize the financial leverage effect. According to Modigliani and Miller's (1958) theory of value, the capital structure of a single company or between companies should not vary by the life-cycle of the firm. However, this is a theory deliberately developed in an artificial setting (Smith, and Watts, 1992). For example, it does not include the cost information, personal or corporate taxes, transaction or contract costs, or fixed investment policy. Under relaxed MM assumptions, and using other major capital structure theories, taxes have the effect of encouraging firms to use debt as much as possible (Miller, 1972). Other theories (for example, Stiglitz, 1972) advocate increasing bankruptcy costs increase with debt levels and the amount of this debt ceiling may indicate the optimal capital structure of the company.

Bankruptcy cost theories evolved into the tradeoff theory, which advocates that firms try to approach a critical level of leverage. The average debt benefit reaches the optimal capital structure to maximize firm value. Static tradeoff theory argues that the debt benefit equals the marginal cost of debt that maximizes the value of the firms (Myers, 2001; Ovtchinnikov, 2010). Firms should therefore manipulate the debt tax shield of interest because internal debt has a low cost relative to external debt. When firms measure the benefits and costs of increasing the amount of debt, it will choose the target-leverage, where interest is the free cash flow after the tax deduction for interest.

This simple effect, however, can be complicated by personal taxes (Miller, 1977) and non-debt tax shields (DeAngelo and Masulis, 1980). Tradeoff theory favors increasing debt, which will generate tax shield benefits, but increase leverage-related costs and influence the optimal capital structure formation process, namely the balance between the benefits and costs. Debt also reduces the agency conflict between

managers and shareholders because debt financing limits free cash flow, which helps owners control agency problems (Jenson and Meckling, 1976). In addition, shareholders may gain wealth by exploiting regulatory authorities and the conflict of interest between them (Smith and Warner, 1979). Moreover, debt costs can resolve conflicts between shareholders and creditors (Jenson and Meckling, 1976). Pecking order theory still shows mixed results (Copeland, Weston and Shastri, 2005). Pecking order theory advocates that the financing pecking order dictates firms' preferences (Myers and Majluf, 1984). Company managers and outside investors information asymmetry issues cause the company to make financing decisions based on a preference for minimal costs. Thereby they prefer to use internal funds or retained earnings, followed by debt, and finally consider issuing new shares. Myers and Majluf (1984) believe that if the company did not issue new equity and use only retained earnings to support investment opportunities, information asymmetry can be resolved. Due to internal and external information asymmetry, issuing more equity would be expensive. Information asymmetry increases the need to issue debt and avoid selling undervalued stocks (Atiyet, 2012).

Analyzing how companies construct their capital structure is an open issue, with ongoing research during the past 20 years, though empirical research began earlier (Taggart, 1977; Marsh, 1982; Jalilvand and Harris, 1984; Titman and Wessels, 1988). Later scholars contributed significantly to research into the creation and verification of capital structure. Others caution that choosing capital structure proxy variables is difficult. Additionally, most initial research focuses on the United States. Shyam-Sunder and Myers (1999) examined 157 US-based firms for 1971 to 1989 to directly test the pecking order theory using a regression for debt. They found that if companies follow the pecking order theory, the gap in using debt financing should have a slope close to one, with results strongly supporting the pecking order theory. Frank and Goyal (2003) extended Shyam-Sunder and Myers (1999) study using a sample of 768 firms listed in the United States to investigate transaction events. They find that when considering a smaller sample of firms, the results support that large firms in the earlier years follow the pecking order model. By nest testing the two methods, the pecking order theory has increased slightly in explanatory power, but still does not overcome the conventional leverage position. Support for the pecking order theory appears in the 1980s and 1990s but not in the 1970s because there were more small companies listed and issuing equity was more important.

Rajan and Zingales (1995) found that, in determining capital structure factors (size, growth rate, profitability, and significant tangible assets) in the United States, it was important to do the same in other countries (e.g., Titman and Wessels, 1988; Rajan and Zingles, 1995; Graham, 2001; Gaud et al., 2005). Most literature supports the relationship between leverage with size, profitability, and market-to-book ratio. However, it remains unclear whether a target leverage even exists. Assuming that it does, two key questions arise. First, how does the company adjust to the target? Second, is there a contradiction between the pecking order theory and tradeoff theory? (Ovtchinnikov, 2010). The study purpose is to fill this gap in the literature. This study examines the capital structure literature through common indicators of size and profitability, and plots profitability on a chart on the horizontal axis, and size on the vertical axis. In this way they divided the sample into four quadrants and verifies whether capital structure and financing strategies vary by quadrant. The authors find that whether for the target-adjustment and the pecking order conduct, with an independent test or the conventional leverage four-factors joint test, the target-adjustment efficiency is superior to pecking order theory for the four quadrants. Only large firms with low profitability and with no financing gap follow the pecking order theory. Those with financing gaps follow the target-adjustment model. In addition, the study conducted robustness test of the leverage factors with a quartile divided method. This test shows the same empirical results with an average foregoing method. These results provide support for the hypothesis that financing policies employed by companies listed on the TWSE vary as a function of the quadrant in which they are classified on the corporate matrix.

The study claims two contributions to the literature on financing decisions. The first is a methodology or procedure to divide the sample cluster into four quadrants of a matrix for analysis. The second is an empirical contribution. Several authors studied financing decisions focusing on the pecking order theory (Shyam-Sunder and Myers, 1999; Frank and Goyal, 2003). We complement the literature by using the

quadrants of a matrix to cluster the sample to distinguish the corporate financing strategy. We also identify excellent performance of the target-adjustment model and weak performance of the pecking order model in Taiwan's stock market. The structure of the rest of this paper is as follows: section 2 presents the literature review, section 3 presents the data and methodology, section 4 describes the results and discussions, and section 5 presents the conclusions.

LITERATURE REVIEW

Bradley et al. (1984) proposed an optimal capital theory based on static tradeoff theory. This theory advocated that although increasing debt will result in a tax shield benefit, it also produces costs, called leverage cost. Formation of an optimal capital structure was by using a tradeoff between the benefits and costs arising from the use of debt. Leverage associated costs, such as the cost of financial crisis, agency problems, offset tax shield benefits. Some scholars affirm static tradeoff theory to explain the actual business capacity. For example, Myers (2001) suggested that static tradeoff theory implies that high profit enterprises have a high proportion of debt, and get substantial tax benefits from the tax shield. In reality, high-profit enterprise's debt ratios will be lower than low-profit enterprise's. Kim (1986) argued the more debt a company has, the more interest burden it bears, the weight of its financial risk is higher, and the possibility of bankruptcy is stronger. In this case, when the company's shareholders and creditors are aware of increasing risk, they would require higher remuneration as compensation thus causing the company's cost of capital to increase. Warner (1977) believes the company's cost of bankruptcy is less than the benefits of increasing debt. However, there are a number of empirical and theoretical articles that confirmed that companies construct their capital structure on largest debt ratio. The goal is to achieve the tax shield advantage wile avoiding bankruptcy costs. Kayhan and Titman (2004) suggest that in the long run, the target debt ratio is consistent with the theory. Static tradeoff theory provides business guidelines to choose their capital structure, it also provides a number of important capital structure life-cycle supports.

Pecking order theory results from the information asymmetry phenomenon between company managers and outside investors. When the company is making financing decisions, they prefer to use their own funds whose priority cost is minimum, then retained earnings, followed by debt, and finally they consider issuance of new shares. Myers' (1984) conclusion indicates managers use information asymmetry to explain they do not like the issuance of equity. They fear it would be a signal of overvalued stock prices. In contrast, Ross (1977) argued that companies use more debt to overcome information asymmetry in order to send a better signal of future prospects. Narayanan (1988); Heinkel and Zechner (1990) noted debt may be a project signal. Asymmetric information may result in over-investment, so some negative NPV project will be taken instead. Others such as Allen et al. (2005) and Fama and French (1988) found that, based on a finance pecking order, when income is less than financing investment, liabilities will be issued. Pecking order theory indicates that life-cycle stages have strong correlation with capital structure. The static tradeoff suggests the opposite. Pecking order theory suggests that with time passing, a high or low debt ratio was appropriate.

The formation of many operations and decision-making is based on business strategy, while the financing decision is based on financing strategy. Every policy adopted is not an isolated process. The strengthening effect of complex business interaction effects between enterprises and financing strategy. Companies will have high stickiness in enterprise risk so it will be more cautious on the use of liabilities. On the other hand, managers' education, preferences and beliefs, and other factors may affect business decisions. In addition, managers of large companies and that of small company's managers have quite a different attitude on decision-making. A number of factors are likely to affect manager's decisions (Kalicanin; Todorovic, 2014). Rajan and Zingales (1995) suggest that factors of capital structure determination (size, growth rate, profitability and significant tangible assets) in the United States are also important in other countries (Gaud et al., 2005). Among them, the impact on capital structure of size and profitability were discussed the most.

Company capital structure is often focused on size. According to the tradeoff theory, size and leverage are positively related. Large companies will not have the same bankruptcy costs in the face of financial crisis and are more able to survive it. Many empirical studies identify a positive relationship between the size and debt (e.g., Warner, 1977; Ang, 1976; Friend and Lang, 1988; Rajan and Zingales, 1995; Michaelas et al., 1999; Booth et al., 2001; Fama and French, 2002; Hall et al., 2004; Gaud et al., 2005; Maghyeren, 2005; Huang and Song, 2002; Omran and Pointon, 2009; Psilaki and Daskalakis, 2009). On the other hand, large companies have low information asymmetry problems, leading to stock issuance as the best source of loans rather than relying on debt. This argument was supported by many scholars (e.g., Kester, 1986; Kim and Sorensen, 1986; Titman and Wessels, 1988; Heshmati, 2001; Bevan and Danbolt, 2002; Chen et al.,2004; Khalid, 2011). The variable of size, based on the theory of tradeoff is accepted by many scholars (e.g., Titman and Wessels, 1988; Rajan and Zingales, 1995; Heshmati, 2001; Bauer, 2004; Keshar, 2004; Abor, 2005; Gaud et al., 2005; Psilaki and Daskalakis, 2009; Ahmad et al., 2009; Ramalho and Silva, 2009; Serrasqueiro and Rogao, 2009; Chakraborty, 2010; Noulas and Genimakis, 2011).

According to the pecking order theory, due to information asymmetry, enterprises would prefer retained earnings, followed by debt, and then issuing new shares (Myers, 1984; Myers and Majluf, 1984). Companies like to profit from retained earnings as a source of investment decision-making. Profitability and leverage was confirmed with a negative correlation (e.g., Kester,1986; Friend et al., 1988; Titman and Wessels, 1988; Rajan and Zingales, 1995; Michaelas et al., 1999; Wald, 1999; Booth et al., 2001; Chen, 2004; Gaud et al., 2005; Maghyeren, 2005; Psilaki and Daskalakis, 2009; Degryse et al., 2010; Khalid, 2011). In contrast, from the tradeoff theoretical point of view, the profitable enterprise was more leveraged. Profitable businesses were more able to survive an economic downturn. As a result, creditors are more willing to provide more loans. According to Jensen and Meckling (1976) the enterprise will make managers manipulate the specifications given in advance to ensure that the performance increases for shareholders. A positive relationship is identified between debt and profitability (e.g., Bevan and Danbolt, 2002; Keshar, 2004; Abor, 2005). Profitability ratio, defined based on tradeoff theoretical is EBITDA to total earnings and is commonly accepted by many scholars (e.g., Bevan and Danbolt, 2002; Bauer, 2004; Gaud et al., 2005; Delcoure, 2007; Ramalho and Silva, 2009; Serrasqueiro and Rogao, 2009; Degryse et al., 2010; Chakraborty, 2010).

DATA AND METHODOLOGY

This study on financing strategies extending the works of Shyam, Sunder and Myers (1999) and Frank and Goyal (2003). We study capital structure literature through common indicators of size and profitability. We plot profitability on a chart on the horizontal axis, and size on the vertical axis to divide the sample into four quadrants and verify whether capital structure and financing strategies vary by quadrant and whether the evidence supports target-adjustment or pecking order theory. This study utilizes the statistical software packages SAS and MATLAB for data analysis.

Rajan and Zingales (1995) found that structural factors determine capital according to size, growth, profitability, and tangible assets. Tangible assets had the greatest influence. In the financing strategy formulation process, different views have different temporal and spatial decision-making considerations. Corporate operations and decision-making is based on corporate strategy, which is influenced by the manager's education, preferences, beliefs, and other factors (Kalicanin; Todorovic, 2014). Since size and profitability have a significant impact on financing decisions. The horizontal axis represents profitability and the vertical axis represents size, to create four quadrants to explore the different combinations of firm size and profitability in a matrix indicating the influence on financing strategy.

Hypothesis: Conventional leverage factors in different quadrants of the corporate cluster will show differences in financing strategies

This study reports data needed to test pecking order and target-adjustment theories. The data here extends from 1995 through 2014. We examine Taiwan Stock Exchange (TWSE) listed manufacturing companies with a total of 9,783 annual firm-year observations. Variables are based on the NT$

pricing. Before 1995 and after 2014 that information is not complete. Empirical data have been obtained from the Taiwan Economic Journal database. The Taiwan Economic Journal main is the best database for this purpose. Table 1 shows the common size balance sheet from1995 to 2014. Debt to current assets decreased by 3%. Increase in fixed assets and other assets was 3%. Relative to credit. current liabilities were unchanged. Shareholders' equity increased by 2% and assets and liabilities and equity changes are considered reasonable. The accounting items of Taiwanese stocks in the Taiwan Stock Exchange went through industrial classification changes on July 2, 2007. The coding rules use in this study were for the new coding rules.

Table 1: Common Size Balance Sheet for TWSE Unit: NT$ Million

The Year Ended	**1995**	**%**	**2000**	**%**	**2005**	**%**	**2010**	**%**	**2014**	**%**
Number of observations	303		2,469		5,120		8,020		9,783	
Panel A: Debit to Assets										
Cash and cash equivalents	144	0.08	1,740	0.08	4,940	0.08	10,480	0.09	13,934	0.09
Short-term investments	31	0.02	419	0.02	1,934	0.03	3,770	0.03	4,714	0.03
Inventory	244	0.14	2,059	0.09	4,946	0.08	9,503	0.08	12,603	0.08
Other current assets	291	0.16	3,068	0.13	8,954	0.16	19,820	0.17	29,636	0.17
Total current assets	710	0.40	7,286	0.32	20,774	0.35	43,573	0.37	60,887	0.37
Long investment	705	0.40	9,179	0.42	22,209	0.37	37,967	0.32	48,442	0.30
Fixed assets	356	0.20	5,652	0.26	16,680	0.28	36,673	0.31	53,338	0.33
Total assets	1,771	1.00	22,117	1.00	59,663	1.00	118,213	1.00	162,667	1.00
Panel B: Credit to Liabilities and Equity										
Current liabilities	463	0.26	4,770	0.22	13,127	0.22	28,080	0.24	41,837	0.26
Long-term liabilities	169	0.10	2,717	0.12	7,465	0.13	13,139	0.11	17,485	0.11
Other liabilities	101	0.05	1,239	0.05	2,388	0.03	3,619	0.03	4,565	0.02
Total Liabilities	733	0.41	8,726	0.39	22,980	0.38	44,838	0.38	63,887	0.39
Shareholders' equity	1,038	0.59	13,391	0.61	36,683	0.62	73,375	0.62	98,780	0.61
Liabilities and equity	1,771	1.00	22,117	1.00	59,663	1.00	118,213	1.00	162,667	1.00

This table represents the Taiwan Economic Journal database of Taiwan stocks book value in selected sample years. The non-manufacturing and other with no inventories financial industry stock is excluded.

Capital Structure Factor

The capital structure factor is composed of size and profitability as illustrated in Figure 1. The horizontal axis represents net profitability before interest, tax, and depreciation with EBITDA as a proxy variable. The vertical axis represents size, with Ln sales as a proxy variable. The two axes constitute four quadrants. The horizontal axis to the right of the first quadrant is less than average profit. The vertical axis above the first quadrant indicates larger than average firms. The upper right corner is the so called large firms-low profitability group (LF-LP). Firms from each quadrant have different characteristics, thus financing policies should have different policy considerations.

Figure 1: Factors Structure Matrix

		PROFITABILITY	
		High	Low
SIZE	Large	Large firms- high profitability	Large firms- low profitability
	Small	Small firms- high profitability	Small firms- low profitability

The horizontal axis represents net profitability before interest, tax, and depreciation with EBITDA as a proxy variable. The vertical axis represents size, with Ln sales as a proxy variable. The two axes constitute four quadrants. The horizontal axis to the right of the first quadrant is less than average profit. The vertical axis above the first quadrant indicates larger than average firms. The upper right corner is the so called large firms-low profitability group (LF-LP).

Target-Adjustment Theory Empirical Model

Tradeoff theory argues that companies should seek an optimal capital structure, in which the marginal benefit equals the marginal cost. It allows companies to achieve maximum value, so businesses can verify the optimal capital structure by comparing the actual capital structure and the deviation rate between actual capital structure and optimal capital structure. This study uses the long-term average debt ratio of companies during the sampling period as an alternative variable to the target debt ratio. Shyam-Sunder and Myers (1999) argued that when the optimal debt ratio is stable, the intercept item should equal the mean-reverting behavior. The debt ratio change is explained by the change in flow ratio variation. The regression equation is as follows:

$$\Delta D_{it} = a + b_{ta}(D^*_{it} - D_{it-1}) + e_{it} \quad (1)$$

Where:

ΔD_{it}: Change in the debt ratio

$\mathbf{b_{ta}}$: Target-adjustment model coefficient

$\mathbf{D^*_{it}}$: Target debt ratio

$\mathbf{D_{it-1}}$: Actual debt ratio

If test result shows that if $b_{ta} > 0$, it is expected to approach the target for adjustment. If at the same time, if $b_{ta} < 1$, there will be a positive adjustment costs because the target cannot be observed. Therefore, this study referred to the Shyam-Sunder and Myers' (1999) approach and uses historical average costs as the starting level of debt. Changes in debt ratio between the target debt ratio and the actual debt ratio from the previous term should have a positive relationship, so the empirical results should be $0 < b_{ta} < 1$.

Pecking Order Theory Empirical Model

Myers (1984) and Myers and Majluf (1984) proposed the pecking order theory, which assumes that a business can take advantage of three sources of funding: retained earnings, liabilities, and equity. When internal funds exceed the demand for funds, there will be an excess of funds to repay debt. Companies will accumulate capital and the corporate debt ratio will decline. From this perspective, companies will have changing internal funding gaps and debt levels can verify whether pecking order theory exists. Shyam-Sunder and Myers (1999) stated the pecking order theory as follows:

$$\Delta D_{it} = a + b_{PO} DEF_{it} + e_{it} \quad (2)$$

Where all terms are as previously defined and:

$\mathbf{b_{po}}$: Pecking order theory coefficient

$\mathbf{DEF_{it}}$: Internal financing deficit

and,

$$DEF_{it} = DIV_{it} + I_{it} + \Delta W_{it} + R_{it} - C_{it} \quad (3)$$

Where:

$\mathbf{DIV_{it}}$: Cash dividend payment

$\mathbf{I_{it}}$: Capital expenditure

$\Delta\mathbf{W_{it}}$: Change in working capital

$\mathbf{R_{it}}$: Long-term debt maturity period of the year started

$\mathbf{C_{it}}$: Net profit after tax

If a firm complies with pecking order theory, the debt ratio variety and internal financing deficit should have a positive relationship, so the empirical results should be a= 0 and $\mathbf{b_{PO} = 1}$. This study divided the samples into groups of $\mathbf{DEF_{it}} < 0$ (with no financing gap), and $\mathbf{DEF_{it}} > 0$ (with financing gap). We observed the financing behaviors of companies in both cases. This study scales $\Delta\mathbf{D_{it}}$, $\mathbf{D^*_{it}}$, $\mathbf{D_{it-1}}$, $\mathbf{DEF_{it}}$, $\mathbf{DIV_{it}}$, $\mathbf{I_{it}}$, $\Delta\mathbf{W_{it}}$, $\mathbf{R_{it}}$, **and** $\mathbf{C_{it}}$ by the total assets of the firms to adjust for company size.

Conventional Leverage Regression

In addition to discussing whether the target-adjustment and pecking order models exist individually, Shyam-Sunder and Myers (1999) also combined the two empirical models to explore, if both exist at the same time and their abilities to explain corporate financing strategy. Their model is as follows:

$$\Delta D_{it} = a + b_{TA}(D^*_{it} - D_{it-1}) + b_{PO}DEF_{it} + e_{it} \quad (4)$$

Pecking order testing was affected by a different exogenous variable information set to observe the differences between its hypothesis and conventional regression leverage, and leverage adjustment behaviors. The main purpose of the conventional set is to explain the leverage factors. The adaptability of variables established by the regression model should be valid for long periods. Conventional empirical analysis focuses on the return to four leverage factors of the regression formula namely: the tangibility, market-to-book ratio, Ln sales, and profitability. This study is modified from Frank and Goyal's (2003) citation of Shyam-Sunder and Myers' (1999) regression formula, adding $\boldsymbol{\beta_{TA}(D^*_i - D_{i-1})}$ to measure the $\boldsymbol{\beta}$ risk and verifies whether their claims still hold true in the Taiwan stock market. The regression formula is as follows:

$$\Delta D_i = \beta_0 + \beta_t \Delta T_i + \beta_{MTB}\Delta MTB_i + \beta_{LS}\Delta LS_i + \beta_P \Delta P_i + \beta_{PO}DEF_i + +\beta_{TA}(D^*_i - D_{i-1}) + e_i \quad (5)$$

Where:

Δ: Represents the first differences between years

$\Delta\mathbf{T_i}$: Fixed assets divided by total assets ratio

$\Delta\mathbf{MTB_i}$: Enterprise assets market value divided by assets book value ratio

$\Delta\mathbf{LS_i}$: Natural logarithm of net sale divided by total assets ratio

$\Delta\mathbf{P_i}$: Operating profit divided by total assets ratio

$\mathbf{D^*_i}$: Average net debt

$\mathbf{D_{i-1}}$ **:** Net debt of the previous period

Frank and Goyal (2003) show Equation 5 is simply a conventional regression run in first differences but with financing deficit as an added factor. In the conventional regression, this term is not present. From the viewpoint of testing the pecking order, the most important of the conventional variables is tangibility. Harris and Raviv (1991) argue that if the pecking order theory holds, one might expect that firms with

few tangible assets would have greater asymmetric information problems. Therefore, companies with few tangible assets will tend to accumulate more debt over time and become more highly levered. Harris and Raviv further argue that the pecking order predicts that $\boldsymbol{\beta_t} < 0$. This is not the conventional prediction regarding the role of tangibility. A more common idea is based on the hypothesis that collateral supports debt. It is often argued that tangible assets naturally serve as collateral. Therefore, collateral is associated with increased leverage. The usual prediction is that $\boldsymbol{\beta_t} > 0$. Companies with high market-to-book ratios are often thought to have more future growth opportunities. As in Myers (1977), there may be concern that debt could limit a firm's ability to seize opportunities when they appear. Barclay et al. (2001) present a model showing that debt capacity of growth options can be negative. The common prediction is that $\boldsymbol{\beta_{MTB}} < 0$.

Large firms are usually more diversified, have better reputations in debt markets and face lower information costs when borrowing. Thus, large firms are predicted to have more debt in their capital structures. The prediction is tha $\boldsymbol{\beta_{LS}}t > 0$. The profit forecast is ambiguous. The tradeoff theory predicts that profitable firms should be more highly levered to offset corporate taxes. Also, in many asymmetric information models, such as Ross (1977), corporate earnings are expected to have higher leverage. But Titman and Wessels (1988) and Fama and French (2002) show that this is not a common finding. In contrast, the literature finds profits and leverage to be negatively correlated. While MacKay and Phillips (2001) challenge this common finding, we expect to find that $\boldsymbol{\beta_P} < 0$.

Anticipated vs. Actual Deficits

Shyam-Sunder and Myers (1999) discussed whether the actual internal financing deficit of firms can explain the behavior of corporate financing more effectively than the expected internal financing deficit. This study also examines the financing deficit and conducts a robustness checks. If the expected internal financing deficit exists, the current internal financing deficit of the firm can be expressed as:

$$\mathrm{DEF_t} + \mathrm{E_{t-1}}|\mathrm{DEF_t}| + \mathrm{Z_t} \qquad (6)$$

$\boldsymbol{\mathrm{E_{t-1}}|\mathrm{DEF_t}|}$ is the expected current internal financing deficit estimated at the end of the previous period, and $\boldsymbol{\mathrm{Z_t}}$ is the current, non-expected, net cash flows. We use the internal financing deficit from the previous term as the alternative variable to the expected internal financing deficit. We then substitute the above empirical model. However, in the regression equation, $\boldsymbol{\mathrm{DEF_t}}$ is the adjustment seasoned equity offerings and treasury shares. We then compare the results with those from the aforementioned empirical models and test to see which offers better explanations and thus can act as a reference for financing decisions.

$$\Delta \mathrm{D_i} = \beta_0 + \beta_t \Delta \mathrm{T_i} + \beta_{\mathrm{MTB}} \Delta \mathrm{MTB_i} + \beta_{\mathrm{LS}} \Delta \mathrm{LS_i} + \beta_{\mathrm{P}} \Delta \mathrm{P_i} + \beta_{\mathrm{PO}}^{\mathrm{ADJ}} \mathrm{DEF_i} + \beta_{\mathrm{TA}}^{\mathrm{ADJ}} (\mathrm{D_i^*} - \mathrm{D_{i-1}}) + \mathrm{e_i} \qquad (7)$$

Where all terms are as previously defined and:

$\boldsymbol{\mathrm{D_i^*} - \mathrm{D_{i-1}}}$: As the internal financing deficit adjusted seasoned equity offerings and treasury shares.

Conventional Standards of Corporate Leverage Factor Verification

The proposed approach of dividing the business matrix quadrants explores capital structure and financing policies. This study uses size, growth, and profitability as three conventional corporate leverage determining factors and tests the two-factor method for robustness. Total assets is a proxy variable for size, M/B (market-to -book ratio) is a proxy variable for growth, EBIT (net income before interest and tax) is the proxy variable for profitability. The three new matrices are thus created by size and growth, size and profitability, and profitability and growth. Large firms-low profitability (LF-LP) represents, large firms-high profitability are represented by (LF-HP) Small firms-high profitability firms and small

firms-low profitability are represented by SF-HP and SF-LP respectively. Large firms-low growth and large firms-high growth are represented by LF-LG and LF-HG respectively. Small firms-high growth and small firms-low growth are indicated by SF-HG and SF-LG respectively. high profitability-low growth with HP-LG represents, high profitability-high growth with HP-HG represents, low profitability-high growth and low profitability-low growth firms are indicated by LP-HG and LP-LG respectively. Figure 1 present the size and profitability factors. The X-axis represents the profitability factor and the Y-axis represents the size factor. Each matrix is divided into four quadrants, with each fraction of the second quartile as the cut-off point. The X-axis is greater than the second quartile for low profitability, and the Y-axis greater than the second quartile for the large firms. The two axes form the first quadrant.

RESULTS AND DISCUSSION

Shyam-Sunder and Myers (1999) study data from 1971 to 1989. Results are presented separately for their sample period (1971-1989) and for subsequent years (1990-1998) for a sample of 157 firms observations for 19 years. Frank and Goyal's (2003) follow their approach of reporting results separately for net debt issued, gross debt issued, and the change in the debt ratio. They also for attempt to match their sample selection criteria. The most significant of their criteria is the requirement that firms report continuously on the necessary variable. These criteria results include a sample with 768 firms and 19 years of data for each firm. We follow their approach of reporting results. We study data from the period 1995 to 2014, for a sample of 9,783 annual firm-year observations and 19 years of data. The regression results are not the same time period as Shyam-Sunder and Myers (1999) and Frank and Goyal's (2003).

Empirical Analysis of Target-Adjustment Model Method

Each target-adjustment policy interpretation specified in each quadrant of the matrix is based on the target-adjustment coefficient. If it is greater than zero, it indicates that the financing policy of the company is using a target-adjustment capital structure. Table 2-5 show the results. The samples are divided into two types, namely, with no financial gap and with financial gap, for testing. Dependent variables of regression are divided into three patterns: net debt issuance, gross debt issuance, and changes in the debt ratio. Frank and Goyal (2003) considered net debt issuance better equipped to measure the test effect, and this study uses the same as the main analysis item.

When net debt issuance is the dependent variable, the t-statistic in each quadrant of the matrix are significantly greater than zero, that is, 10.08, 5.42, 5.79, and 7.35 in the LF-LP, LF-HP, SF-HP, and SF-LP respectively. When net debt issuance is the dependent variable, the t-statistic in each quadrant of the matrix are significantly greater than zero, that is, 75.40, 2.74, 9.55, and 115.45 in the LF-LP, LF-HP, SF-HP, and SF-LP respectively. Most information shows the coefficient of firms with financing gap is greater than for firms with no financing gap. The LF-LP group has a coefficient for firms with a financing gap of 0.909, and the coefficient with no financing gap of 0.174. For the SF-HP with financing gap the coefficient equals 0.259, and that with no financing gap equals 0.198. In the SF-LP, the coefficient for firms with a financing gap equals 1.144, and that for firms with no financing gap equals 0.234. The exceptions are LF-HP quadrant, with the coefficient for firms with a financing gap equals 0.145, and that for firms with no financing gap equals 0.316. Our findings contradict Frank and Goyal (2003), who found the coefficient for firms with no financing gap was higher than the book value of assets in the sample with a financing gap. The fourth quadrant of the matrix follows the target-adjusted financing strategy. The financing gaps appear in the following order: LF-LP → SF-LP → SF-HP → LF-HP.

Empirical Analysis of Pecking Order Theory

Each pecking order policy interpretation quadrant of the matrix is based on the pecking order coefficient. Table 2-5 show the results with the samples divided into two types, namely, with no financing gap and with financing gap, for testing.

Table 2: Regression Results for Target Adjustment and Pecking Order Models

	LF-LP					
	Data with No Gaps Permitted in the Reporting of Flow of Funds Data			**Data with Gaps Permitted in the Reporting of Flow of Funds Data**		
	Net Debt Issued	**Gross Debt Issued**	**Change in Debt Ratio**	**Net Debt Issued**	**Gross Debt Issued**	**Change In Debt Ratio**
Panel A: Target-Adjustment Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.014***	-0.062***	-0.063***	-0.018***	-0.015	0.035***
	(3.49)	(-2.91)	(-4.76)	(-3.11)	(-0.75)	(3.43)
Target-adjustment coefficient	0.174***	0.064***	2.117***	0.909***	0.353***	-1.224***
	(10.08)	(4.97)	(34.68)	(75.40)	(27.28)	(-30.78)
N	2,364	2,,364	2,,364	1,584	1,584	1,584
R^2	0.04	0.01	0.34	0.78	0.32	0.37
Panel B: Pecking Order Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.011***	0.047**	0.056***	-0.056***	-0.081***	0.059***
	(-2.54)	(2.04)	(3.18)	(-4.87)	(-4.43)	(6.39)
Pecking order coefficient	-0.221***	0.812***	0.765***	0.260***	0.984***	-0.512***
	(-15.09)	(9.98)	(12.43)	(15.88)	(38.16)	(-39.18)
N	2,364	2,364	2,364	1,584	1,584	1,584
R^2	0.09	0.04	0.06	0.14	0.48	0.19

Group LF-LP represents large firms-low profitability. The dependent variable is the net or gross annual debt issued, scaled by the book value of assets or change in the debt-to-asset ratio. The target-adjustment equation predicts gradual adjustment to target ratios, and each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient $\boldsymbol{b_{ta}}$ *estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of* $\boldsymbol{b_{po}}$*=1. Panel A shows the results of the target-adjustment model, and panel B shows the results of the pecking order model. *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 3: Regression Results for Target Adjustment and Pecking Order Models (Continued)

	LF-HP					
	Data with No Gaps Permitted in The Reporting of Flow of Funds Data			**Data with Gaps Permitted in The Reporting of Flow of Funds Data**		
	Net Debt Issued	**Gross Debt Issued**	**Change in Debt Ratio**	**Net Debt Issued**	**Gross Debt Issued**	**Change In Debt Ratio**
Panel A: Target-Adjustment Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.008	-0.079**	-0.021***	-0.046***	0.011	0.009**
	(0.92)	(-2.23)	(-3.57)	(-5.50)	(0.75)	(1.66)
Target-adjustment coefficient	0.316***	0.074	0.343***	0.145***	0.032	0.164***
	(5.42)	(1.26)	(6.44)	(2.74)	(1.27)	(2.73)
N	543	543	543	163	163	163
R^2	0.05	0.01	0.07	0.04	0.01	0.04
Panel B: Pecking Order Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.015	0.209***	0.016***	0.001	0.084***	0.016**
	(-1.63)	(7.68)	(2.67)	(0.07)	(4.47)	(2.11)
Pecking order coefficient	-0.170***	1.675***	0.185***	-0.834***	-1.190***	-0.085
	(-7.13)	(23.40)	(12.04)	(-7.08)	(-5.44)	(-0.96)
N	543	543	543	163	163	163
R^2	0.09	0.50	0.21	0.24	0.16	0.01

Group LF-HP represents large firms-high profitability. The dependent variable is the net or gross annual debt issued, scaled by the book value of assets or change in the debt-to-asset ratio. The target-adjustment equation predicts gradual adjustment to target ratios, and each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient $\boldsymbol{b_{ta}}$ *estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of* $\boldsymbol{b_{po}}$*=1. Panel A shows the results of the target-adjustment model, and panel B shows the results of the pecking order model. *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 4: Regression Results for Target Adjustment and Pecking Order Models (Continued)

	SF-HP					
	Data with No Gaps Permitted in The Reporting of Flow of Funds Data			**Data with Gaps Permitted in The Reporting of Flow of Funds Data**		
	Net Debt Issued	**Gross Debt Issued**	**Change in Debt Ratio**	**Net Debt Issued**	**Gross Debt Issued**	**Change In Debt Ratio**
Panel A: Target-Adjustment Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.024***	-0.233***	-0.018***	-0.059***	0.010**	0.016***
	(4.07)	(-5.37)	(-6.80)	(-11.53)	(1.84)	(4.87)
Target-adjustment coefficient	0.198***	0.226***	0.346***	0.259***	0.342***	0.585***
	(5.79)	(7.03)	(11.01)	(9.55)	(8.82)	(11.77)
N	1,521	1,521	1,521	512	512	512
R^2	0.02	0.03	0.07	0.15	0.13	0.21
Panel B: Pecking Order Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.048***	0.042***	0.005**	-0.026***	0.025***	0.017**
	(-8.09)	(6.45)	(1.78)	(-3.68)	(3.28)	(3.37)
Pecking order coefficient	-0.018***	0.381***	0.121***	-0.622***	-0.099	0.128***
	(-23.05)	(19.44)	(13.30)	(-9.27)	(-1.35)	(2.72)
N	1,521	1,521	1,521	512	512	512
R^2	0.26	0.20	0.10	0.14	0.01	0.01

*Group SF-HP represents small firms-high profitability. The dependent variable is the net or gross annual debt issued, scaled by the book value of assets or change in the debt-to-asset ratio. The target-adjustment equation predicts gradual adjustment to target ratios, and each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient b_{ta} estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of b_{po}=1. Panel A shows the results of the target-adjustment model, and panel B shows the results of the pecking order model. *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 5: Regression Results for Target Adjustment and Pecking Order Models (Continued)

	SF-LP					
	Data with No Gaps Permitted in the Reporting of Flow of Funds Data			**Data with Gaps Permitted in The Reporting of Flow of Funds Data**		
	Net Debt Issued	**Gross Debt Issued**	**Change in Debt Ratio**	**Net Debt Issued**	**Gross Debt Issued**	**Change In Debt Ratio**
Panel A: Target-Adjustment Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.016***	-0.233***	-0.018***	-0.106**	0.025	-0.104***
	(2.72)	(-5.37)	(-6.80)	(-2.08)	(0.41)	(-6.22)
Target-adjustment coefficient	0.234***	0.226***	0.346***	1.144***	0.967***	5.060***
	(7.35)	(7.03)	(11.01)	(115.45)	(10.29)	(109.81)
N	1,693	1,693	1,693	1,403	1,403	1,403
R^2	0.99	0.05	0.05	0.90	0.07	0.90
Panel B: Pecking Order Model						
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.003	0.057***	0.003	0.575***	-0.297***	0.178***
	(-0.49)	(6.59)	(0.77)	(18.52)	(-16.10)	(8.80)
Pecking order coefficient	-0.015***	0.667***	0.149***	-4.906***	1.891***	-1.457***
	(-7.50)	(19.44)	(16.13)	(-195.94)	(154.70)	(-89.14)
N	1,693	1,693	1,693	1,403	1,403	1,403
R^2	0.03	0.31	0.12	0.96	0.94	0.85

*Group SF-LP represents small firms-low profitability. The dependent variable is the net or gross annual debt issued, scaled by the book value of assets or change in the debt-to-asset ratio. The target-adjustment equation predicts gradual adjustment to target ratios, and each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient b_{ta} estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of b_{po} =1. Panel A shows the results of the target-adjustment model, and panel B shows the results of the pecking order model. *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

When net debt issuance is the dependent variable, the t-statistic in each group for the LF-LP, LF-HP, SF-HP, and SF-LP equals -15.09,-7.13,-23.05, and -7.50 respectively and shows negative correlations. When net debt issuance is the dependent variable, only the LF-LP group with financing gap, of 0.260, shows a positive correlation and significant t-statistic. The other three groups have negatively correlation. For LF-HP, SF-Hp, and SF-LP the t-statistics equal -7.08, -9.27, and -195.94 respectively. Enterprises in LF-LP, with financing gap, have tend to pecking order theory. The rest rejected the pecking order theory.

Target-Adjustment and Pecking Order Theory Joint Empirical Model

Table 6-7 shows the conventional regression with the target-adjustment and pecking order joint overall test results. In addition to the coefficient of market-to-book and the Ln sales of column (4) in the LF-HP, the Ln sales of column (1) in the LF-LP, the tangibility of column (10) show the SF-LP opposite sign. The rest of this article coefficient of conventional leverage regression aforementioned definition is assumed that the literature section roughly in line. Shyam-Sunder and Myers (1999) pointed out that, if the pecking order is the main driving factor, it will supplant the conventional variables affected. This study also uses Frank and Goyal's (2003) regression equation (5) to increase pecking order funds ($\mathbf{DEF_i}$), control variables, and test whether the conventional regression is still robust. The regression results show, the coefficient of Ln sales in column (8) in the SF-HP, the Ln sales in column (5) in the LF-HP, the tangibility in column (11) in the SF-LP, reverse signs equal 0.048, 0.091 and 0.541 respectively. The rest show no significant changes. The internal pecking order financing deficit of the four groups, except for the coefficient on the LF-LP is positive 0.110, with t-statistic of 8.62, which is highly significant.

Table 6: Leverage Regression with Conventional Variable and Deficit for Pecking Order and Target-Adjustment, 1995-2014

	LF-LP			LF-HP		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.002	0.006	-0.006	0.003	-0.044***	-0.045***
	(0.37)	(1.12)	(-1.58)	(0.51)	(-6.67)	(-6.99)
Tangibility	0.218***	0.211***	0.080***	0.151***	0.213***	0.203***
	(23.63)	(23.03)	(11.32)	(5.18)	(9.44)	(8.20)
Market- to-book	-0.007	-0.009	0.006	0.007	0.003	0.003
	(-1.13)	(-1.53)	(1.39)	(0.96)	(0.46)	(0.57)
Ln sales	-0.014	-0.042***	0.014	-0.045***	0.091***	0.090***
	(-0.96)	(-2.86)	(1.34)	(-2.46)	(5.08)	(6.13)
Profitability	-0.164***	-0.138***	-0.057***	-0.231**	-0.717***	-0.672***
	(-25.57)	(-19.59)	(-10.73)	(-1.98)	(-6.89)	(-6.58)
Pecking order		0.110***	-0.045***		-0.390***	-0.380***
		(8.62)	(-4.66)		(-16.08)	(-15.93)
Target-adjustment			0.700***			0.216***
			(58.66)			(5.56)
N	3,948	3,948	3,948	706	706	706
R^2	0.16	0.17	0.56	0.05	0.31	0.34

Group LF-LP represents large firms-low profitability; Group LF-HP represents large firms-high profitability. The conventional regression is $\Delta \boldsymbol{D_i} = \boldsymbol{\beta_0} + \boldsymbol{\beta_t}\Delta \boldsymbol{T_i} + \boldsymbol{\beta_{MTB}}\Delta \boldsymbol{MTB_i} + \boldsymbol{\beta_{LS}}\Delta \boldsymbol{LS_i} + \boldsymbol{\beta_P}\Delta \boldsymbol{P_i} + \boldsymbol{e_i}$. *Here; D is defined as the ratio of total debt to market capitalization. T=Tangibility is defined as the ratio of fixed assets to total assets.MTB is the market-to-book ratio defined as the ratio of the market value of assets to the book value of assets. LS are Ln sales, defined as the natural logarithm of constant sales. P is profit, defined as the ratio of operation income to the book value of assets. The sample period is 1995–2014. Financial firms and utilities are excluded. The horizontal axis represents net profitability before interest, tax, and depreciation (EBITDA) as a proxy variable; the vertical axis represents size with Ln sales as a proxy variable. The two axes constitute four quadrants. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

The rest of the coefficients have negative signs. The coefficients on LF-HP, SF-HP, and SF-LP equal -0.390, -0.600, and -4.273 respectively, with t-statistic of -16.08, -36.48, and -93.49 respectively. In addition to the LF-LP following the pecking order theory, the other three groups did not follow the theory. Tables 2-5 yield the same conclusion. Further, target-adjustment internal financing gap ($\mathbf{D_i^* - D_{i-1}}$), the coefficient of market-to-book and Ln sales in column (3) in the LF-LP, the tangibility in column (12) in the SS-PL cluster equal 0.006, 0.014, and -1.004 respectively, with no substantial changes for the rest. The coefficient on pecking order in column (2) in the LF-LP equals 0.110 and for the reversal column (3)

equals -0.045. The target-adjustment for the remaining three quadrant of the matrices are all positive with t-statistic of 58.66, 5.56, 7.34, and 172.77 respectively. These statistics are highly significant, showing that the four groups follow the target-adjustment. Tables 2-5 yield the same conclusion. The data analysis showed that target-adjustment and pecking order joint conventional regression test and individual tests lead to roughly the same conclusion. In terms of target-adjustment, the four clusters are consistent with the results of a positive correlation, contrary to Frank and Goyal's (2003) conclusion that pecking order's relative efficiency shows more differences between the Taiwan stock and American stocks. According to Shyam-Sunder and Myers (1999), if the pecking order reversal becomes negative, it has the same meaning as a target-adjustment.

Table 7: Leverage Regression with Conventional Variable and Deficit for Pecking Order and Target-Adjustment, 1995-2014 (Continued)

	SF-HP			SF-LP		
	(7)	(8)	(9)	(10)	(11)	(12)
Constant	0.005	-0.065***	-0.063***	-0.049	-0.198***	-0.071***
	(1.05)	(-15.94)	(-15.48)	(-1.06)	(-8.42)	(-9.82)
Tangibility	0.230***	0.495***	0471***	-0.567***	0.541***	-1.004***
	(6.34)	(16.99)	(16.30)	(-8.60)	(15.16)	(-71.06)
Market- to-book	-0.029***	-0.013***	-0.012***	-0.033	0.152***	0.030***
	(-6.98)	(-3.99)	(-9.66)	(-0.46)	(4.19)	(2.68)
Ln sales	-0.049***	0.048***	0.053***	0.166**	0.582***	0.233***
	(-3.39)	(4.18)	(4.68)	(2.24)	(15.29)	(19.69)
Profitability	0.404***	-0.440***	-0.427***	1.664***	0.398***	0.182***
	(5.28)	(-6.90)	(-6.77)	(45.33)	(17.29)	(25.33)
Pecking order		-0.600***	-0.589***		-4.273***	-0.424***
		(-36.48)	(-36.10)		(-93.49)	(-16.11)
Target-adjustment			0.150***			0.895***
			(7.34)			(172.77)
N	2,033	2,033	2,033	3,096	3,096	3,096
R^2	0.05	0.42	0.44	0.62	0.90	0.99

Group SF-HP represents small firms-high profitability; Group SF-LP represents small firms-low profitability The conventional regression is $\Delta \boldsymbol{D_i} = \boldsymbol{\beta_0} + \boldsymbol{\beta_t}\Delta \boldsymbol{T_i} + \boldsymbol{\beta_{MTB}}\Delta \boldsymbol{MTB_i} + \boldsymbol{\beta_{LS}}\Delta \boldsymbol{LS_i} + \boldsymbol{\beta_P}\Delta \boldsymbol{P_i} + \boldsymbol{e_i}$ *.Here. D is defined as the ratio of total debt to market capitalization. T=Tangibility is defined as the ratio of fixed assets to total assets. MTB is the market-to-book ratio defined as the ratio of the market value of assets to the book value of assets. LS are Ln sales, defined as the natural logarithm of constant sales. P is profit, defined as the ratio of operation income to the book value of assets. The sample period is 1995–2014. Financial firms and utilities are excluded. The horizontal axis represents net profitability before interest, tax, and depreciation (EBITDA) as a proxy variable; the vertical axis represents size with Ln sales as a proxy variable. The two axes constitute four quadrants. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 6-7 shows the coefficients for the 4 groups, with values of -0.045, -0.380, -0.589, and -0.424. Pecking order consistently shows negative results with the target-adjustment showing a positive correlation between test results. Shyam-Sunder and Myers (1999) introduced the financing order into the pecking order test and the coefficient turned from negative to positive with different conclusions. It is also different from the conclusion from Frank and Goyal (2003) who found the pecking order coefficient of large companies is more significant, and mean reversion in corporate leverage is surprisingly weak.

In this study, the R^2 in Column 1 for the LF-LP conventional regression had a result of 0.16. Column 2, adding pecking order internal financing deficit had a value of 0.17. Column 3 added target-adjustment for the internal financing deficit and had a value of 0.56, showing a monotonically increasing trend. The other 3 groups also showed the same trend, though the results in Frank and Goyal (2003) do not have this tendency. This may be because many small companies in the United States became listed after 1980. The financing deficit and increasing internal control variable improves the explanatory power and proves that target-adjustments in internal financing deficits remain for Taiwanese companies. Overall, after adding the pecking order variable, the test results for LF-LP consists of pecking order theory. After adding the target-adjustment, the four quadrants follow the target-adjustment theory and suggest that firms operating in different matrices have different capital structures and financing decision-making, which supports the hypothesis.

Robustness Checks: Anticipated vs. Actual Deficits

Table 8-9 shows that the coefficient of Ln sales in Column 7 in the SF-HP and the tangibility in Column 10 in the SF-LP were -0.057 and -0.615 respectively. This finding does not match the conventional theory, while the others did not differ much from the conventional theory. When adding the financing deficit variable, the coefficient of tangibility in Column 11 in the SF-LP group is inverted to 0.692, remaining little changed. Except the coefficient of financing deficit in Column 2 in the LF-LP group of 0.518, has a highly significant t-statistic of 23.76. The other three groups did not comply with pecking order theory.

Table 8: Leverage Regression with Anticipated Variable Vs. Actual Deficits for Small Firms, 1995-2014

	LF-LP			LF-HP		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.023**	-0.072***	-0.028***	-0.027***	0.002	0.003
	(-2.02)	(-7.28)	(-5.11)	(-3.44)	(0.25)	(0.30)
Tangibility	0.278***	0.432***	0.156***	0.429***	0.317***	0.320***
	(15.36)	(25.66)	(14.83)	(8.11)	(6.00)	(6.08)
Market- to-book	-0.062***	-0.052***	-0.029***	-0.035***	-0.044***	-0.040***
	(-3.84)	(-3.75)	(-3.74)	(-3.93)	(-5.22)	(-4.76)
Ln sales	0.028	0.017***	0.029**	-0.058**	-0.044**	-0.049**
	(0.84)	(4.18)	(1.85)	(-2.09)	(-1.71)	(-1.89)
Profitability	-0.173***	-0.440	-0.027***	-0.274**	-0.184	-0.187
	(-16.36)	(0.60)	(-4.88)	(-2.21)	(-1.60)	(-1.63)
Financing deficit		0.518***	0.122***		-0.580***	-0.557***
		(23.76)	(8.79)		(-5.40)	(-5.18)
Lagged leverage			0.830**			0.068**
			(59.12)			(1.73)
N	1,584	1,584	1,584	163	163	163
R^2	0.21	0.42	0.82	0.43	0.53	0.51

Group LF-LP represents large firms-low profitability; Group LF-HP represents large firms-high profitability The conventional regression is $\Delta \boldsymbol{D_i} = \boldsymbol{\beta_0} + \boldsymbol{\beta_t}\Delta \boldsymbol{T_i} + \boldsymbol{\beta_{MTB}}\Delta \boldsymbol{MTB_i} + \boldsymbol{\beta_{LS}}\Delta \boldsymbol{LS_i} + \boldsymbol{\beta_P}\Delta \boldsymbol{P_i} + \boldsymbol{DEF_{PQ}^{ADJ}}\boldsymbol{DEF_i} + \boldsymbol{\beta_{TA}^{ADJ}}(\boldsymbol{D_i^* - D_{i-1}}) + \boldsymbol{e_i}$. *Here D is defined as the ratio of total debt to market capitalization T=Tangibility is defined as ratio of fixed assets to total assets. MTB is the market-to-book ratio defined as the ratio of the market value of assets to the book value of assets. LS is Ln sales defined as the natural logarithm of constant sales. P is profit defined as the ratio of operation income to book value of assets. The sample period is 1995-2014. Financial firms and utilities are excluded. The horizontal axis represents net profitability before interest, tax, and depreciation (EBITDA) as a proxy variable; the vertical axis represents size, with Ln sales as a proxy variable. The two axes constitute four quadrants.* $\boldsymbol{The\ term\ of\ "D_i^* - D_{i-1}"}$ *As the internal financing deficit adjusted seasoned equity offerings and treasury shares. *** And ** indicate significance at the 1 and 5 percent levels respectively.*

When adding the lagged leverage control variable, the coefficients of tangibility, market–to-book, and Ln sales in Column 11 in the SF-LP group were inverted to -0.803, 0.018, and 0.066 respectively. The rest did not change much. The lagged leverage internal financing deficit is all positive, with a highly significant t-statistic. The further increase in lagged leverage did not significantly reduce explanatory power, contrary to the findings in Frank and Goyal (2003). The results are consistent with Fama and French (2002) who argue that mean reversion in corporate leverage is surprisingly weak. Overall, after adding the financing deficit variable, the SF-LP groups follow pecking order theory and the other three groups did not. After adding the lagged leverage, all four groups follow the target-adjustment theory. The $\mathbf{R^2}$ in Column 1 in the SF-LP of the conventional regression equals 0.21. Column 2 added the financing deficit variable value of 0.42, and Column 3 included lagged leverage with a value of 0.82, showing a monotonically increasing trend. Likewise, in the other three groups, the SF-LP group adds the internal financing gap of lagged leverage, where the coefficient of determination grew to 0.99. This result shows that changes in debt can slow the trajectory of the capital structure. The evidence shows that the robustness of the test results performed well for the actual internal financing gap and expected small sample robustness checks remained steady, with insignificant results for a separate verification and joint verification.

Table 9: Leverage Regression with Anticipated Variables. Actual Deficits for Small Firms, 1995-2014 (Continued)

	SF-HP			SF-LP		
	(7)	(8)	(9)	(10)	(11)	(12)
Constant	-0.061***	-0.024***	-0.022***	-0.113	0.643***	0.091***
	(-10.36)	(-3.35)	(-3.21)	(-1.10)	(25.02)	(8.27)
Tangibility	0.459***	0.323***	0.245***	-0.615***	0.692***	-0.803***
	(5.94)	(4.38)	(3.44)	(-6.17)	(26.52)	(-43.97)
Market- to-book	-0.019***	-0.019***	-0.014***	-0.046	-0.005	0.018
	(-3.94)	(-4.20)	(-3.26)	(-0.29)	(-0.13)	(1.26)
Ln sales	-0.057***	-0.035**	-0.023	0.182	-0.072**	0.066***
	(-2.56)	(-1.67)	(-1.16)	(1.05)	(-1.68)	(4.22)
Profitability	0.207**	0.034	0.042	1.647***	0.015	0.111***
	(2.28)	(0.39)	(0.50)	(30.02)	(0.88)	(17.26)
Financing deficit		-0.582***	-0.505***		-5.438***	-1.235***
		(-3.63)	(-7.76)		(-147.30)	(-26.92)
Lagged leverage			0.190***			0.765***
			(7.25)			(95.77)
N	512	512	512	1,403	1,403	1,403
R^2	0.10	0.21	0.29	0.62	0.98	0.99

Group SF-HP represents small firms-high profitability; Group SF-LP represents small firms-low profitability. The conventional regression is $\Delta \boldsymbol{D_i} = \boldsymbol{\beta_0} + \boldsymbol{\beta_t}\Delta \boldsymbol{T_i} + \boldsymbol{\beta_{MTB}}\Delta \boldsymbol{MTB_i} + \boldsymbol{\beta_{LS}}\Delta \boldsymbol{LS_i} + \boldsymbol{\beta_P}\Delta \boldsymbol{P_i} + \boldsymbol{DEF_{PO}^{ADJ}}\boldsymbol{DEF_i} + \boldsymbol{\beta_{TA}^{ADJ}}(\boldsymbol{D_i^*} - \boldsymbol{D_{i-1}}) + \boldsymbol{e_i}$*. Here D is defined as the ratio of total debt to market capitalization T=Tangibility is defined as ratio of fixed assets to total assets.MTB is the market-to-book ratio defined as the ratio of the market value of assets to the book value of asstes.LS is Ln sales defined as the natural logarithm of constant sales. P is profit defined as the ratio of operation income to book value of assets. The sample period is 1995-2014. Financial firms and utilities are excluded. The horizontal axis represents net profitability before interest, tax, and depreciation (EBITDA) as a proxy variable; the vertical axis represents size, with Ln sales as a proxy variable. The two axes constitute four quadrants..* **The term of** "$\boldsymbol{D_i^* - D_{i-1}}$" *As the internal financing deficit adjusted seasoned equity offerings and treasury shares. *** And ** indicate significance at the 1 and 5 percent levels respectively.*

Robustness Checks: Conventional Standards of Corporate Leverage Factor Verification

Table 10-12 shows the robustness check results, beginning with the net debt issuance variable (to save space, other gross debt issued and changes in debt issued were omitted). Columns 1-4 and Columns 9-12 show results with no financing gap. Columns 5-8 and Columns 13-16 with financing gap. The results for LF-HG, LF-LP, and HP-LG show the coefficients, except target-adjustment, were significantly positive for DEF < 0. Pecking order was also positive with t -statistic significantly greater than zero. The results of the aforementioned method using the average approach is the same. That is, each quadrant of the matrix will be a cluster using target-adjustment theory, but also with the use of pecking order theory as a financing resource. In all clusters for LF-HG, the clustering coefficient was 0.708, with a t-statistic of 56.55 and R^2 of 0.44, showing the best performance for the twelve clusters. The results using the average of the preceding methods show that the SF-HP clustering coefficient was 0.909, with a t-statistic of 75.40, and R^2 of 0.78. The data show that the average method is better than the quartile method.

Hypothesis Results

By individual test, the four quadrants of the cluster, whether DEF < 0 or DEF > 0, the t-statistics are significantly different from zero, and comply with the target-adjustment theory, Moreover, in LF-LP under with financing gap have compliance tends to pecking order theory. The rest are rejected for the pecking order theory. By joint test, after adding the pecking order variable, the test results for LF-LP consists of pecking order theory. After adding the target-adjustment, the four quadrants follow the target-adjustment theory. By anticipated vs. actual deficits test, after adding the financing deficit variable, the SF-LP groups follow pecking order theory and the other three groups did not. After adding the lagged leverage, all four groups follow the target-adjustment theory. By conventional standards of corporate leverage factor, the results of the aforementioned method using the average approach is the same. The data showing strong evidence supporting the hypothesis that clusters of firms in different quadrants will follow different financing strategies. Table 13-15 is the result of summarized.

Table 10: Testing the Determinants Factor of Traditional Standard Corporate Profitability

	Net debt Issued				Net debt Issued			
	With No Financing Gap				With Financing Gap			
	LF-LG	LF-HG	SF-HG	SF-LG	LF-LG	LF-HG	SF-HG	SF-LG
Panel A: Target-Adjustment Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.014***	0.009***	0.012**	0.017***	-0.024***	-0.030***	-0.054***	-0.042***
	(2.64)	(2.64)	(2.27)	(2.75)	(-8.88)	(-11.30)	(-18.92)	(-13.88)
Target-adjustment	0.467***	0.708***	0.434***	0.445***	-0.233***	0.313***	0.160***	0.177***
	(26.33)	(56.55)	(29.61)	(22.62)	(-20.26)	(26.69)	(15.48)	(16.44)
N	4,730	4,090	4,826	4,250	2,973	2,881	2,878	2,721
R^2	0.13	0.44	0.10	0.11	0.12	0.20	0.08	0.09
Panel B: Pecking Order Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.015***	0.028***	-0.024***	-0.014**	-0.001	-0.002	-0.014***	-0.006
	(-2.75)	(6.19)	(-4.13)	(-2.20)	(-0.39)	(-0.56)	(-3.96)	(-1.62)
Pecking order	-0.191***	0.307***	-0.226***	-0.177***	-0.235***	-0.298***	-0.393***	-0.359***
	(-24.75)	(22.01)	(-25.46)	(-19.63)	(-7.64)	(-12.79)	(-17.85)	(-16.66)
N	4,730	4,090	4,826	4,250	2,973	2,881	2,878	2,721
R^2	0.12	0.15	0.12	0.08	0.03	0.05	0.10	0.09

Group LF-LG indicates large firms-low growth; LF-HG indicates large firms-high growth; SF-HG indicates small firms-high growth; and SF-LG indicates small firms-low growth. The dependent variable is the net annual of debt issued, scaled by the book value of assets. The target-adjustment equation predicts the gradual adjustment to target ratios, where each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient $\boldsymbol{b_{ta}}$ *estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of* $\boldsymbol{b_{po}}$*=1. Panel A shows results of the target-adjustment model, and panel B shows results of the pecking order model. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 11: Testing the Determinants Factor of Traditional Standard Corporate Profitability (Continued).

	Net Debt Issued				Net Debt Issued			
	With No Financing Gap				With Financing Gap			
	LF-LP	LF-HP	SF-HP	SF-LP	LF-LP	LF-HP	SF-HP	SF-LP
Panel A: Target-Adjustment Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.013***	0.007***	0.009**	0.017**	-0.037***	-0.022***	-0.053***	-0.071***
	(2.90)	(2.36)	(1.92)	(2.07)	(-15.27)	(-8.35)	(-20.02)	(-18.92)
Target-adjustment	0.505***	0.696***	0.466***	0.330***	0.212***	0.436***	0.161***	0.108***
	(32.99)	(61.46)	(27.65)	(12.94)	(22.08)	(31.07)	(16.08)	(9.23)
N	5,965	3,718	5,381	3,111	3,817	2,480	3,096	1,781
R^2	0.15	0.50	0.12	0.05	0.11	0.28	0.08	0.05
Panel B: Pecking Order Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.040***	-0.011***	-0.018***	-0.036***	-0.005**	0.009**	-0.012***	-0.024***
	(9.58)	(-2.86)	(-3.48)	(-3.10)	(-1.67)	(-2.25)	(-3.75)	(-5.48)
Pecking order	0.419***	-0.232***	-0.181***	-0.196***	-0.328***	-0.180***	-0.425***	-0.440***
	(45.67)	(-29.86)	(-23.47)	(-17.15)	(-16.63)	(-6.40)	(-20.29)	(-18.25)
N	5,965	3,718	5,381	3,111	3,817	2,480	3,096	1,781
R^2	0.26	0.19	0.09	0.09	0.07	0.02	0.12	0.16

Group LF-LP indicates large firms-low profitability; LF-HP indicates large firms-high profitability; SF-HP indicates small firms-high profitability; and SF-LP indicates small firms-low profitability. The dependent variable is the net annual of debt issued, scaled by the book value of assets. The target-adjustment equation predicts the gradual adjustment to target ratios, where each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient $\boldsymbol{b_{ta}}$ *estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of* $\boldsymbol{b_{po}}$*=1. Panel A shows results of the target-adjustment model, and panel B shows results of the pecking order model. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 12: testing the Determinants Factor of Traditional Standard Corporate Profitability (Continued)

	Net Debt Issued				Net Debt Issued			
	With No Financing Gap				With Financing Gap			
	HP-LG	HP-HG	LP-HG	LP-LG	HP-LG	HP-HG	LP-HG	LP-LG
Panel A: Target-Adjustment Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.011**	0.006	0.012	0.017***	-0.035***	-0.041***	-0.054***	-0.042***
	(2.28)	(1.49)	(0.27)	(2.75)	(-13.64)	(-15.62)	(-18.92)	(-13.88)
Target-adjustme	0.414***	0.708***	0.434***	0.445***	0.223***	0.263***	0.160***	0.177***
nt	(23.99)	(53.39)	(23.61)	(22.62)	(20.25)	(21.06)	(15.48)	(16.44)
N	5,152	3,946	4,826	4,250	3,117	2,459	2,878	2,721
R^2	0.10	0.42	0.10	0.11	0.12	0.15	0.08	0.09
Panel B: Pecking Order Model								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.028***	-0.015***	-0.024***	-0.014**	-0.010***	-0.011***	-0.014***	-0.006
	(6.19)	(-3.13)	(-4.13)	(-2.20)	(-2.84)	(-2.78)	(-3.96)	(-1.62)
Pecking order	0.307***	-0.245***	-0.226***	-0.177**	-0.288***	-0.370***	-0.393***	-0.359***
	(22.01)	(-25.89)	(-25.66)	(-19.63)	(-12.03)	(-15.18)	(-17.85)	(-16.66)
N	5,152	3,946	4,826	4,250	3,117	2,459	2,878	2,721
R^2	0.11	0.15	0.12	0.08	0.04	0.09	0.10	0.09

Group HP-LG indicates high profitability-low growth; HP-HG indicates high profitability-high growth; LP-HG indicates low- profitability-high growth; and LP-LG indicates low profitability -low growth. The dependent variable is the net annual of debt issued, scaled by the book value of assets. The target-adjustment equation predicts the gradual adjustment to target ratios, where each firm's target is measured by its average debt ratio over 1995–2014. The target-adjustment coefficient $\boldsymbol{b_{ta}}$ *estimates a fraction of the distance between the actual and the target covered in one year. Pecking order equations predict debt issues equal to each financing deficit, implying a pecking order coefficient of* $\boldsymbol{b_{po}}$*=1. Panel A shows results of the target-adjustment model, and panel B shows results of the pecking order model. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

Table 13: Each Group of Target-adjustment and Pecking Order Test Summary

Corporate Matrix	Target-Adjustment Theory and Pecking Order Theory Test			
	Net Debt Issue DEF<0		Net Debt Issue DEF>0	
	Pecking Order Coefficient	Target-Adjustment Coefficient	Pecking Order Coefficient	Target-Adjustment Coefficient
SF-HP group	-	Target-adjustment***	-	Target -adjustment***
LF-HP group	-	Target -adjustmen***	-	Target -adjustment***
LF-LP group	Pecking order***	Target -adjustment***	-	Target -adjustment***
SF-LP group	-	Target -adjustment***	-	Target -adjustment***

*Table13 shows the results the target-adjustment model, and the pecking order model Summary of this paper. *** And ** indicate significance at the 1 and 5 percent levels, respectively.*

CONCLUSION

The goal of this study is use companies listed in the Taiwan Stock Exchange as samples to examine capital structure. We follow an approach similar to Frank and Goyal's (2003) test study of US businesses on the pecking order theory of financing methods of capital structure in 1971–1998. The study uses empirical data related to capital structure and financing decisions on listed companies in Taiwan. The empirical data in this study were obtained from the Taiwan Economic Journal database. Beginning from 1995 and ending in 2014, the sample of manufacturing companies listed at the Taiwan Stock Exchange included a total of 9,783 annual firm-year observations. The variables are based on the NT$ pricing. The study methodology is to divide the sample divided into four quadrant clusters, testing target-adjustment and the pecking order theory independently and in combination with the traditional regression joint testing. The actual and expected internal funding gap and robustness checks of the standards of traditional corporate leverage decision factors using OLS regression were used to normalize the test for the hypothesis inference.

Table14: Each Group Financing Strategies of Conventional Regression of Internal Funding Gap and Lagged Leverage Test Summary

Corporate Matrix	Each Stage Financing Strategies of Conventional Regression of Internal Funding Gap and Lagged Leverage Test Summary			
	Traditional Regression Contains Pecking Order and Target-Adjustment		Traditional Regression Contains Lagged Leverage and Target-Adjustment	
	Pecking Order Coefficient	Target-Adjustment Coefficient	Pecking Order Coefficient	Target-Adjustment Coefficient
SF-HP group	-	Target-adjustment***	-	Target-adjustment***
LF-HP group	-	Target -adjustmen***	-	Target -adjustment***
LF-LP group	Pecking order**	Target -adjustment***	-	Target -adjustment***
SF-LP group	-	Target -adjustment***	-	Target -adjustment***

*Table14 shows results of the target-adjustment model, and the pecking order model of financing strategies of conventional regression of internal funding gap and lagged leverage *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

Table15: Conventional Standard Determinants of Corporate Leverage Summary

	Net Debt Issued Def<0		Net Debt Issued Def>0	
	Pecking Order Coefficient	Target-Adjustment Coefficient	Pecking Order Coefficient	Target-Adjustment Coefficient
LF-LG	- -	Target-adjustment***	-	Target-adjustment***
LF-HG	Pecking order***	Target-adjustment***	-	Target-adjustment***
SF-HG	-	Target-adjustment***	-	Target-adjustment***
SF-LG	-	Target-adjustment***	-	Target-adjustment***
LF-LP	Pecking order***	Target-adjustment***	-	Target-adjustment***
LF-HP	-	Target-adjustment***	-	Target-adjustment***
SF-HP	-	Target-adjustment***	-	Target-adjustment***
SF-LP	-	Target-adjustment***	-	Target-adjustment***
HP-LG	Pecking order***	Target-adjustment***	-	Target-adjustment***
HP-HG	-	Target-adjustment***	-	Target-adjustment***
LP-HG	-	Target-adjustment***	-	Target-adjustment***
LP-LG	-	Target-adjustment***	-	Target-adjustment***

*Table15 shows results of the target-adjustment model, and the pecking order model. of Conventional standard determinants of corporate leverage Summary. *** and ** indicate significance at the 1 and 5 percent levels, respectively.*

The main findings of this study are as follows: First, when tested independently, the target-adjustment theory proved superior to the pecking order theory. Second, a conventional regression analysis that included factors related to both the target-adjustment and pecking order theories, also produced evidence to suggest that the target-adjustment theory is superior to the pecking order theory. With the exception of the LF-LP group, t-tests of the internal financing deficit of the pecking order were significant. When factors related to the target-adjustment theory were included (all of which were significant), all pecking order theory factors became non-significant. Third, a small sample of firms for which DEF> 0, the conventional regression with pecking order and target-adjustment two variables maintain on robustness checks. These results emerge after adding the pecking order that the four quadrants of pecking order are all negative and reject the pecking order. Next, we add the target-adjustment. The four quadrant t-statistic are highly significant, following the target-adjustment.

Fourth, when two variables related to conventional regression (i.e., conventional regression aim pecking order and target-adjustment or internal financing deficit and lagged leverage) are used in a joint robustness checks, and the test procures robust results. Fifth, there is strong evidence to suggest that structural characteristics of the clusters that comprise each quadrant are correlated with a target-adjustment structure. Hovakimian and Li (2011) argued that enterprises with target leverage ratios will automatically adjust in accordance with the target structure. Sixth, although internal factors related to

pecking order and target-adjustment financing deficits for TWSE have explanatory power, the former's is a bit weaker than the latter's. Nevertheless, an increase in either factor (in any cluster) improves the model's explanatory power (R^2). This last finding may be attributable to the same factors associated with the LF-LP firms and in the mature stage of their life-cycle.

Seventh, the average foregoing results show that the average method is the optimum method for dividing firms into quartiles. The quartile classifications can be further divided in terms of their size, growth, and profitability. Overall, the data show that listed firms in the Taiwanese stock market tend to engage in target-adjustment leveraged debt financing. This may account for the majority of SMEs, but it also shows that there may exist a great deal of enterprise funds, intermediation from bank loans and credits (Berger and Dell, 1998). Pecking order theory is not the best factor to explain TWSE financing. Static tradeoff theory, by contrast, has much better explanatory power. The evidence produced here demonstrates that conventional leverage factors among firms in different quadrants will result in those firms implementing different financing strategies.

This study is limited to financial firms. Regulated public utilities are not included in the sample, and undistributed property is limited. Second, the use of variables in this study sample was observed for the financial indicators in the analysis. Managers' decision-making process was observed using subjective and objective environmental factors. The latent factors behind the decision makers are more difficult to capture. Therefore, whether the conclusion can correctly describe the whole picture of the subject of research is not completely clear. Future research might include extracting latent factors using multivariate factor analysis, second, extracting latent variables as a grouping of criterion variables, third, discussing the issues for each group by different life-cycle or characteristics, and, finally, comparing the advantages and disadvantages of its methods. This study provides a reference for researchers and policy-makers.

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