CAPITAL STRUCTURE POLICY: DEBT RATIO AND BUSINESS PERFORMANCE: CASE OF LISTED COMPANIES IN THAILAND

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ABSTRACT

The purpose of this study is to investigate the relationship between business performance and debt ratio. The data were collected from Datastream from 1994-2009. All companies listed in this period were collected and sorted out. Data were kept only for the full period available. The results are economically significant and can explain for chemical, food produce, and personal goods industries. Robustness testing shows significance only for the second period. The model suggests managers focus on profitability, sales expenses and leverage for 2- and 3- years lagged in order to improve business performance.

KEY WORDS: CAPITAL STRUCTURE POLICY / DEBT RATIO / BUSINESS PERFORMANCE / THAILAND

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โครงสร้างเงินทุน: สัดส่วนหนี้สินและผลประกอบการของธุรกิจ กรณีศึกษาบริษัทจดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย

CAPITAL STRUCTURE POLICY: DEBT RATIO AND BUSINESS PERFORMANCE: CASE OF LISTED COMPANIES IN THAILAND

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บทคัดย่อ

งานวิจัยชิ้นนี้จัดทำขึ้น เพื่อศึกษาความสัมพันธ์ระหว่างโครงสร้างเงินทุนและผลประกอบการของธุรกิจ ข้อมูลการวิจัยเก็บรวบรวมจาก Data Steam โดยใช้ข้อมูลระหว่างปี 2537-2552 โดยรวบรวมข้อมูลจากบริษัทในตลาดหลักทรัพย์ของประเทศไทย และ คัดแยกเฉพาะบริษัทที่มีข้อมูลครบทุกปี ผลลการวิจัยพบว่ามีนัยยะสำคัญ เมื่อทดสอบแยกเป็นรายอุตสาหกรรมพบความสัมพันธ์ในกลุ่มผลิตภัณฑ์เคมี ผู้ผลิตอาหาร และ สินค้าของใช้ส่วนบุคคล เมื่อทดสอบในช่วงเวลาพบความสัมพันธ์ในช่วงปี 2545-2553. ผลการทดลองแนะนำให้ผู้บริหารพิจารณาการบริหารการทำกำไร การบริหารค่าใช้จ่ายในการโฆษณาและการขาย และ หนี้สินของเงินทุนใน 2 และ 3 ปีที่ผ่านในการเพิ่มผลประกอบการของธุรกิจ

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CHAPTER I
INTRODUCTION

Capital Structure refers to the way a corporation finances its assets though a combination of sources of funds, which are equity, debt or hybrid securities. Each component has its own good and bad points such as risk association, tax deductable, agency cost etc. Therefore, the Capital Structure will affect business performance, which will finally affect a firm's wealth and value.

Jones, A. (2005, July 24) stated that the capital structure is affected by several factors; four primary factors were 1. Firm's business risk which is associated with the operation of the business. 2. The firm's tax position: the advantages from tax deductions will result a level D/E ratio. 3. Financial flexibility: a steady supply of capital is necessary for stable operations, which is important to the long term success. In an economic meltdown, a strong balance sheet is needed to obtain loans from sources of fund. The firm might find it advantageous to issue equity to strengthen the firm's capital base and promote financial stability. And 4.Managerial attitudes (conservatism or aggressiveness): a more aggressive manager tends to raise funds through debt accrual to boost profits. This factor doesn't affect the optimal capital structure, but it influences the capital structure policy.

In Capital Structure and Firm Performance: A New Approach to Testing Agency Theory and an Application to the Banking Industry (Berger, Allen N. & Patti. Emilia Bonaccorsi di, 2003) said that corporate governance indicates the leverage impact agency costs and will finally determine a firm's performance. The study uses a new approach to test the theory and also employs the simultaneous – equations model that accounts for reverse causality from a firm's performance to the capital structure. The research used data of the U.S banking industry; the results are both statistically and economically significant, as well as robust.

The argument for the relationship between capital structure and a firm's value was tested by several factors; tax-deduction, bankruptcy costs, agency costs, leverage-induced tax shields. (Hatfield, Gay B., Cheng, Louis T.W. & Devidson III, Wallace N. Fall, 1994) The tax issue is an important subject since it varies across the industry. The relationship between movement of debt toward the industry average and the industry average was tested by using a sample of 183 debt issue announcements in the USA for the period January 1, 1982, through December 31, 1986. To test the sensitivity of both the industry classification and the components of the leverage ratio, the study uses both Value Line and COMPUSTAT as sources of industry averages and defines the leverage ratio in terms of market value for equity and book value for equity. The study then tests whether this has an effect on the stock market returns for shareholders. The result shows that there is no statistical significance that markets react to the announcement of new debt issues for either group of firms. Also a relationship between a firm's debt level and its industry's debt level was not found.

Capital structure has emphasized not only the contracting problems among agents within the firm (e.g., managers and investors), but also the implications of financing decisions for agents outside the firm (e.g., competitors and consumers) (Campello, 2003). This literature stresses that a firm's mode of financing influences its conduct in the product market, as well as the conduct of other market participants, thereby influencing competitive outcomes. Although these theories have received much attention, only a few of their implications have been empirically examined. Directly testing those ideas is a challenging task since it is difficult to establish whether or not the competitive outcomes associated with a firm's financing decisions were already anticipated by the firm's managers. Another concern with the interpretation of the empirical relation between capital structure and product market behavior is the possibility that both a firm's financial structure and its competitive performance may be jointly influenced by unobserved (or unmodeled) factors arising from the market environment. A study of competitive performance following capital structure changes, for instance, may assign a fake causality to capital structure, if both performance and recapitalizations are influenced by underlying trends in industry concentration, excess capacity, and growth.

1.1 Objective

A Manager of a firm uses sources of funds from various sources; equity, debt, and hybrid security. Some firms only use one source, but some use a combination of those sources. This thematic paper aims to find the relationship between capital structure and business performance and whether the capital structure affects the firm's performance or not.

1.2 Scope of study

Data collected via Datastream, from a large cross-section of industries over a number of years, as opposed to exploring stylized industry/time settings. All firm-level data are from SET (Stock Exchange of Thailand) over the 1980–2009 periods. Regarding observations from all listed companies, data were obtained only from those firm-years with valid information on total assets, long-term debt, and sales. The criterion for industry selection is at least ten firms in each year. The firms in Banking, Insurance and Finance industry were specially sorted, as the debt ratio of these industries were abnormally large.

CHAPTER II
LITERATURE REVIEW

The firm- and industry-level evidence of the effects of capital structure on product market outcomes for a large cross-section of industries over a number of years (Campello, 2003). The analysis uses shocks, an unexpected or unpredictable event that affects an economy, to aggregate demand as representative for external factor changes in the product market environment. It was found that debt financing has a negative impact on firms (relative-to-industry) sales growth in industries where rivals are relatively unleveraged during recessions, but not during booms. In contrast, no such effects are observed for firms competing in high debt industries. At the industry level, markups are more countercyclical when industry debt is high. The cyclical dynamics found for a firm's sales growth and for industry markups are consistent with Chevalier and Scharfstein's (American Economic Review (1996)) prediction that firms which rely heavily on external financing possibly incur underinvestment in market share building in response to negative shocks to demand; and that competitive outcomes resulting from such actions depend on the financial structures of their industry rivals. The goal of this paper is to empirically examine the argument that capital structure influences a firm's (as well as its rivals') incentives to compete in the product market, thereby influencing competitive outcomes.

Financial structure and product markets: some theories and hypotheses, one of the well-known theories in the literature about the interactions between capital structure and product markets is the ‘‘long purse’’ or ‘‘predation’’ argument. The basic story stated by Telser (1966) and formalized by Bolton and Scharfstein (1990), stresses that dependence on outside financing can hinder a firm's ability to fight competition, which in turn prompts financially unconstrained rivals to pursue predatory market strategies. In empirically examining this argument, researchers often take some measure of debt financing as a proxy for financial fragility and study whether that measure is associated with competitive outcomes such as diminished profits and market share losses. The testing strategy used in this paper goes a step further in that it only takes indebtedness to be a measure of financial fragility under a set of specific conditions: (1) the firm is highly-leveraged in relation to its industry rivals, (2) the firm operates in a market where the use of debt financing is generally low, and (3) there is a negative shock to demand.

An alternative line of argument suggests that debt could contribute to a firm's competitive performance. According to the ‘‘strategic commitment’’ theory of Brander and Lewis (1986), a firm's decision to use debt works as a commitment to more aggressive behavior in the product market. This threat is credible because of the option-like payoffs associated with debt under limited liability and induces the firm's unleveraged rivals to accommodate by reducing their output (also see Maksimovic, 1986). If ex post this dynamic is found to work in the data, then one should observe market share gains for the more leveraged firms. One difficulty in testing this idea, however, is that the availability of such gains should ex ante lead to a prisoners' dilemma-like behavior in which rival firms would use more debt.

According to Financial Distress and Corporate Performance (Opler & Titman, 1994), it was found that highly leveraged firms lose substantial market share to their more conservatively financed competitors in industry downturns. Specifically, firms in the top leverage decile in industries that experience output contractions see their sales decline by 26 percent more than do firms in the bottom leverage decile. A similar decline takes place in the market value of equity. These findings are consistent with the view that the indirect costs of financial distress are significant and positive. Consistent with the theory that firms with specialized products are especially vulnerable to financial distress, they also found that highly leveraged firms that engage in research and development suffer the most in economically distressed periods. They also found that the unfavorable consequences of leverage are more pronounced in concentrated industries. The findings that market share loss of highly leveraged firms in industry downturns are consistent with a number of different interpretations. The research refers to such losses as customer driven. Alternatively, financially strong firms may be taking advantage of these distressed periods to aggressively advertise or price their products in an effort to drive out vulnerable competitors. It is called losses competitor driven. The evidence could also indicate that more leveraged firms are quicker to efficiently downsize in response to an industry downturn. It is called losses manager driven. Unlike manager-driven reductions in sales that can be interpreted as a benefit of financial distress, customer-driven and competitor-driven sales losses are clearly costly to shareholders. Unfortunately, the research cannot directly determine whether sales declines in periods of financial distress are manager driven, customer driven, or competitor driven. The result in this article indicates that there is a positive relationship between financial condition and a firm's performance in industry downturns. During these downturns, more highly leveraged firms tend to lose market share and experience lower operating profits than their competitors.

Campello, M., Fluck, Z., 2004 investigate the dynamics of product market competition based on financing decision influence real corporate performance and consumer welfare. The model proposes the interaction of product market competition and a firm's financing decisions when the firm faces capital market imperfections and consumers face switching costs. In the model, consumers anticipate that capital market frictions may drive their supplier out of business and account for welfare losses that a firm's bankruptcy imposes upon them. Likewise, managers, when investing in long-term market share building, take into account the possibility of business failure and the residual value they may capture from the firms liquidation process. Their theory yields four central implications. In response to a negative shock to demand: (1) more leveraged firms will experience significant market share losses; (2) the market share losses of more leveraged firms will be more pronounced in industries where low debt usage is the standard; (3) the market share losses of more leveraged firms will be more pronounced in industries where consumers face higher switching costs; and (4) the market share losses of more leveraged firms will increase in industries where asset liquidation is less efficient. Using detailed firm- and industry-level data from U.S. manufacturers over the 1990-91 recessions, they present empirical evidence supporting their model's predictions. After that they expand their empirical analysis, studying a large panel of firms over the various phases of the full business cycles contained in the 1976-96 period. Results from these broader tests provide additional evidence in support of their theory.

The theory as mentioned follows the work of Titman (1984), Maksimovic (1986,1988) Klemperer (1987,1995), Bolton and Scharfstein (1996) and Dasgupta and

Titman (1998) on consumption, competition, financial contracting, and liquidation. In the model, rival firms produce different brands of the same product and face capital market imperfections when raising external finance. These firms compete for consumers who have different preferences and it is not easy to switch brands across producers due to potentially high costs occur. In this environment, the trade-off between short-and long term profit maximization exists. Producers can maximize profits in the long run by charging lower prices, at first, in order to build up market share, then raise prices to capture profits from locked-in customers. This investment in market share is profitable in the long run, but costly in the short run. Managers' ability to favor long-term profit maximization at the expense of short-term results may depend on the financial constraints their firms face (e.g., their ability to service debt). The model predicts that a firm's market share will vary over the course of the business cycle depending on the capital structure of the firm itself, the nature of its customers' habit formation, the liquidation value of its assets, and the financial status of its industry rivals. Their model uses regression on the log change of firm sales on (1) four lags of itself, (2) four lags of the log change in PPE, (3) the lagged log of total assets, and (4) the lagged leverage ratio. Logs of sales growth are included to capture the effect of firm-specific factors contributing to product market performance in the recent past; for example, this picks up in the cross-section those (weaker) firms who may be unprofitable prior to the 1990-91 recessions. Change in PPE and total assets are also included in the specification on the grounds that the leverage coefficient may be biased if the model fails to control recent investment spending, which might have been financed with debt, or for the portion of leverage that is explained by a higher borrowing capacity. They focus in on the sensitivity of sales growth to lagged leverage, that is, on the residual correlation between debt and performance, after controls for a firm's past performance, capital-intensity, and size are imposed.

CHAPTER III
DATA AND METHODOLOGY

This thematic paper studies the interaction between financial structure and business performance looking at data from a large cross-section of industries over a number of years, as opposed to exploring stylized industry/time settings. All firm-level data are from SET (Stock Exchange of Thailand) over the 1980–2009 periods. Observations from all listed companies, data were obtained only from those firm-years with valid information on total assets, long-term debt, and sales. The criterion for the industry selected is at least ten firms in each year. The firms in Banking, Insurance and Finance industry were specially sorted, as the debt ratio of these industries was abnormally large.

Proxies for business performance and capital structure in examining the link between business performance and capital structure, business performance is measured by sales growth, stock returns, and changes in operating income relative to industry averages (Opler and Titman, 1994). Sales growth is the most direct measure of customer-driven losses in sales. For stock return, it was stated that "stock returns of more highly leveraged firms are more sensitive to economic stimulus, so we expect a negative relation between leverage and stock returns during downturns even under the null hypothesis of leverage irrelevancy". In contrast, operating income does not share this property (since looking at EBIT). However, unlike stock returns and sales growth, this variable can be manipulated by a firm in some situations like financial distress. In particular, some of the financially distressed (i.e., highly leveraged) firms may manipulate their accounting policies to temporarily increase operating income to avoid technical defaults. This would bias operating incomes upwards for distressed firms, making it less likely that they would reflect financial stress costs.

Empirical research has often linked price-setting behavior with some aspect of debt financing (see, e.g., Chevalier, 1995), in some settings, pricing decisions may reasonably reflect how a firm's financial status might affect its competitive behavior. More generally, though, firms can implement a number of alternative policies that influence their performance, but that may not be reflected in how they price their products. Examples of such policies are decisions about capital outlays, research and development spending, plant or store location, distribution network, etc. One way to build a practical measure of performance that summarizes information from the combined effects of pricing and other competitive strategies is to look at changes in firms' share of industry sales. In what follows, this study use a firm's relative-to-industry sales growth to gauge its performance (see also Campello, 2003). This is different from most other performance proxies, this measure can be consistently estimated across many industries and periods.

The capital structure proxy used, denoted Leverage (Campello, 2003), is computed as the ratio of long term debt to total assets, all measured at book values. Using ''long-term book leverage'' helps reduce the potential for reverse causality (Causality is the relationship between an event (the cause) and a second event (the effect), where the second event is a consequence of the first.) between performance and capital structure in at least two ways. First, in contrast to market values, long-term book values are less sensitive to capital market assessments about performance in the near future. Second, while leverage changes (e.g., LBOs) are likely to reflect changes in expectations about ensuing outcomes, leverage levels carry the cumulative effect of past financing decisions. This study restricts the sample's debt-to asset distribution to the [0; 1] range. This implies the deletion of firm-years with negative book equity (nearly bankrupt firms) from the sample. For Control variables, in a classical paper, Myers and Majluf (1984) argue that firms with favorable growth prospects will exhaust their internal sources of funds before soliciting outside financing, implying a negative correlation between debt and profitability. In contrast, Jensen (1986) proposes a positive association between profits and leverage, arguing that debt may discipline managerial behavior. Because sales growth is likely to be associated with profitability and debt ratios may correlate with profitability, one must control profitability in any empirical model that gauges the effect of debt on sales performance. In a similar vein, one may argue that capital spending in one period can lead to sales growth in the next, and that investment is more likely to take place under lower debt burdens (Myers, 1977). In this case, the relation between firm sales growth and leverage should account for fixed investment spending. Accordingly, as in previous papers in the product market literature, a firm's Profitability (proxied by operating earnings over assets, Campello, 2003), Investment, and Size (the log of total assets, Campello, 2003) are used as controls in the regressions of sales growth on leverage. Finally, to the extent that a firm's sales performance may be influenced by its sales efforts (e.g., advertising and use of promotions, Campello, 2003) and that those efforts might correlate with financial leverage, one needs to introduce controls for sales-related expenditures in a model designed to capture the association between sales performance and debt. Hence, the baseline sales performance model also includes the sum of advertising expenses, plus sales expenses scaled by total sales as an added control variable (denoted Sell Expenses).

$$\begin{aligned} Sales\ Growth_{i,t} = {} & \\ & \propto + \beta Size_{i,t} + \beta_2 Profitability_{i,t} + \beta_3 Investment_{i,t} \\ & + \beta_4 SellExpense_{i,t} + \beta_5 Leverage_{i,t\,(or\,t-1\,to\,t-3)} + \varepsilon_{i,t} \end{aligned} \qquad (1)$$

In order to purge idiosyncratic effects from the estimation of Campello, 2003 at a low cost, prior to the estimations, all the variables were adjusted by removing their mean industry effects in each year. By adjustment, two benefits are, first, it more safely ascribes relations among the variables of interest to the dynamics of competition in the sample firms' industry-years. The second advantage refers to the interpretation of the estimates. By adjusting observations of a firm's sales growth in this manner, a variable that measures the firm's sales growth relative to that of its industry rivals in a given year was obtained; this roughly gauges a firm's market share growth. Likewise, the average rivals' leverage becomes the means used to measure a firm's indebtedness. To ensure that the empirical industry-year mean represents a reliable measure of centrality, industry validity was required a minimum of ten firms to be represented in each industry-year (Campello, 2003). In gauging the extent to which a firm's financial position differs from that of its industry peers, Leverage is not only adjusted for industry-year mean effects, but also standardized (i.e., z-score) within each industry-year. In other words, it is not the absolute size of the difference from the industry average that matters, but rather the relative size of that deviation (see also Almazan and Molina, 2002; MacKay and Phillips, 2003). The upshot of standardizing deviant behavior is that it generalizes the test of the proposition that debt systematically affects performance across different types of industries at different points in time. Put differently, standardization allows this study to use the same means across different industry environments. Consider, for example, the information that a firm's debt-to-asset ratio deviates by 5% from its industry average.

By standardizing Leverage, again, the number of firm in each industry require a minimum of ten firms to qualify for the final sample and get reliable estimates of the within-industry-year standard deviation of Leverage. This makes z-scores reasonable. However, if the underlying distribution of Leverage ratios within each industry-year is not well behaved (skewness), the requirement might be considered for 30-40 firms (Campello, 2006)

Clearly, that deviation will be relevant if the industry average is just 10% and most firms' debt ratios are distributed within a ±1% band around the 10% average. On the other hand, the same 5% deviation is likely to be uninformative when the industry average leverage is 40% and rivals' debt ratios vary widely around that number. While most previous studies looking at relative-to-rival debt positions they overlook cross-industry differences in debt dispersion, the rescaling approach used here accounts for that property of the data, identifying truly informative deviant behavior.

The descriptive statistics used in the research are mean, standard deviation, and coefficient. The coefficient will be tested statistically. The hypothesis sign is either positive or negative for leverage due to the assumption that managers will be forced to be cost efficient, which finally results in improving business performance or underinvestment respectively (Frydenberg, 2004). Size will also either be a positive or negative sign (Opler and Titman, 1994). Small firms may be more financially weak and more subject to customer-driven and competitor-driven sales losses. On the other hand, larger firms may benefit the most from the discipline of financial distress and may be more subject to manager-driven sales reductions. Profitability is the ratio of operating earnings plus depreciation, the more Profitability the more Sales Growth should be as the firm tend to use internal funds before external funds. Internal funds have less cost than external funds, therefore, it benefits the firm in terms of being unrestricted to more business opportunity and will result in Sales Growth. The hypothesis sign should then be positive. Investment signs should be positive as a result of expanding the PPE. Sales Expenses are also expected to be positive, since managers normally considers advertising and sales expenses as a percentage of sales, and it drives the sales directly. The more spending will result in an improvement of sales performance.

CHAPTER IV
RESULTS

4.1 Reviewing Data Selection

This section reviews raw data from Data Steam as shown in table 4.1. It reports the first raw data obtained using the criteria of firms with primary quotes, equity (instrument type), Active (Status) and Thailand Market Exchange (Market). The Number of industry types is 39 industries; however, using these criteria, Nonequity Investment Instruments were excluded automatically. Therefore 38 industries remain, and the number of firm then increases gradually every year. The first raw data were sorted to leave only firms that had full data of all variables in the period 1995-2009. The criterion was at least ten firms in the industry and excluded firms in the financial sector which are Banks, Financial Services (Sector) and Life Insurance. As a result, the data used for OLS regression are 56 firms and separated into four industries as listed in table 4.2.

Table 4.3 reports summary descriptive statistics for the main variables used in the regression estimations (before industry-year adjustments). The data are collected annually from Data Steam. Firm Size is total assets. Sales Growth is the annual gross sales growth at time t, given by ($Sales_t$ - $Sales_{t-1}$)/$Sales_{t-1}$.Leverage is the ratio of long-term debt to total assets. Profitability is operating earnings plus depreciation over assets. Investment is capital expenditures over assets. SellExpenses is the ratio of advertising and sales expenses to total Assets. The sample period is 1995-2009. Only observations from industry-years containing at least ten firms are used.

All variables report skewness to the left, except Profitability which reports skewness to the right. The average Firm Size is 9,376.27 Million Baht. When separated into two periods; it was found that the first period is lower than the second period. Sales growth mean for overall sample and full period report’s 7.22%, the first period is, in contrast to Firm Size, better than the second period. Leverage overall is

16.74% to Assets and it is greater for the first period. Profitability show 1.56% to Assets and the first period is lower than the second period. Investment report 4.97% to Assets and is greater in the first period. SellExpense is 11.21% to Assets and a bit larger for the first period.

Table 4.1: Number of listed companies in Thailand between 1995-2009

Industry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Alternative Energy	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Automobiles & Parts	**2**	**3**	**4**	**5**	**5**	**7**	**9**	**13**	**14**	**15**	**15**	**15**	**15**	**15**	**15**
Banks	**10**	**10**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**	**11**
Beverages	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Chemicals	**12**	**13**	**15**	**15**	**15**	**17**	**17**	**18**	**23**	**26**	**27**	**28**	**28**	**28**	**28**
Construction & Materials	**11**	**14**	**14**	**14**	**14**	**22**	**23**	**26**	**35**	**38**	**38**	**40**	**40**	**41**	**41**
Electricity	**1**	**1**	**1**	**1**	**2**	**3**	**3**	**4**	**5**	**5**	**5**	**5**	**5**	**5**	**5**
Electronic & Electrical Equipm	**3**	**4**	**4**	**4**	**5**	**8**	**10**	**11**	**11**	**14**	**14**	**14**	**15**	**15**	**15**
Financial Services (Sector)	**8**	**11**	**10**	**10**	**11**	**14**	**20**	**26**	**34**	**35**	**35**	**35**	**35**	**35**	**35**
Fixed Line Telecommunications	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**
Food & Drug Retailers	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**2**	**2**
Food Producers	**22**	**22**	**23**	**23**	**23**	**32**	**33**	**34**	**35**	**36**	**36**	**36**	**36**	**36**	**36**
Forestry & Paper	**0**	**0**	**0**	**0**	**0**	**2**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**
Gas, Water & Multiutilities	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**2**	**2**	**1**	**2**
General Industrials	**4**	**4**	**5**	**5**	**5**	**5**	**6**	**7**	**8**	**8**	**8**	**8**	**8**	**8**	**8**
General Retailers	**4**	**5**	**5**	**5**	**5**	**9**	**12**	**12**	**14**	**14**	**14**	**14**	**14**	**14**	**14**
Health Care Equipment & Servic	**6**	**6**	**8**	**8**	**8**	**12**	**13**	**13**	**14**	**16**	**16**	**16**	**16**	**16**	**16**
Household Goods & Home Constru	**9**	**9**	**10**	**10**	**10**	**12**	**13**	**13**	**16**	**17**	**17**	**17**	**17**	**17**	**17**
Industrial Engineering	**2**	**2**	**3**	**3**	**3**	**8**	**8**	**10**	**14**	**15**	**16**	**16**	**17**	**17**	**17**
Industrial Metals & Mining	**5**	**5**	**5**	**5**	**5**	**9**	**10**	**19**	**26**	**29**	**29**	**31**	**31**	**31**	**31**
Industrial Transportation	**5**	**5**	**5**	**5**	**5**	**6**	**7**	**8**	**10**	**10**	**10**	**10**	**10**	**10**	**10**
Leisure Goods	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**2**	**2**	**2**	**2**	**2**
Life Insurance	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**
Media	**6**	**7**	**8**	**8**	**8**	**13**	**15**	**20**	**23**	**23**	**24**	**24**	**24**	**24**	**24**
Mining	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**5**	**5**	**5**	**5**	**5**
Mobile Telecommunications	**3**	**3**	**3**	**3**	**3**	**4**	**4**	**5**	**5**	**6**	**6**	**6**	**6**	**6**	**6**
Nonlife Insurance	**9**	**10**	**13**	**13**	**14**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**	**15**
Oil & Gas Producers	**2**	**2**	**2**	**2**	**2**	**4**	**4**	**5**	**5**	**5**	**7**	**7**	**8**	**8**	**8**
Oil Equipment & Services	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**
Personal Goods	**19**	**19**	**21**	**21**	**21**	**27**	**27**	**27**	**28**	**28**	**29**	**30**	**30**	**30**	**31**
Pharmaceuticals &	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**

Table 4.1: Number of listed companies in Thailand between 1995-2009 "Cont."

Industry	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Biotechnolog															
Real Estate Investment & Servi	14	15	16	16	17	28	30	34	37	39	40	40	40	40	41
Real Estate Investment Trusts	0	0	0	0	0	0	0	0	0	2	7	9	5	5	5
Software & Computer Services	1	1	1	1	1	1	2	6	6	7	7	8	8	8	8
Support Services	2	3	5	5	5	8	9	10	14	16	16	16	16	16	16
Technology Hardware & Equipmen	4	4	4	4	4	6	7	9	12	13	13	13	13	13	13
Travel & Leisure	9	9	9	10	12	14	15	16	19	20	20	20	20	20	20
Unclassified	0	0	0	0	0	0	0	1	1	2	1	1	1	1	1
Grand Total	181	195	214	216	223	307	336	386	452	484	497	507	506	506	510

Number of Industry	29	29	30	30	30	32	33	34	36	37	37	38	38	38	38

Table 4.2: Selected Listed Companies separated into four industries.

Chemicals (12 Firms)	Food Producer (18 Firms)	Personal Goods (16 Firms)	Real Estate & Investment Service (10 Firms)
1. AJ PLAST	1. CHAROEN POKPHAND FOODS	1. ASIA FIBER	1. BANGKOK LAND
2. NEP REALTY & IND.	2. CHUMPORN PALM OIL IND.	2. BANGKOK NYLON	2. HEMARAJ LAND AND DEV.
3. SRITHAI SUPERWARE	3. FOOD AND DRINKS	3. CASTLE PEAK HOLDINGS	3. KRISDA MAHANAKORN
4. THAI CARBON BLACK	4. GFPT	4. CHAI WATANA TANNERY	4. NATURAL PARK
5. THAI CENTRAL CHM.	5. KUANG PEI SAN FOOD PRDS.	5. LUCKYTEX (THAILAND)	5. MDX
6. IRPC	6. MALEE SAMPRAN	6. PEOPLE'S GARMENT	6. PROPERTY PERFECT
7. THAI FILM INDUSTRY	7. PAKFOOD	7. PRANDA JEWELRY	7. QUALITY HOUSES
8. THAI PLASTIC CHM.	8. PRESIDENT RICE PRODUCTS	8. SAHA PATHANAPIBUL	8. SAMMAKORN
9. VINYTHAI	9. S KHONKAEN FOODS	9. SAHA-UNION	9. BTS GROUP HDG.
10. UNIVENTURES	10. ETERNAL ENERGY	10. SAWANG EXPORT	10. THAI FACTORY DEV.
11. WHITE GROUP	11. SEAFRESH INDUSTRY	11. TEXTILE PRESTIGE	
12. YONG THAI	12. SURAPON FOODS	12. THAI NAM PLASTICS	
	13. THAI PRESIDENT FOODS	13. THAI RAYON	
	14. THAI VEGETABLE OIL	14. THAI TORAY TEXTILE	
	15. UNIVERSAL STARCH	15. THAI WACOAL	
	16. THAI-DENMARK SW BR	16. TTL INDUSTRIES	
	17. TROPICAL CANNING		
	18. UNITED FLOUR MILL		

Table 4.2: Selected Listed Companies separated into four industries.(Cont.)

Chemicals (12 Firms)	**Food Producer (18 Firms)**	**Personal Goods (16 Firms)**	**Real Estate & Investment Service (10 Firms)**
13. AJ PLAST	19. CHAROEN POKPHAND FOODS	17. ASIA FIBER	11. BANGKOK LAND
14. NEP REALTY & IND.	20. CHUMPORN PALM OIL IND.	18. BANGKOK NYLON	12. HEMARAJ LAND AND DEV.
15. SRITHAI SUPERWARE	21. FOOD AND DRINKS	19. CASTLE PEAK HOLDINGS	13. KRISDA MAHANAKORN
16. THAI CARBON BLACK	22. GFPT	20. CHAI WATANA TANNERY	14. NATURAL PARK
17. THAI CENTRAL CHM.	23. KUANG PEI SAN FOOD PRDS.	21. LUCKYTEX (THAILAND)	15. MDX
18. IRPC	24. MALEE SAMPRAN	22. PEOPLE'S GARMENT	16. PROPERTY PERFECT
19. THAI FILM INDUSTRY	25. PAKFOOD	23. PRANDA JEWELRY	17. QUALITY HOUSES
20. THAI PLASTIC CHM.	26. PRESIDENT RICE PRODUCTS	24. SAHA PATHANAPIBUL	18. SAMMAKORN
21. VINYTHAI	27. S KHONKAEN FOODS	25. SAHA-UNION	19. BTS GROUP HDG.
22. UNIVENTURES	28. ETERNAL ENERGY	26. SAWANG EXPORT	20. THAI FACTORY DEV.
23. WHITE GROUP	29. SEAFRESH INDUSTRY	27. TEXTILE PRESTIGE	
24. YONG THAI	30. SURAPON FOODS	28. THAI NAM PLASTICS	
	31. THAI PRESIDENT FOODS	29. THAI RAYON	
	32. THAI VEGETABLE OIL	30. THAI TORAY TEXTILE	
	33. UNIVERSAL STARCH	31. THAI WACOAL	
	34. THAI-DENMARK SW BR	32. TTL INDUSTRIES	
	35. TROPICAL CANNING		
	36. UNITED FLOUR MILL		

Table 4.2: Selected Listed Companies separated into four industries.(Cont.)

Chemicals (12 Firms)	Food Producer (18 Firms)	Personal Goods (16 Firms)	Real Estate & Investment Service (10 Firms)
25. AJ PLAST	37. CHAROEN POKPHAND FOODS	33. ASIA FIBER	21. BANGKOK LAND
26. NEP REALTY & IND.	38. CHUMPORN PALM OIL IND.	34. BANGKOK NYLON	22. HEMARAJ LAND AND DEV.
27. SRITHAI SUPERWARE	39. FOOD AND DRINKS	35. CASTLE PEAK HOLDINGS	23. KRISDA MAHANAKORN
28. THAI CARBON BLACK	40. GFPT	36. CHAI WATANA TANNERY	24. NATURAL PARK
29. THAI CENTRAL CHM.	41. KUANG PEI SAN FOOD PRDS.	37. LUCKYTEX (THAILAND)	25. MDX
30. IRPC	42. MALEE SAMPRAN	38. PEOPLE'S GARMENT	26. PROPERTY PERFECT
31. THAI FILM INDUSTRY	43. PAKFOOD	39. PRANDA JEWELRY	27. QUALITY HOUSES
32. THAI PLASTIC CHM.	44. PRESIDENT RICE PRODUCTS	40. SAHA PATHANAPIBUL	28. SAMMAKORN
33. VINYTHAI	45. S KHONKAEN FOODS	41. SAHA-UNION	29. BTS GROUP HDG.
34. UNIVENTURES	46. ETERNAL ENERGY	42. SAWANG EXPORT	30. THAI FACTORY DEV.
35. WHITE GROUP	47. SEAFRESH INDUSTRY	43. TEXTILE PRESTIGE	
36. YONG THAI	48. SURAPON FOODS	44. THAI NAM PLASTICS	
	49. THAI PRESIDENT FOODS	45. THAI RAYON	
	50. THAI VEGETABLE OIL	46. THAI TORAY TEXTILE	
	51. UNIVERSAL STARCH	47. THAI WACOAL	
	52. THAI-DENMARK SW BR	48. TTL INDUSTRIES	
	53. TROPICAL CANNING		
	54. UNITED FLOUR MILL		

Table 4.3 Descriptive statistics overall sample

Overall Sample Full Period	**Mean**	**Median**	**Std.Dev.**	**Pct.**25**	**Pct.**75**	**N. Obs***
Size (฿ Millions)	9,376.27	2,576.41	21,594.20	1,336.30	7,180.80	840
Sales Growth	0.0722	0.0463	0.3886	-0.0661	0.1736	840
Leverage	0.1674	0.0656	0.4506	0.0000	0.2261	840
Profitability	0.0156	0.0340	0.3335	-0.0095	0.0787	840
Investment	0.0497	0.0189	0.2681	0.0048	0.0520	840
SellExpenses	0.1121	0.0864	0.1574	0.0568	0.1251	840
Period 1: 1995-2002	**Mean**	**Median**	**Std.Dev.**	**Pct.**25**	**Pct.**75**	**N. Obs***
Size (฿ Millions)	9,014.52	2,476.79	21,370.80	1,254.29	7,011.52	448
Sales Growth	0.0892	0.0543	0.4616	-0.0607	0.1820	448
Leverage	0.2035	0.0925	0.5721	0.0012	0.2785	448
Profitability	0.0054	0.0314	0.4462	-0.0190	0.0756	448
Investment	0.0588	0.0197	0.3629	0.0060	0.0505	448
SellExpenses	0.1151	0.0867	0.2031	0.0527	0.1276	448
Period 2: 2003-2009	**Mean**	**Median**	**Std.Dev.**	**Pct.**25**	**Pct.**75**	**N. Obs***
Size (฿ Millions)	9,789.69	2,965.94	21,866.73	1,444.80	7,268.03	392
Sales Growth	0.0529	0.0428	0.2825	-0.0700	0.1596	392
Leverage	0.1261	0.0365	0.2414	0.0000	0.1516	392
Profitability	0.0273	0.0361	0.1041	0.0022	0.0827	392
Investment	0.0392	0.0177	0.0592	0.0036	0.0523	392
SellExpenses	0.1087	0.0859	0.0773	0.0603	0.1202	392

* N. Obs = number of observations
** Pct. = Percentile

Table 4.4 report data in each industry Firm Size. Rankings from highest to lowest are Chemical Industry, Real Estate, Food Producers and Personal Goods. Sales Growth in Real Estate was highest, then Chemicals, Food Producer and Personal Goods. Leverage of four industries report the same with Sales Growth, which is highest in Real Estate then Chemicals, Food Producers and Personal Goods. Profitability and Investment is no different for Chemicals, Food Producer and Personal Goods. Only Real Estate report minus profitability. SellExpenses is highest for Food Producers, the second is Personal Goods, third is Real Estate and Chemicals the last.

Table 4.4 Descriptive statistics separated into four industries

Chemicals Industry	**Mean**	**Median**	**Std.Dev.**	**Pct.25**	**Pct.75**	**N. Obs***
Size (฿ Millions)	16,759.13	5,647.40	37,098.03	1,362.36	11,608.01	180
Sales Growth	0.0966	0.0770	0.2365	-0.0364	0.2020	180
Leverage	0.1778	0.1180	0.1963	0.0008	0.2936	180
Profitability	0.0343	0.0374	0.0800	0.0060	0.0838	180
Investment	0.0412	0.0134	0.0677	0.0051	0.0468	180
SellExpenses	0.0797	0.0815	0.0301	0.0543	0.0991	180

Food Producer	**Mean**	**Median**	**Std.Dev.**	**Pct.25**	**Pct.75**	**N. Obs***
Size (฿ Millions)	5,877.17	2,095.86	15,775.29	1,124.53	3,524.03	270
Sales Growth	0.0763	0.0632	0.2113	-0.0460	0.1934	270
Leverage	0.1520	0.0502	0.2870	0.0048	0.1676	270
Profitability	0.0350	0.0428	0.1073	0.0007	0.0933	270
Investment	0.0491	0.0314	0.0575	0.0080	0.0637	270
SellExpenses	0.1360	0.1140	0.0835	0.0776	0.1631	270

Personal Goods	**Mean**	**Median**	**Std.Dev.**	**Pct.25**	**Pct.75**	**N. Obs***
Size (฿ Millions)	3,733.02	1,732.83	4,666.10	1,218.67	4,628.68	240
Sales Growth	0.0156	0.0199	0.1457	-0.0581	0.0895	240
Leverage	0.0631	0.0000	0.1195	0.0000	0.0691	240

Table 4.4 Descriptive statistics separated into four industries (Cont.)

Chemicals Industry	**Mean**	**Median**	**Std.Dev.**	**Pct.25**	**Pct.75**	**N. Obs***
Profitability	0.0358	0.0426	0.0691	0.0032	0.0810	240
Investment	0.0371	0.0219	0.0418	0.0077	0.0544	240
SellExpenses	0.1181	0.0963	0.0706	0.0677	0.1407	240

Real Estate	**Mean**	**Median**	**Std.Dev.**	**Pct.25**	**Pct.75**	**N. Obs***
Size (฿ Millions)	15,844.39	9,678.78	17,513.15	3,585.34	19,239.63	150
Sales Growth	0.1264	0.0448	0.8123	-0.2973	0.3854	150
Leverage	0.3492	0.2441	0.9349	0.1184	0.3437	150
Profitability	-0.0741	0.0068	0.7619	-0.0785	0.0425	150
Investment	0.0811	0.0043	0.6238	0.0011	0.0182	150
SellExpenses	0.0985	0.0466	0.3395	0.0293	0.0683	150

* N. Obs = number of observations

4.2 OLS results

This section examines OLS regressions that predict sales growth as a function of firm size, Leverage, Profitability, investment and SellExpense.

Using OLS regressions for the full period and all firms, Table 4.5 reports result and are statistically significant at 5% and 1%. Four models of OLS regression used the same year of leverage for model 1, 1-year lagged leverage for model 2, 2-year lagged for model 3 and 3-year lagged for model 4. As shown in table 5, only model 1-3 can predict mean industry-adjusted Sales Growth (P-values of F-test are 0.0392, 0.0277, and 0.0297 respectively).

Table 4.5 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 1995 to 2009 Period

Dep.Var.: Sales Growth$_t$	**Model 1** **Leverage$_t$**	**Model 2** **Leverage$_{t-1}$**	**Model 3** **Leverage$_{t-2}$**	**Model 4** **Leverage$_{t-3}$**
Size$_t$	0.0134	0.0158	0.0161	0.0151
t	(1.25)	(1.5)	(1.46)	(1.3)
Profitability$_t$	0.1061*	0.1014*	0.0960*	0.0857*
	(2.42)	(2.43)	(2.26)	(1.97)
Investment$_t$	0.1278	0.1123	0.1206	0.0934
	(1.73)	(1.59)	(1.66)	(1.26)
SellEx$_t$	-0.2685*	-0.2441*	-0.2728*	-0.2410
	(-2.13)	(-2.02)	(-2.21)	(-1.9)
Leverage$_t$	0.0078			
	(0.59)			
Leverage$_{t-1}$		-0.0142		
		(-1.1)		
Leverage$_{t-2}$			-0.0148	
			(-1.09)	
Leverage$_{t-3}$				-0.0121
				(-0.85)
R_2	0.0139	0.016	0.017	0.0142
Adjusted-R_2	0.008	0.0097	0.0102	0.0068
Prob > F	0.0392	0.0277	0.0297	0.0893
Number of Observations	840	784	728	672

** Significant at the 1 percent level.

* Significant at the 5 percent level.

Looking into each variable, all models report a statistically significant 5% in Profitability, and SellExpenses (only model 1, 2 and 3). Profitability's coefficient reports positive sign and the more lagged to leverage the less relative to Sales Growth. SellExpenses' coefficient, however, have highly negative relationship to Sales Growth.

4.3 Robustness Check

To see consistency in the model over a long time period, data were separated into two time periods which are 1995-2002 and 2003-2009. Table 4.6 and 4.7 report robustness checking, the first period (1995-2002) have no significance for all models and all variables.

Table 4.6 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 1995 to 2002 Period

Dep.Var.: Sales Growth$_t$	**Model 1** Leverage$_t$	**Model 2** Leverage$_{t-1}$	**Model 3** Leverage$_{t-2}$	**Model 4** Leverage$_{t-3}$
Size$_t$	0.0063	0.0134	0.0078	0.0067
T	(0.34)	(0.71)	(0.37)	(0.27)
Profitability$_t$	0.0910	0.0905	0.0826	0.0691
	(1.61)	(1.66)	(1.45)	(1.13)
Investment$_t$	0.1462	0.1327	0.1383	0.1071
	(1.44)	(1.36)	(1.31)	(0.97)
SellEx$_t$	-0.3157	-0.2704	-0.3212	-0.2828
	(-1.73)	(-1.54)	(-1.72)	(-1.41)
Leverage$_t$	0.0084			
	(0.38)			
Leverage$_{t-1}$		-0.0335		
		(-1.46)		
Leverage$_{t-2}$			-0.0103	
			(-0.39)	
Leverage$_{t-3}$				-0.0178
				(-0.58)
R_2	0.0106	0.0164	0.0128	0.0107
Adjusted-R_2	-0.0006	0.0037	-0.0022	-0.0073
Prob > F	0.4507	0.2674	0.5108	0.7052
Number of Observations	448	392	336	280

** Significant at the 1 percent level.

* Significant at the 5 percent level.

The second period (2003-2009), in contrast, reports very good F-test with zero value for all models. The second period report that Profitability also is significant (1%) for all model and has a positive relation to Sales Growth. However, compared to the main model in the previous section, SellExpense have no significance any more.

Table 4.7 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the year 2003 to 2009 Period

Dep.Var.: Sales Growth$_t$	**Model 1 Leverage$_t$**	**Model 2 Leverage$_{t-1}$**	**Model 3 Leverage$_{t-2}$**	**Model 4 Leverage$_{t-3}$**
Size$_t$	0.0103	0.0061	0.0066	0.0108
t	(0.95)	(0.53)	(0.55)	(0.82)
Profitability$_t$	0.6336**	0.7603**	0.6903**	0.6902**
	(4.68)	(5.49)	(5.05)	(4.63)
Investment$_t$	-0.2359	-0.0164	-0.0422	-0.0419
	(-1.03)	(-0.06)	(-0.12)	(-0.1)
SellEx$_t$	0.0052	0.0434	-0.0623	-0.2567
	(0.03)	(0.23)	(-0.32)	(-1.16)
Leverage$_t$	0.0173			
	(1.31)			
Leverage$_{t-1}$		0.0169		
		(1.21)		
Leverage$_{t-2}$			-0.0088	
			(-0.61)	
Leverage$_{t-3}$				-0.0111
				(-0.7)
R_2	0.0701	0.1015	0.1108	0.1276
Adjusted-R_2	0.0581	0.0878	0.0946	0.1076
Prob > F	0	0	0	0
Number of Observations	392	336	280	224

** Significant at the 1 percent level.

* Significant at the 5 percent level.

4.4 OLS result for within the industry

The study then tests for within the industry, the results are shown in table 4.8-11.

Table 4.8 report OLS results for the Chemicals Industry for the full period 1995-2009.Model 1-4 can explain the relationship between explanatory variables and predicted variables. However, not all of the independent variables can be explained. For Leverage only 3-year lagged Leverage and 2-year lagged leverage are significant and with 1% and 5% respectively. For Firm Size, its report is significant for all models. The negative sign of 3-year lagged coefficient state a negative relationship to Sales Growth. The more the Debt Ratio, the less Sales Growth a firm obtains. Firm Size and Sales Growth are related in the same direction.

Table 4.8 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 2003 to 2009 Period: Chemicals Industry

Dep.Var.: Sales Growth$_t$	**Model 1 Leverage$_t$**	**Model 2 Leverage$_{t-1}$**	**Model 3 Leverage$_{t-2}$**	**Model 4 Leverage$_{t-3}$**
Size$_t$	0.0240*	0.0287**	0.0336**	0.0338**
T	(2.31)	(2.89)	(3.36)	(3.54)
Profitability$_t$	0.6192**	0.5944**	0.5402**	0.2544
	(2.88)	(2.94)	(2.68)	(1.31)
Investment$_t$	0.0147	-0.1970	-0.0495	-0.1274
	(0.06)	(-0.79)	(-0.19)	(-0.51)
SellEx$_t$	-0.9812	-1.0933*	-1.2628*	-1.3403*
	(-1.75)	(-2.02)	(-2.29)	(-2.59)
Leverage$_t$	0.0010			
	(0.06)			
Leverage$_{t-1}$		-0.0182		
		(-1.11)		
Leverage$_{t-2}$			-0.0422*	
			(-2.55)	
Leverage$_{t-3}$				-0.0455**
				(-2.88)
R_2	0.1369	0.154	0.1845	0.188
Adjusted-R_2	0.1121	0.1279	0.1573	0.1585
Prob > F	0.0001	0	0	0
Number of Observations	180	168	156	144

** Significant at the 1 percent level.

* Significant at the 5 percent level.

Table 4.9 show results for Food Producers, even the models seem to be good, significant at 1%, but any variable can explain Sales Growth.

Table 4.9 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 2003 to 2009 Period: Food Producer Industry

Dep.Var.: Sales Growth$_t$	**Model 1** **Leverage$_t$**	**Model 2** **Leverage$_{t-1}$**	**Model 3** **Leverage$_{t-2}$**	**Model 4** **Leverage$_{t-3}$**
Size$_t$	0.0202	0.0183	0.0196	0.0213
t	(0.067)	(0.109)	(0.094)	(0.067)
Profitability$_t$	0.6412	0.6295	0.5375	0.5038
	(0)	(0)	(0)	(0)
Investment$_t$	0.5191	0.6190	0.4391	0.3527
	(0.02)	(0.01)	(0.104)	(0.185)
SellEx$_t$	0.3546	0.3018	0.1686	0.2187
	(0.021)	(0.054)	(0.29)	(0.162)
Leverage$_t$	0.0179			
	(0.148)			
Leverage$_{t-1}$		0.0179		
		(0.162)		
Leverage$_{t-2}$			0.0114	
			(0.379)	
Leverage$_{t-3}$				0.0094
				(0.463)
R_2	0.16	0.1675	0.1268	0.1224
Adjusted-R_2	0.1441	0.1506	0.1077	0.1015
Prob > F	0	0	0	0
Number of Observations	270	252	234	216

** Significant at the 1 percent level.

* Significant at the 5 percent level.

Table 4.10, Personal Goods, is similar to table 4.9, a good model but no explanatory variable is valid.

Table 4.10 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 2003 to 2009 Period: Personal Goods Industry

Dep.Var.: Sales Growth$_t$	**Model 1**	**Model 2**	**Model 3**	**Model 4**
	Leverage$_t$	**Leverage$_{t-1}$**	**Leverage$_{t-2}$**	**Leverage$_{t-3}$**
Size$_t$	0.0142	0.0124	0.0124	0.0105
t	(0.075)	(0.136)	(0.157)	(0.235)
Profitability$_t$	0.5602	0.6150	0.6152	0.6619
	(0)	(0)	(0)	(0)
Investment$_t$	0.0073	0.0001	-0.0690	-0.1008
	(0.972)	(1)	(0.773)	(0.679)
SellEx$_t$	0.2600	0.2321	0.2204	0.2585
	(0.02)	(0.043)	(0.067)	(0.031)
Leverage$_t$	0.0013			
	(0.876)			
Leverage$_{t-1}$		0.0000		
		(0.997)		
Leverage$_{t-2}$			0.0000	
			(0.999)	
Leverage$_{t-3}$				-0.0060
				(0.507)
R_2	0.1322	0.1405	0.1366	0.1634
Adjusted-R_2	0.1137	0.1208	0.1153	0.1409
Prob > F	0	0	0	0
Number of Observations	240	224	208	192

** Significant at the 1 percent level.

* Significant at the 5 percent level.

Model 1-4 in Real Estate cannot be represented.

Table 4.11 OLS Regressions Predicting Mean Industry-Adjusted Sales Growth in the years 2003 to 2009 Period: Real Estate Industry

Dep.Var.: Sales Growth$_t$	**Model 1** **Leverage$_t$**	**Model 2** **Leverage$_{t-1}$**	**Model 3** **Leverage$_{t-2}$**	**Model 4** **Leverage$_{t-3}$**
Size$_t$	-0.0502	-0.0388	-0.0458	-0.0566
t	(0.392)	(0.506)	(0.457)	(0.387)
Profitability$_t$	0.1230	0.1047	0.1018	0.1029
	(0.251)	(0.299)	(0.32)	(0.334)
Investment$_t$	0.2486	0.1544	0.1681	0.1542
	(0.23)	(0.408)	(0.385)	(0.435)
SellEx$_t$	-0.6185	-0.4135	-0.4626	-0.4642
	(0.112)	(0.256)	(0.195)	(0.212)
Leverage$_t$	0.0831			
	(0.244)			
Leverage$_{t-1}$		-0.0308		
		(0.679)		
Leverage$_{t-2}$			-0.0238	
			(0.751)	
Leverage$_{t-3}$				0.0025
				(0.974)
R$_2$	0.0229	0.0173	0.0185	0.0182
Adjusted-R$_2$	-0.0111	-0.0194	-0.0211	-0.0249
Prob > F	0.6441	0.7965	0.8002	0.8327
Number of Observations	150	140	130	120

** Significant at the 1 percent level.

* Significant at the 5 percent level.

4.5 Assumption Check

The study also tests the assumption check for multicollinearity, and Auto correlation. The result is shown in table 4.12. It was found that all models from 0-year leverage to 3-year leverage have no multicollinearity with a VIF below 10 for all variables, and have no auto correlation as checked by the Durbin-Watson which reports a result of almost two. For the normality test, refer to the law of large numbers, 840 data assume normal distribution.

Table 4.12: Assumption Check

OLS Model full period all firms	VIF	Durbin-Watson	Remark
OLS Model 1: Leverage$_t$		2.2	No problem
Size$_t$	1.1		No problem
Profitability$_t$	1.2		No problem
Investment$_t$	2.3		No problem
SellEx$_t$	2.3		No problem
Leverage$_t$	1		No problem
OLS Model 2: Leverage$_{t-1}$		2.19	No problem
Size$_t$	1.1		No problem
Profitability$_t$	1.2		No problem
Investment$_t$	2.3		No problem
SellEx$_t$	2.4		No problem
Leverage$_t$	1		No problem
OLS Model 3: Leverage$_{t-2}$		2.19	No problem
Size$_t$	1.1		No problem
Profitability$_t$	1.2		No problem
Investment$_t$	2.4		No problem
SellEx$_t$	2.4		No problem
Leverage$_t$	1		No problem
OLS Model 4: Leverage$_{t-3}$		2.21	No problem
Size$_t$	1.1		No problem
Profitability$_t$	1.2		No problem
Investment$_t$	2.4		No problem
SellEx$_t$	2.4		No problem
Leverage$_t$	1		No problem

CHAPTER V
CONCLUSION

The Thailand Stock Market interplay between Business Performance and Debt Ratio follows the model of Campello (2003). However, the different sources cannot be represented with the exact model obtained. Only the variables used follow the model, but spine and dummy variables of Leverage were excluded. Instead, this thematic paper use lagged leverage from 0-year to 3 years, and separates the models into two periods and into each industry to check robustness.

OLS result from table 4.5 valid only for Model 1-3, and only Profitability and SellExpense are statistically significant at 5%. The positive sign of Profitability imply that the more profitability the more the sales growth. Since the variable is the deviation from industry mean, the more profitability above industry mean also affect Sales Growth in a positive way. In contrast, the under industry mean profitability will impact Sales Growth drops. Sell Expense, on the other hand, appear as negative signs. The more the SellExpense the less the Sales Growth obtained. The more above SellExpense move away from the mean they affect a firm's performance in the opposite direction and vice versa. And there is no relation between Sales Growth and Leverage. This implies that managers should make decisions concerning SellExpense and Profitability in order to strengthen business performance.

Looking at each period in table 6 and 7, even the first period cannot use this model to represent it, but the second period is used. Profitability, a positive sign, is still significant with 1%, which is less than the full period. This still suggests that managers consider managing profitability to improve business performance.

Table 4.8-4.11 reports results from the OLS full period, but are separated into four industries. Only the chemicals industry reports valid for the model with a p-value for the F-test at zero. The variables that are valid from this industry are Size, Profitability (exclude model 4), SellExpense (exclude model 1), 2-year leverage lagged (model 3), and 3-year leverage lagged (model 4). Based on this result, managers can use the result of model 3 because it has most variables valid. Again the model suggests Profitability should be considered in order to improve Sales Growth.

Since Profitability, which represent the relationship to Sales Growth for almost all models, is the ratio of operating earnings plus depreciation, therefore, to improve Business Performance, Managers should consider the operations of the firm. The operation of the firm can be improved in various ways according to the characteristics of the firm and industry. SellExpense is the second priority factor that should be considered, as it is still significant. The SellExpense is the ratio of advertising and sales expenses to total assets. The negative sign of the coefficient indicates an opposite direction to Sales Growth. However, the effectiveness of advertising and sales expenses should be considered more than just reducing them.

As the objective of this thematic paper is to find the relationship between Debt Ratio and Business Performance. The result shows the significance for models in the Chemicals industry only and with 2- and 3-year lagged leverage. The relationship of Sales Growth and Leverage in the past year implies a long run relationship to business performance. In other words, the manager will see the results of leverage decisions not in a year or two years but longer. Leverage is not just to remove the industry year mean, but also to standardize it. The purpose is to see variations across industry, since the leverage is significant only to Chemicals. The study interprets this only from the industry mean. Leverage with both negative sign in model 3 and 4, imply opposite direction to Sales Growth. Leverage that under industry mean then result in increasing of firm performance.

According to the result, this thematic paper therefore contributes to managers in Chemicals industry the most and in concerns about the Size, Profitability, Selling Expense, and Leverages for 2-year lagged factors. For other businesses not in Chemicals industry they should consider the business' characteristics whether they are similar or not to the Chemicals industry before using the model.

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