

The Determinants of Sticky Cost Behavior: A Structural Equation Modeling Approach

Nuchjaree Pichetkun*

Panarat Panmanee, Ph.D.**

บทคัดย่อ

การงานวิจัยนี้ศึกษาปัจจัยในการกำหนดพฤติกรรมต้นทุนที่ไม่สมมาตรของบริษัทจดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทยโดยวิธีโมเดลสมการโครงสร้าง โปรแกรมที่นำมาใช้ในการพัฒนาตัวแบบพฤติกรรมต้นทุนคือ โปรแกรม AMOS (Analysis of Moment Structures) ซึ่งได้นำมาใช้ในการสร้างโมเดลการวัด เพื่อยืนยันตัวแปรแฝงของตัวแบบพฤติกรรมต้นทุนด้วยวิธีการวิเคราะห์ปัจจัยเชิงยืนยัน ผลการวิเคราะห์แสดงให้เห็นว่าโมเดลการวัดที่ได้มีคุณสมบัติเหมาะสมดี นอกจากนี้การวิเคราะห์ปัจจัยเชิงสำรวจและการวิเคราะห์ถดถอยพบว่าคุณได้นำมาใช้เพื่อกำหนดปัจจัยที่ทำให้เกิดความไม่สมมาตรของต้นทุน ผลการวิจัยพบว่า ต้นทุนในการปรับตัวและต้นทุนตัวแทนมีผลทำให้ระดับความไม่สมมาตรของต้นทุนเพิ่มขึ้น ในขณะที่ต้นทุนทางการเมืองและบริษัทภิบาลมีผลทำให้ระดับความไม่สมมาตรของต้นทุนลดลง ผลที่ได้จากการศึกษานี้จะมีประโยชน์ต่อผู้บริหารทำให้มีความเข้าใจมากขึ้นเกี่ยวกับพฤติกรรมต้นทุนซึ่งเป็นเรื่องที่มีความสำคัญต่อผู้บริหารสำหรับการวางแผน การควบคุมและ

* Assistant Professor of Accounting and Finance Department,
Faculty of Business Administration at Rajamangala University of Technology Thanyaburi

** Associate Professor of Accounting and Finance Department,
Faculty of Business Administration at Rajamangala University of Technology Thanyaburi

การกำหนดแนวทางลดต้นทุน นอกจากนี้ผลการศึกษายังเป็นประโยชน์ต่อผู้ลงทุนและนักวิเคราะห์ทางการเงินให้เข้าใจพฤติกรรมของผู้บริหารซึ่งเป็นข้อมูลที่สำคัญในการตัดสินใจลงทุน แต่ข้อมูลดังกล่าวไม่ได้เปิดเผยไว้ในรายงานทางการเงินของบริษัทจดทะเบียน

คำสำคัญ: พฤติกรรมต้นทุนที่ไม่สมมาตร พฤติกรรมต้นทุนยืดหยุ่นที่ไม่สม่ำเสมอ วิธีโมเดลสมการโครงสร้าง ต้นทุนการปรับตัว ต้นทุนทางการเมือง ต้นทุนตัวแทน บรรษัทภิบาล

ABSTRACT

This study aimed to investigate the determinants of sticky cost behavior of Thai listed companies by using the structural equation modeling (SEM) approach. In order to obtain the good-fit cost behavior model, AMOS (Analysis of Moment Structures) program was used to construct the measurement models to confirm the latent variables of cost behavior model through the confirmatory factor analysis (CFA). The results indicated that the measurement models were good-fit models. The exploratory factor analysis (EFA) and multiple regression analysis were utilized to specify the determinants of cost stickiness. The results showed that adjustment costs and agency costs are positively associated with the degree of cost stickiness, but political costs and corporate governance are negatively associated with the degree of cost stickiness. These findings will contribute to management for understanding cost behavior which is critical to managers for planning, controlling and reducing costs. In addition, the result of this study will also contribute to investors and financial analysts for understanding managers' behavior, which is useful information in making the investment decisions. However, it is not disclosed in financial reports.

Keywords: Sticky Cost Behavior, Asymmetrical Cost Behavior, Structural Equation Modeling, Adjustment Costs, Political Costs, Agency Costs, Corporate Governance

1. Introduction

The more the international competition increases, the more managers need cost management information. Managers are interested in estimating past cost behavior patterns, since this information can help more accurate cost predictions concerning future cost for planning and decisions. An understanding of cost behavior is therefore critical for managers and accountants in providing

and using information to make effective decisions (Maher, Stickney, & Weil, 2008). From management perspective, "managers need to know how costs behave to make informed decision about products, to plan, and to evaluate performance" (Lanen, Shannon, & Maher, 2011, p. 51). The traditional model of cost behavior identifies the separation of cost into fixed and variable components. The variable costs change proportionately with changes

in the activity volume, but the fixed costs remain unchanged as the volume changes within the relevant range (Hilton, Maher, & Selto, 2008). The recent empirical research discovered that some costs (e.g., selling, general, and administrative costs, cost of goods sold and total operating costs) are sticky or asymmetric; that is, costs increase more when activity rises than they decrease when activity falls by an equivalent amount (Anderson, Banker, & Janakiraman, 2003). Therefore, costs do not always increase or decrease proportionally with the changing of activities. In applying cost estimation methods that based on traditional model of cost behavior in cost analysis such as cost-volume-profit analysis, flexible budgeting, and cost-plus pricing, it is necessary to consider whether costs behave mechanistically or sticky (Maher et al., 2008). Otherwise, managers may lose firm's competitive advantage to the others who have the more accurate information.

From perspective of investors, the implication of determinants cost behavior may reveals management behavior and advantage of corporate governance that cannot be observed directly. Because cost behavior can be affected by management decision and information in company's published financial statements is the result of the decision made by managers. Moreover, financial information can affect the distribution of wealth among investors, management and other stakeholders (Pepper, 1989).

Previous research has a major controversy about the determinants of cost stickiness phenomenon. Anderson et al. (2003) stated that

“sticky costs occur because managers deliberately adjust the resources committed to activities” (p. 47). Even though agency costs were mentioned, agency theory was not applied to examine the reasons for sticky costs. Chen, Lu, and Sotiropoulos (2008) expanded the research of Anderson et al. (2003) and found cost asymmetry or cost stickiness increases with managerial empire building incentive due to conflict of interest between managers and shareholders. However, Anderson and Lanen (2007) found weak evidence of sticky costs. They revised the estimation models of previous research and considered the foundational model of economic production. Their paper suggested that the problem is in “ambiguity about what defines managerial discretion (cost management) and how managerial discretion about redeploying resources releasing resources interacts with recording costs in the accounting system...” (p. 29). Dierynck and Renders (2009) studied the relationship between labor cost asymmetry and earnings management incentive and found that the degree of cost asymmetry of companies, which have incentive to manage earnings, is declining. In summary, the academic research literature has not been able to provide strong evidence of the reasons of cost stickiness.

In addition, only few empirical researches provided evidence of the sticky cost behavior of Thai companies. To the best of knowledge there are no results in the recent literature regarding how both agency costs and political costs impact on cost stickiness. The purpose of this study was to construct a model to perform a comprehensive

investigation of sticky cost behavior. It fulfills a gap and attempts to contribute to knowledge base by exploring sticky cost behavior for developing a greater understanding of cost stickiness which is useful for not only managers but also accountants, investors, financial analysts and the other users of financial reports. These external users need information to help them make investment and credit decisions.

From methodological perspective, prior research used only multiple regression analysis to develop a cost behavior model. Multiple regression analysis is a method for a single model; there are one dependent variable and a number of independent variables. Because of limitation of multiple regression analysis, this study utilized a new method called structural equation modeling (SEM). Smith and Langfield-Smith (2004) suggested that SEM offers advantages over multiple regression analysis. It is the analysis of sets of relations between observed variables and latent variables which cannot be measured directly. Therefore, this research utilized SEM with AMOS program to study the proxy of agency costs and other latent variables for searching the causes of sticky cost behavior.

2. Literature Review and Hypothesis Development

2.1 Empirical Evidence of Cost Behavior

Empirical research found overhead costs are not proportional to overhead activities by using cross-sectional data from 100 hospitals in Washington State at department level since 1989 and 1990 (Noreen & Soderstrom, 1994) and using

panel data from 108 hospitals in Washington State during 1977–1992 (Noreen & Soderstrom, 1997). Consequently, Noreen and Soderstrom (1994) confirmed that costing systems which assume costs are proportional to activity will overstate relevant overhead costs for decision-making and performance evaluation purposes.

Anderson et al. (2003) introduced the concept of a sticky cost behavior. They examined cost behavior by using selling, general, and administrative (SG&A) costs and sales revenue of 7,629 firms over 20-year period (during 1979–1998). They found that SG&A costs are sticky; SG&A costs increased 0.55% per 1% increase in sales revenue but decreased only 0.35% per 1% decrease in sales revenue.

Several researches investigated cross-countries differences in sticky cost behavior. Medeiros and Costa (2004) studied the properties of sticky costs and the stickiness of SG&A costs in Brazilian companies and confirmed cost stickiness for Brazilian companies. Calleja, Steliaros, and Thomas (2006) used data for a sample of US, UK, French and German companies. The results found costs are stickier for French and German companies than for US and UK companies due to differences in the corporate governance regimes across these four countries. Banker and Chen (2006a) analyzed a sample of 19 OECD countries and recommended that labor market characteristics are significant factors of across-country variations in the degree of cost stickiness.

In Asian countries, Yang, Lee, and Park (2005) inspected cost behavior of Korean general hospital, and found total costs, labor cost

and administrative costs are sticky. The results provided strong support that the more hospitals have assets intensity or employees intensity, the more costs are sticky. Kuo (2007) found that SG&A costs of Taiwanese computer electronic industry are sticky; costs increased 0.470% per 1% increase in sales revenue but decreased only 0.316% per 1% decrease in sales revenue. Recent study on cost behavior of Japanese companies revealed that SG&A costs and cost of goods sold (COS) are sticky (Yasukata & Kajiwara, 2008).

The cost stickiness researchers have attempted to find the causes of cost stickiness. Prior research has been centered on economic factors which make managers to hesitate to adjust cost downward. In assessing the factors reducing of demand in the market, management considers measures of economic activity. A decline in demand is more likely to endure in periods of recession than in periods of economic growth. Anderson et al. (2003) used the percentage growth in real gross national product (GNP) as a measure of economic growth and found that the degree of cost stickiness is greater in higher growth period. The same results in previous research, Banker and Chen (2006a) included variable measuring the rate of macroeconomic growth (GDP) to study cost stickiness of 19 OECD countries during 1996–2005.

In summary, prior research has found that: 1) cost behavior is sticky in different countries; 2) economic growth is the determinant of cost stickiness. Based on the discussion of empirical evidence of cost behavior, the following questions may be raised:

Q1: Is cost behavior of Thai listed companies sticky? and

Q2: Is cost behavior still sticky, after controlling for economic variables?

It is proposed that cost behavior of Thai listed companies is also sticky and cost behavior is still sticky, after controlling for economic variables. In accordance with these research questions, the study introduced the following hypotheses.

H1a: Cost behavior of Thai listed companies is sticky.

H2a: Cost behavior is still sticky, after controlling for economic variables.

2.2 Adjustment Cost Theory

The cost of adjustment theory was introduced by Lucas (1967). When a shock happens, a company cannot immediately change its factors of production without cost of adjustment. That is, changing the level of the production factors used is costly. Many researchers have adapted this concept to change circumstances such as changes of investment or capital (Mortensen, 1973; Epstein & Denny, 1986; Cooper & Haltiwanger, 2006; Groth & Khan, 2010), change of employment (Leitao, 2011; Nakamura, 1993) and changes of the level of inventories (Danziger, 2008).

Adjustment costs “are implicit, in that they result in lost output and are thus not measured and reported on income and expenditure statement generated by firm’s accounts” (Hamermesh & Pfann, 1996, p. 1267). If managers need to increase or decrease committed resources, adjustment costs will be incurred. Therefore, managers may be hesitant about cutting resources when sales decline.

Previous research on cost stickiness used intensity of total assets and intensity of employees as the proxy of adjustment costs. To support this, all prior research indicated that cost stickiness is impacted by both intensity of assets and intensity of employees (Anderson et al., 2003; Subramaniam & Weidenmier, 2003; Medeiros & Costa, 2004; Yang et al., 2005; Anderson, Chen, & Young, 2005).

Although, adjustment costs are not explicit monetary costs presented in financial reports, prior research utilized only intensity of total assets and intensity of employees as the proxy of adjustment costs. This study introduced three variables to measure adjustment costs -i.e. stock intensity, equity intensity, and capital intensity. They are measured from book value of common stock, equity (or net assets) and fixed assets that reported in statement of financial position.

In summary, prior research has found that adjustment costs influenced the degree of cost stickiness. Based on the discussion for adjustment costs, the following question is raised:

Q3: Do adjustment costs affect the degree of cost stickiness?

It is proposed that adjustment costs will moderate the extent of resources decreases for decreases in sales, so adjustment costs will influence the degree of cost stickiness. In accordance with this research question, the study introduced the following hypothesis.

H3a: Adjustment costs affect the degree of cost stickiness in a positive direction.

2.3 Political Process Theory

This study introduced political process theory to expands knowledge base about cost behavior because “society, politics and economics are inseparable, and economic issues cannot meaningfully be investigated in the absence of considerations about the political, social and institutional framework in which the economic activity take place” (Deegan & Unerman, 2011, p.322).

Political process theory adopt the self-interest assumption that politician maximize their utility. Therefore, political process is a competition for wealth transfer via governance service. Political costs are costs associated with the government expropriating wealth from companies and redistributing it to other parties in society (Foster, 1986). The corporations must incur costs of coalescing into lobbying group and becoming informed about how prospective government actions will affect them (Watts & Zimmerman, 1986). Political process theory proposes postulations about the use of accounting numbers in political process; for example, politicians may use large reported earnings as evidence of monopoly. Consequently, management of large companies may prefer to manage earnings to optimal level by maintaining unutilized resources rather than adjust costs when sales revenue declines.

On the other hand, profit-sharing agreement with workers always uses financial statement numbers as a basis for profit-sharing plan. Management has the potential to affect their

compensation by adjusting cost when sales revenue declines.

Empirical research suggested that political costs are important variables in disclosure decision and accounting method decision. Management will attempt to reduce political costs. Wong (1988) found that companies, with higher effective tax rate, larger market concentration ratio and more capital intensive, volunteered to disclose current cost financial statements. This result recommended that political costs influenced management's decision to voluntary disclose. Further, political costs influenced managers' decision to disclose segment reports (Birt, Bilson, Smith, & Whaley, 2006) and corporate social responsibility (CSR) disclosures (Belkaoui & Karpik, 1989; Gamerschlag, Moller, & Verbeeten, 2010). In conclusion, companies disclosed this information to decrease or avoid political costs.

Additionally, political costs also influence manager's choices of accounting policies. The political process theory explains that managers utilize accounting choices to decrease wealth transfers resulting from the regulatory process (Watts & Zimmerman, 1986; George & Leverty, 2010).

This study applied political process theory to search the determinants of sticky cost behavior and utilized political costs as independent variables. There are five variables that are used as a proxy for political costs.

1) Size

The investigators have used company size as a proxy for company's political sensitivity and incentive of management to manage earnings. The

larger company is more and has relatively larger wealth transfer than small company (Watts & Zimmerman, 1986; Kern & Morris, 1991; Laam-Tennant & Rollins, 1994; Seay, Pitts, & Kamary, 2004). Hence, this study hypothesized that the larger company has more cost stickiness than the small company.

2) Risk

The political costs vary with the company's risk. The high-risk company is more likely to maintain costs when sales revenue declines. Beta of company's stock is a measure of risk. (Peltzman, 1977; Zmijewski & Hagerman, 1981; Watts & Zimmerman, 1986; Seay et al., 2004).

3) Capital intensity

The capital intensive company is subject to relatively more political costs and more cost stickiness. Wong (1988) and Belkaoui and Karpik (1989) measured political costs by capital intensity in their research.

4) Concentration

Concentration ratio is a measure of degree of competition in an industry (Watts & Zimmerman, 1986; Wong, 1988; Godfrey & Jones, 1999). The higher competition degree, the more likely the management is to stick costs to reduce political costs.

5) Tax ratio

Effective tax rate is component of political costs (Kern & Morris, 1991). Inoue and Thomas (1996) confirmed that taxation has significant impact on managers' choice because Japanese tax system is related to financial reporting system.

In sum, prior research has found that political costs have strong effect on managers, decision on disclosing information and choosing accounting methods. This study introduced political costs to investigate cost behavior; the following questions may be raised:

Q4: Do political costs affect the degree of cost stickiness?

It is proposed that political costs influence the degree of cost stickiness because management may manage earnings to optimal level in order to reduce wealth transfers. In accordance with this research question, the study introduced the following hypothesis.

H4a: Political costs affect the degree of cost stickiness in a positive direction.

2.4 Agency Theory

Agency theory was developed by Jensen and Meckling (1976), and it was used to study management's incentive. Agency theory is applied to explain the relationship and behavior between shareholders (principals) and managers (agents). They engage in contract that shareholders assign authority and responsibility to managers and managers work on behalf of shareholders. The incentive plan or contract will motivate managers to behave in the way that aligned with shareholders' interests.

Although Anderson et al. (2003) explained the impact of managers' decisions on cost behavior, a few study has explored the underlying theory affecting management decisions. Chen et al. (2008) and Bankov, Byzalov, and Plehn-Dujowich (2011) draw on agency theory, and used free cash flow to

measure the degree of managers' empire-building incentives. The results found cost stickiness is greater in firm-years with higher free cash flow. Their results suggested that corporate governance can reduces cost stickiness. Furthermore, Banker, Ciftci, and Mashruwala (2008) examined the role of managers' optimism in managerial decisions regarding capacity of activity resources that led to costs. Accordingly, exploring management decision processes and additional factors which affect cost behavior in each industry is important to better understanding stickiness.

The most results implied that sticky costs occur from the role of manager in adjusting committed resources in response to change in activities. Nevertheless, previous research on cost stickiness phenomenon found only indirect evidence on the proposition that sticky cost behavior is result of management's decisions.

This study applied agency theory because cost stickiness may stem from empire building incentive. Thus, this study used agency costs as independent variables to explain sticky cost behavior and postulated that the company with higher agency costs has the higher degree of cost stickiness. The existing research has applied financial statement-based agency cost measures as follows.

1) Asset utilization ratio

It is a proxy for management's efficiency in use of assets. This provides a measure of the effectiveness of company investment decisions and the ability of company's management to direct assets to their most productive use. Company with

lower asset utilization ratio is making non-optimal investment decision or using fund to purchase unproductive assets, and creating agency costs for shareholders. This is a variable used by Ang, Cole, and Lin (2000), Singh and Wallance (2003), and McKnight and Weir (2009). A lower asset utilization ratio is a signal of agency misalignment and the existence of agency costs.

2) Discretionary expenditure ratio

It is a proxy for management's efficiency in perquisite consumption. This is variable used by Ang et al. (2000), Singh and Wallance (2003), Truong (2006), Florackis (2008), Henry (2009) and Jelinek and Stuerke (2009). A higher discretionary expenditure ratio is an indicator of agency misalignment and the existence of agency costs.

3) Free cash flow (FCF)

It is involved in underinvestment. Companies with agency problems will has high free cash flow. This is variable employed by Chen et al. (2008), Florackis (2008), Chae, Kim, and Lee (2009), and Banker et al. (2011).

4) Tobin's Q

It is employed as a representation of managerial performance. The premise is that poorly-performing managers are more likely to make decisions that increase agency costs. The lower Tobin's Q ratio indicates poorer managerial performance and the existence of agency costs. This is similar to variables used by Lang, Stulz, and Walkling (1991), Dey (2008) and Heney (2009).

5) Firm size

Larger companies have a greater scale of operations, which provides greater opportunity and

incentive for managers to shirk (Demsetz & Lehn, 1985). Hence, larger companies will have higher agency conflicts. Similar to Dey (2008) and Birt et al. (2006), this variable was used to measure agency costs.

6) Leverage

It is probable that companies with greater leverage will have higher agency costs related to debt. The companies with higher leverage ratio have greater incentive to manage earnings so that they protect adverse effects on their debt rating (Dey, 2008). This means that when leverage increases, agency costs of debt also increase (Jensen, 1986).

7) ROA (Return on Assets)

The prior research utilized ROA as a proxy for firm performance, similar to Tobin's Q (Dey, 2008; Jelinek & Stuerke, 2009). The lower ROA indicates poor performance and agency problems.

According to existing studies, this research gathered these variables together in order to develop measurement model of agency costs. Based on the discussion of the degree of cost stickiness in context of agency theory, the following questions may be raised:

Q5: Do agency costs affect the degree of cost stickiness?

It is proposed that agency costs positively relate to the degree of cost stickiness. In accordance with this research question, the study introduced the following hypothesis.

H5a: Agency costs affect the degree of cost stickiness in positive direction.

2.5 Corporate Governance Variables

Jensen (1993) presented that there are four basic categories of corporate governance; legal and regulatory mechanisms, internal control mechanisms, external control mechanisms, and product market competition. Internal control mechanisms consist of the board of directors, the executive compensation, the firm's ownership structure, and the firm's debt structure. They are the most variables being used in public interest and academic research. There are interactions between these variables, encourage serious endogeneity problems in corporate governance research (Bhagat & Jefferis, 2002).

In Thailand, the Thai Institute of Directors Association (IOD) has conducted the corporate governance report, which presenting the results of the evaluation of corporate governance practices of Thai listed companies since 2001. The current evaluation criteria are corporate governance indexes (CGI) or ratings, that base on components of code of practice. Thai listed companies are evaluated according to 132 criteria in the following five categories derived from the Organization for Economic Cooperation and Development (OECD) principles of corporate governance as follows:

1. Rights of Shareholders
2. Equitable Treatment of Shareholders
3. Role of Stakeholders
4. Disclosure and Transparency
5. Board Responsibilities

Each of Thai listed companies is clustered into following six groups according to their corporate governance performance:

- | | |
|-----------------|---------|
| 1. Excellent | CGI = 5 |
| 2. Very Good | CGI = 4 |
| 3. Good | CGI = 3 |
| 4. Satisfactory | CGI = 2 |
| 5. Pass | CGI = 1 |
| 6. N/A | |

This study used CGI as a proxy for corporate governance variable in order to correct the problem of endogeneity between corporate governance variables and provide empirical evidence for regulating about corporate governance standards.

Empirical research of cost behavior which considered corporate governance started with research by Calleja et al. (2006) and Banker and Chen (2006a). They found that corporate governance system influences the degree of cost stickiness. Costs of companies that are subject to code-law system of corporate governance are stickier than costs of companies which are subject to common-law system of corporate governance. They did not add corporate governance as a variable into cost behavior model. Lastly, Chen et al. (2008) and Banker et al. (2011) found cost asymmetry or cost stickiness increases with managerial empire building incentive due to conflict of interest between managers and shareholders. Chen et al. (2008) suggested that good corporate governance can reduce cost stickiness by preventing managers' over-spending on selling, general and administrative costs.

In summary, earlier research has found that corporate governance factors impact on cost stickiness. Based on the discussion of causes and consequences of the sticky cost behavior and

empirical evidence of cost behavior, the following questions may be raised:

Q6: Does corporate governance affect the degree of cost stickiness?

It is proposed that there is a negative association between the strength of corporate governance and the degree of cost stickiness. In accordance with this research question, the study introduced the following hypothesis.

H6a: The higher corporate governance affects the degree of cost stickiness in negative direction.

There is no study in this review investigated latent constructs for adjustment costs, political costs, and agency costs measured by multiple indicators. To address this issue, latent constructs for adjustment costs, political costs, and agency costs were developed and examined in this study using confirmatory factor analysis (CFA).

3. Research Methodology

3.1 Theoretical Framework

To better understand the determinants of sticky cost behavior or asymmetrical cost behavior, the theoretical framework was developed (Figure 1). The measurement model was proposed to investigate theoretical constructs or latent variables that cannot be observed directly. The relationships of observed variables and latent variables of adjustment costs, political costs, and agency costs were specified a priori, and described as implied conceptual models. They are measurement models as analyzed in confirmatory factor analysis (CFA), which is Semi-SEM (Kline, 2011).

3.2 Research Design

3.2.1 Selection of the Subjects

Target population of this study was Thai listed companies. The Stock Exchange of Thailand classified the companies into 8 industries. The study used the purposive selection procedure to investigate cost behavior of companies in 7 industries except for financials industry and property fund sector in property and construction industry, because of the difference of standardized financial reports. The analysis spanned nine years during 2001-2009. After eliminating companies with missing values of variables, the final sample comprises 100 companies, with 1,280 company-year observations (from only eight years due to time lag).

3.2.2 Instrumentation and Materials

This study adapted the model of Anderson et al. (2003) which used selling, general, and administrative costs as the proxy for costs and sales revenue as the proxy for activity due to the paucity of cost and activity driver data. However, this study used total operating costs as the proxy for costs because of the different classifying items in financial reports. Banker et al. (2011) and Balakrishnan, Labro, and Soderstrom (2010) also used total operating costs as the proxy for costs. In addition, this study adapted two models of Balakrishnan et al. (2010), which removed committed fixed cost (BLS1 Model and BLS2 Model).

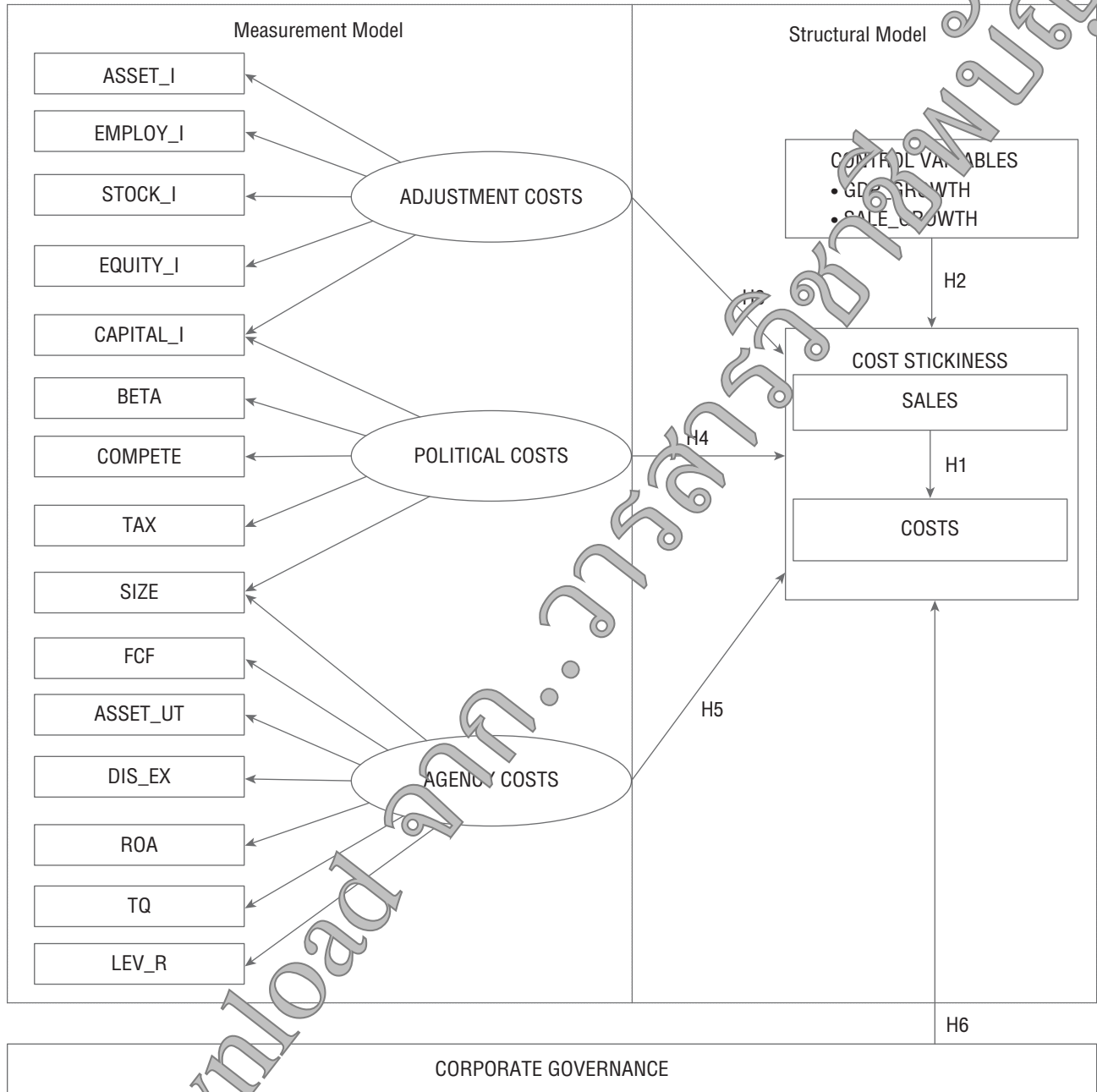


Figure 1 Theoretical Framework

3.2.3 Variables in the Study

Literature reviews show that cost stickiness is influenced by the factors other than activity change. For inquiring into the reasons for sticky cost behavior, this study examined three latent variables –i.e. adjustment costs, political costs, and agency costs by controlling economic factors (Table 1).

3.2.4 Data Collection

Quantitative research method based on secondary data was applied in this analysis. The data on costs, sales revenue, assets, liabilities and equity are available in financial reports of Thai listed companies which are in the database of SEC. In addition, other data can be derived from SET and companies' websites. Fortunately, the

Table 1 Variables and Measurement

Variables	Symbol	Measurement
Independent Variables		
- Adjustment Costs		
• Asset Intensity	ASSET_I	Total assets/total sales
• Employee Intensity	EMPLOYEE_I	Number of employees/Total sales
• Stock Intensity	STOCK_I	Book value of common stocks/Total sales
• Equity Intensity	EQUITY_I	Equity/Total sales
• Capital Intensity	CAPITAL_I	Fixed assets/Total sales
- Political Costs		
• Capital Intensity	CAPITAL_I	Fixed assets/Total sales
• Risk	BETA	Beta of company's stock
• Concentration Ratio	COMPETE	% of total industry sales made by 8 largest companies in the industry
• Tax Ratio	TAX	Tax expense/Earnings before Tax
• Size	SIZE	Natural log of total assets
- Agency Costs		
• Size	SIZE	Natural log of total assets
• Free Cash Flow	FCF	(Cash flow from operating activity – Dividend) /Total assets
• Asset Utilization Ratio	ASSET_UT	Total sales/Total assets
• Discretionary expense ratio	DIS_EX	SG&A costs/Total Sales
• Return on assets	ROA	EBIT/Total assets
• Tobin's Q	TQ	(Market capital + Long Term debts)/Total assets
• Leverage ratio	LEV_R	Total debts/Total assets
- Corporate Governance		
• Corporate Governance Index	CGI	The Thai IOD's rating (1-5)
Control Variables		
• GDP Growth	GDP_GROWTH	Gross Domestic Product growth in year t
• Sales Growth	SALE_GROWTH	Sales growth of the industry of company i in year t
Dependent Variable		
- Cost Stickiness	STICKY	Difference between the change in costs for a 1-percent increase in sales and the change in costs for a 1-percent decrease in sales

companies' financial reports can also be accessed from SETSMART (SET Market Analysis and Reporting Tool), the web-based application from the SET.

3.3 Data Processing and Analysis

There were three stages of analysis in this study. The first stage is confirmatory factor analysis (CFA), to evaluate and optimize the priori measurement models for adequate model fit and validity. The measurement models for adjustment costs, for political costs, and for agency costs were evaluated and optimized separately. The second stage is exploratory factor analysis (EFA), to obtain a more parsimonious set of composite scores (i.e., factor scores) that are then used in subsequent analyses (e.g., regression) instead of the measured variable scores. The last stage is multiple regression analysis, to analyze the data for the purpose of answering the research questions.

Data was prepared and screened before analyzed. Because the most estimated methods in SEM make specific distributional assumption about the data. Data-related problems can make result biased and SEM computer programs failed to yield a logical solution (Kline, 2011). AMOS version 18 was used to analyze the data for measurement models. In contrast, the structural model defines relations among latent variables. The software application used to organize and analyze the data for structural model was SPSS version 17.

3.3.1 The First Stage: Developing Measurement Models

The hypothetical models were specified in advance. Figure 2 shows the measurement model based on prior research and theories of

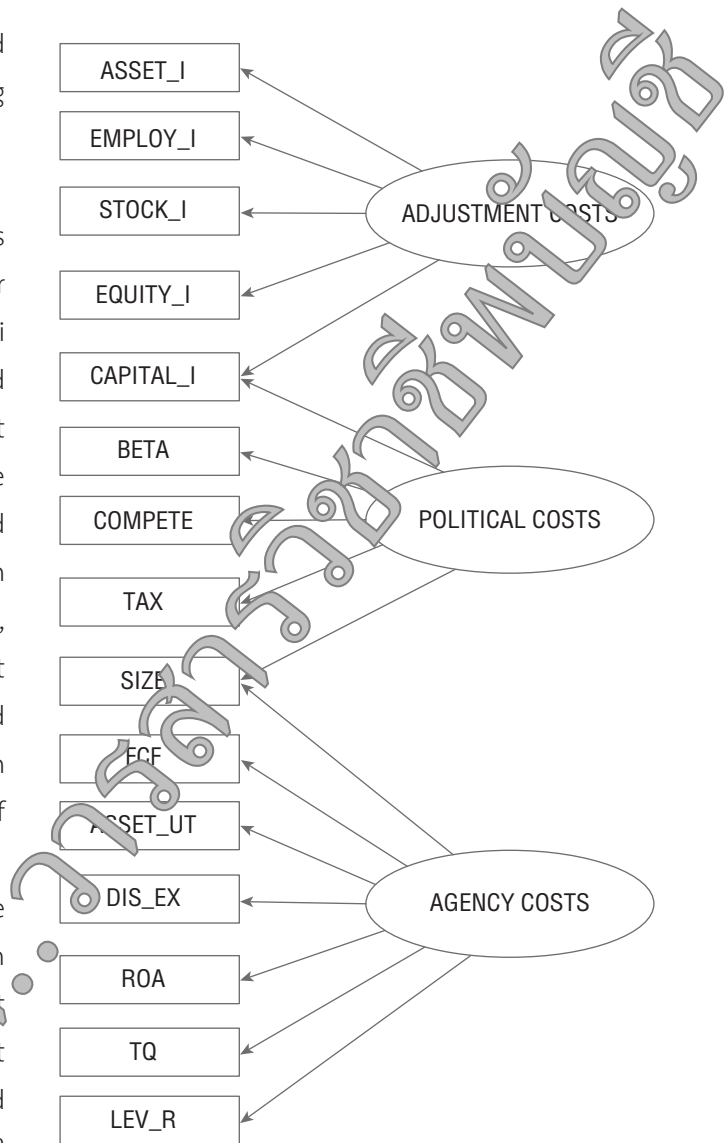


Figure 2 Measurement Models

adjustment costs, political costs, and agency costs.

The observations in this study were assessed outliers. The extreme observations were eliminated from the estimation by discarding an observation if any observation was in highest or lowest 0.5% of its distribution, resulting in 143 observations decreasing made all observations

to 1137 observations. Furthermore, multivariate outlier was assessed. There is minimal evidence of serious multivariate outliers in this study for transformed data.

The original data file should be screened for collinearity and normality. The collinearity can occur when separate variables measure the same thing. Tolerance and variance inflation factor (VIF) are statistics that can detect collinearity among three or more variables or multivariate collinearity. Kline (2011) recommended that tolerance value lesser than 0.10 or VIF greater than 10.0 may indicate extreme multivariate collinearity. The screened data reveals no item to be substantially multivariate collinearity (VIF = 1.0320 to 4.3860).

Multivariate normality is the most important assumption in the conduct of SEM analysis and especially in use of AMOS (Arbuckle, 2007). Estimation in SEM with maximum likelihood assumes multivariate normality; this means that all univariate distributions are normal and each variable is normally distributed for each value of every other variable and all bivariate scatterplots are linear, and finally the distribution of residuals is homoscedastic (Kline, 2011). It is very difficult to assess all these aspects of multivariate normality. Fortunately, many cases of multivariate normality are detectable by inspection of univariate normality. Non-normal distribution causes by skewness and kurtosis. Kline (2011) suggested that absolute value of skew index greater than 3.0 indicates extremely skewness and absolute value of kurtosis index greater than 10.0 suggesting a problem, value greater than 20.0 signals serious

problem. However, the maximum likelihood estimation, which is estimation technique in AMOS, is robust against moderate violation of multivariate normality (Anderson & Garbing, 1988; Bentler & Chou, 1987).

Kline (2011) recommended four approximate fit indexes that are the most widely presented in the SEM literature. They are Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Comparative Fit Index (CFI), and Standardized Root Mean Square Residual (SRMR).

In addition, quality of the latent construct should be evaluated. This index indicates internal consistency in set of observed variables. It is referred to as maximal reliability in the context of scale construction and as the measure of construct reliability (Hancock & Mueller, 2006). Construct reliability measures convergent validity that is proportion of covariance in set of observed variables.

3.3.2 The Second Stage: Estimating Factor Scores

This study utilized factor analysis to summarize relationships among the variables in the form of a more parsimonious set of factor scores so that these factor scores can then be used in multiple regression analyses instead of the measured variable scores. Exploratory factor analysis (EFA) is the statistical method that can be used for exploring the relationships among measured variables and trying to determine whether these relationships can be summarized in a smaller number of latent constructs (Thompson, 2004).

EFA extraction method used for this study is principal component analysis. It was used to compute factor pattern coefficients. Factor rotation was performed by the varimax rotation method. Then regression method was used to obtain factor scores. If there are multiple factors in one latent construct, factor scores will be weighted average value with percentage of variance.

3.3.3 The Final Stage: Constructing Structural Model of Cost Behavior

Multiple regression analysis was used to analyze the relationship among variables, especially causal relationship. This study examined the conditions when analyzed the data. There

are four conditions about residual or error term. Three models were investigated the conditions. The residual terms of ABJ model and BLS1 model are normal while residual term of BLS2 model is approximately normal. Residual terms of all models are constant, so they are homoscedasticity. All models have no autocorrelation and multicollinearity problems (Durbin-Watson < 3 and VIF < 10).

After examining these conditions, the models of Anderson et al. (2003) and Balakrishnan et al. (2010) were employed to investigate cost stickiness.

Model (1): Basic Model was analyzed to answer research question 1 and to test hypothesis 1.

- Q1 : Is cost behavior of Thai listed companies sticky?
- H1₀ : Cost behavior of Thai listed companies is not sticky.
- H1_a : Cost behavior of Thai listed companies is sticky.

ABJ Model:

$$\ln \left[\frac{TC_{i,t}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec_D}_{i,t} * \text{ Sale Change} + \epsilon_{i,t}$$

BLS1 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec_D}_{i,t} * \text{ Sale Change} + \epsilon_{i,t}$$

BLS2 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{S_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec_D}_{i,t} * \text{ Sale Change} + \epsilon_{i,t}$$

Where, for sample companies i, at year t
 TC = Total operating costs

S = Total sales

Dec_{D_{i,t}} = 1 when sales have decreased from year t-1 to t, and 0 otherwise

Sale Change = $\ln \left[\frac{S_{i,t}}{S_{i,t-1}} \right]$ for ABJ Model

Sale Change = $\ln \left[\frac{S_{i,t} - S_{i,t-1}}{S_{i,t}} \right]$ for BLS1 and BLS2 Model

Cost is sticky, when β_1 more than $\beta_1 + \beta_2$

Hence, H1₀ : $\beta_1 = \beta_2 = 0$

H1_a : $\beta_1 > \beta_1 + \beta_2$ or $\beta_2 < 0$

Model (2): Basic model with economic variables was analyzed to answer research question 2 and to test hypothesis 2.

Q2 : Is cost behavior still sticky, after controlling for economic variables?

H2₀ : Cost behavior is not sticky, after controlling for economic variables.

H2_a : Cost behavior is still sticky, after controlling for economic variables.

ABJ Model:

$$\ln \left[\frac{TC_{i,t}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{D_{i,t}} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \varepsilon_{i,t}$$

BLS1 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{D_{i,t}} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \varepsilon_{i,t}$$

BLS2 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{S_i} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{D_{i,t}} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \varepsilon_i$$

Cost is sticky, when β_1 more than $\beta_1 + \beta_2 + \beta_3 + \beta_4$

Hence, H2₀ : $\beta_i = 0$ i = 1, 2, ..., 4

H2_a : $\beta_1 > \beta_1 + \beta_2 + \beta_3 + \beta_4$; or $\beta_2 < 0$ or $\beta_3 < 0$ or $\beta_4 < 0$

Model (3): Full Model with all variables was analyzed to answer research question 3, 4, 5 and to test hypothesis 3, 4, 5.

Q3 : Do adjustment costs affect the degree of cost stickiness?

Q4 : Do political costs affect the degree of cost stickiness?

Q5 : Do agency costs affect the degree of cost stickiness?

H3₀ : Adjustment costs do not affect the degree of cost stickiness in positive direction.

H3_a : Adjustment costs affect the degree of cost stickiness in positive direction.

H4₀ : Political costs do not affect the degree of cost stickiness in positive direction.

H4_a : Political costs affect the degree of cost stickiness in positive direction.

H5₀ : Agency costs do not affect the degree of cost stickiness in positive direction.

H5_a : Agency costs affect the degree of cost stickiness in positive direction.

ABJ Model:

$$\ln \left[\frac{TC_{i,t}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{i,t} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \beta_5 \text{ ADJUSTMENT COSTS} + \beta_6 \text{ POLITICAL COSTS} + \beta_7 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

BLS1 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{TC_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{i,t} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \beta_5 \text{ ADJUSTMENT COSTS} + \beta_6 \text{ POLITICAL COSTS} + \beta_7 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

BLS2 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{S_{i,t-1}} \right] = \beta_0 + \beta_1 \text{ Sale Change} + \beta_2 \text{ Dec}_{i,t} * \text{Sale Change} + \beta_3 \text{ GDP_GROWTH} + \beta_4 \text{ SALE_GROWTH} + \beta_5 \text{ ADJUSTMENT COSTS} + \beta_6 \text{ POLITICAL COSTS} + \beta_7 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

Adjustment costs affect the degree of cost stickiness in positive direction, when β_5 less than 0

Hence, H3₀ : $\beta_5 = 0$

H3_a : $\beta_5 < 0$

The higher political costs, the more likely manager is to manage earnings. Political costs affect the degree of cost stickiness in positive direction, when β_6 less than 0.

Hence, $H4_0 : \beta_6 = 0$

$H4_a : \beta_6 < 0$

The higher agency costs, the more likely manager is to retain costs; that is the “stickier” cost behavior. Agency costs affect the degree of cost stickiness in positive direction, when β_6 (less than 0)

Hence, $H5_0 : \beta_7 = 0$

$H5_a : \beta_7 < 0$

ABJ Model, BIS1 Model and BLS2 Model: The observations were separated weak corporate governance from strong corporate governance. Then model (3) of three models were analyzed to answer research question 6 and to test hypothesis 6.

Q6 : Does corporate governance affect the degree of cost stickiness.

$H6_0$: Corporate governance does not affect the degree of cost stickiness in negative direction.

$H6_a$: Corporate governance affects the degree of cost stickiness in negative direction.

The stronger corporate governance, the more likely manager is to utilize resources more efficiently; that is the “less sticky” cost behavior.

β_{21} = degree of cost stickiness of weak corporate governance

β_{22} = degree of cost stickiness of strong corporate governance

Hence, $H6_0 : \beta_{21} = 0$ or $\beta_{22} = 0$

$H6_a : \beta_{21} < 0$ and $\beta_{21} < \beta_{22}$

4. Research Results

4.1 The Descriptive Statistic Summary

Panel B, C and D of Table 2 display the descriptive statistics of variables which are the proxy for adjustment costs, political costs, and agency costs after data transformation. All of variable distributions were close to normal because absolute value of skew index less than 3.0 and absolute value of kurtosis index less than 10.0. As soon as data had been prepared and screened, multivariate statistic analysis can be used in this study.

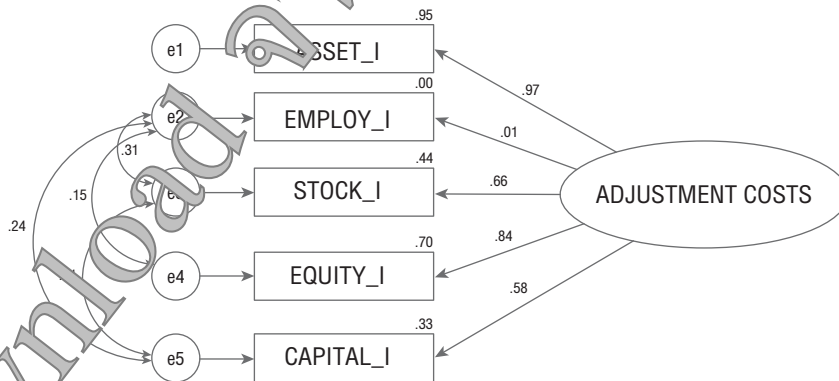
4.2 Measurement Models

4.2.1 Adjustment Cost Model

The final measurement model of adjustment costs was indicated by four observed variables (asset intensity, stock intensity, equity intensity, and capital intensity). Employee intensity was deleted from the model ($p = .712$, squared multiple correlation = .00). Figure 3 illustrates the final measurement model with standardized coefficients and squared multiple correlations.

Table 2 Summary of Descriptive Statistic for Transformed Data of Variables

Variables	Transformed data (1137 observations)				
	Mean	Median	Standard Deviation	Skewness	kurtosis
PANEL B. Adjustment Costs					
ASSET_I	0.2001	0.0982	0.65596	0.768	0.569
EMPLOY_I	-7.8378	-7.6255	1.15290	-0.610	0.072
STOCK_I	-1.5694	-1.5672	1.17510	0.157	0.424
EQUITY_I	-0.4220	-0.4187	0.87750	-0.085	1.276
CAPITAL_I	-1.0429	-1.0167	1.02711	0.603	0.581
PANEL C. Political Costs					
CAPITAL_I	-1.0429	-1.0167	1.02711	0.603	0.581
BETA	0.4938	0.3600	0.46833	0.943	0.293
COMPET	0.6764	0.6867	0.08118	1.033	2.875
TAX	.14000	0.1053	0.14720	1.153	2.106
SIZE	14.8350	14.6573	1.28190	0.603	0.072
PANEL D. Agency Costs					
SIZE	14.8350	14.6573	1.28190	0.603	0.072
FCF	0.0521	0.0527	0.09263	0.118	2.253
DIS_EX	0.1592	0.1284	0.11220	1.516	2.603
ROA	0.0722	0.0740	0.07962	-0.693	3.241
TQ	0.7677	0.6267	0.57012	2.204	6.535
LEV_R	0.4128	0.3717	0.23382	0.603	1.594



Chi-square = 1.477, Chi-square/df = 1.477, df = 1, p = .224
 GFI = .999, CFI = 1.000, RMR = .004, RMSEA = .020

Figure 3 The Final Measurement Model of Adjustment Costs

Table 3 CFA Results of Adjustment Cost Measurement Model

Model	χ^2/df	p-value	GFI	CFI	RMSEA	CN	Construct Reliability
Adjustment Costs	1.477	.224	.999	1.000	.020	2955	.96
Recommended values	< 3	> .05	> .95	> .90	≤ .05	> 200	.50

Measurement Model Fit: Measurement Model of adjustment costs is good fit. Table 3 shows comparing the adjustment cost model fit results with recommended values.

Quality of the Latent Construct: The variance of latent variable can be explained by observed variables 96%.

In summary, the result confirmed that adjustment costs can be measured by asset intensity, stock intensity, equity intensity, and capital intensity.

4.2.2 Political Cost Model

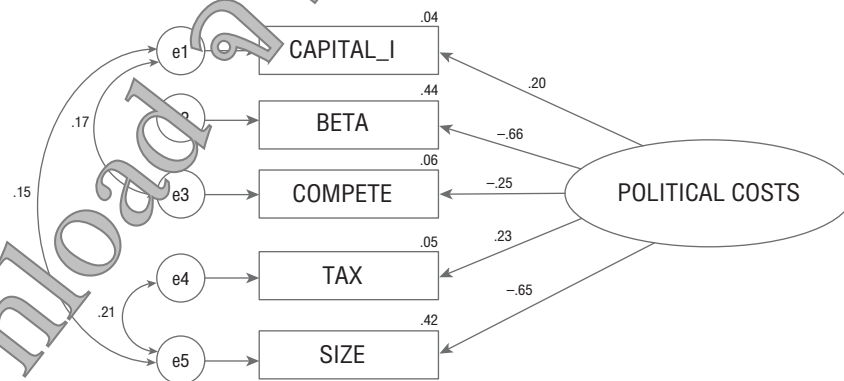
The final measurement model of political costs was indicated by five observed variables (capital intensity, risk, concentration ratio, tax ratio,

and size). Figure 4 illustrates the final measurement model with standardized coefficients and squared multiple correlations.

Measurement Model Fit: Measurement Model of political costs is good fit because χ^2/df statistic did not exceeded 3.0. Table 4 displays comparing the political cost model fit results with recommended values.

Quality of the Latent Construct: The variance of latent variable can be explained by observed variables 63%.

In summary, the result confirmed that political cost can be measured by capital intensity, risk, concentration ratio, tax ratio, and size.



Chi-square = 3.200, Chi-square/df = 1.600, df = 2, p = .202
 GFI = .999, CFI = .997, RMR = .003, RMSEA = .023

Figure 4 The Final Measurement Model of Political Costs

Table 4 CFA Results of Political Cost Measurement Model

Model	χ^2/df	p-value	GFI	CFI	RMSEA	CN	Construct Reliability
Political Costs	1.600	.202	.999	.997	.003	2128	.63
Recommended values	< 3	> .05	> .95	> .90	≤ .05	> 200	> .5

4.2.3 Agency Cost Model

The final measurement model of agency costs was indicated by six observed variables (size, free cash flow, discretionary expense ratio, ROA, Tobin’s Q, and leverage ratio). Asset utilization ratio was deleted from the model in initial step. Figure 5 illustrates the final measurement model with standardized coefficients and squared multiple correlations.

Measurement Model Fit

Model of agency costs is good fit. Table 5 exhibits comparing the agency cost model fit results with recommended values.

Quality of the Latent Construct:

The variance of latent variable can be explained by observed variables 65%.

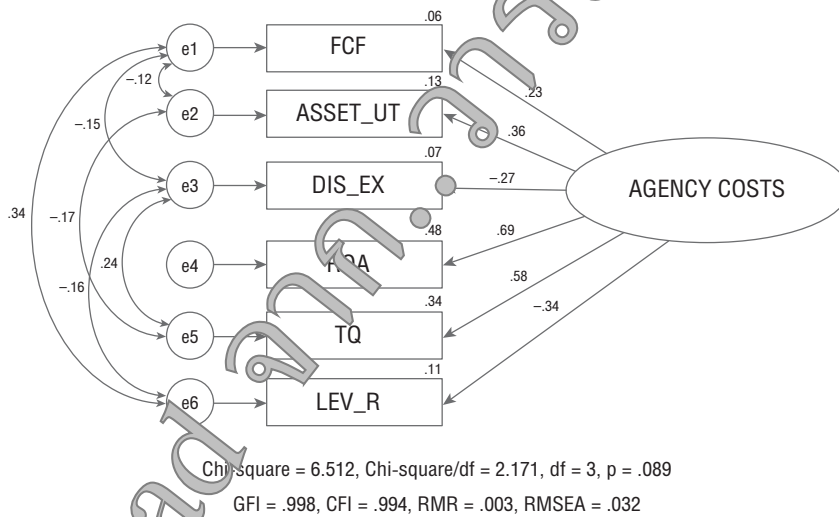


Figure 5 The Final Measurement Model of Agency Costs

Table 5 CFA Results of Agency Cost Measurement Model

Model	χ^2/df	p-value	GFI	CFI	RMSEA	CN	Construct Reliability
Agency Costs	2.171	.089	.998	.994	.032	1364	.65
Recommended values	< 3	> .05	> .95	> .90	≤ .05	> 200	> .50

In summary, the result confirmed that agency costs can be measured by size, free cash flow, discretionary expense ratio, ROA, Tobin's Q, and leverage ratio.

4.3 Estimation Factor Scores

An exploratory factor analysis was performed on three constructs; adjustment costs, political costs, and agency costs.

Adjustment costs

The measurement model from CFA found that asset intensity, stock intensity, equity intensity, and capital intensity can be used to measure adjustment costs. Next step is estimating factor scores.

Data is appropriate for EFA (KMO = .739). This analysis resulted in one factor with eigenvalues greater than one, explaining 67.98% of variance.

Political costs

The measurement model from CFA found that capital intensity, risk, concentration ratio, tax ratio, and size can be used to measure political costs. Next step is estimating factor scores.

Data is appropriate for EFA (KMO = .547). This analysis resulted in three factors with eigenvalues greater than .999, explaining 73.58% of variance. In this case, factor scores were weighted average value with percentage of variance.

Agency costs

The measurement model from CFA found that size, free cash flow, discretionary expense ratio, ROA, Tobin's Q, and leverage ratio can be used to measure agency costs. Next step is estimating factor scores.

Data is appropriate for EFA (KMO = .545). This analysis resulted in two factors with eigenvalues greater than .997, explaining 67.84% of variance. In this case, factor scores were weighted average value with percentage of variance.

4.4 Structural Model of Sticky Cost Behavior

The four conditions about residual or error term were investigated. Then the multiple regression analysis was used to formulate model according to Figure 6 and Table 6.

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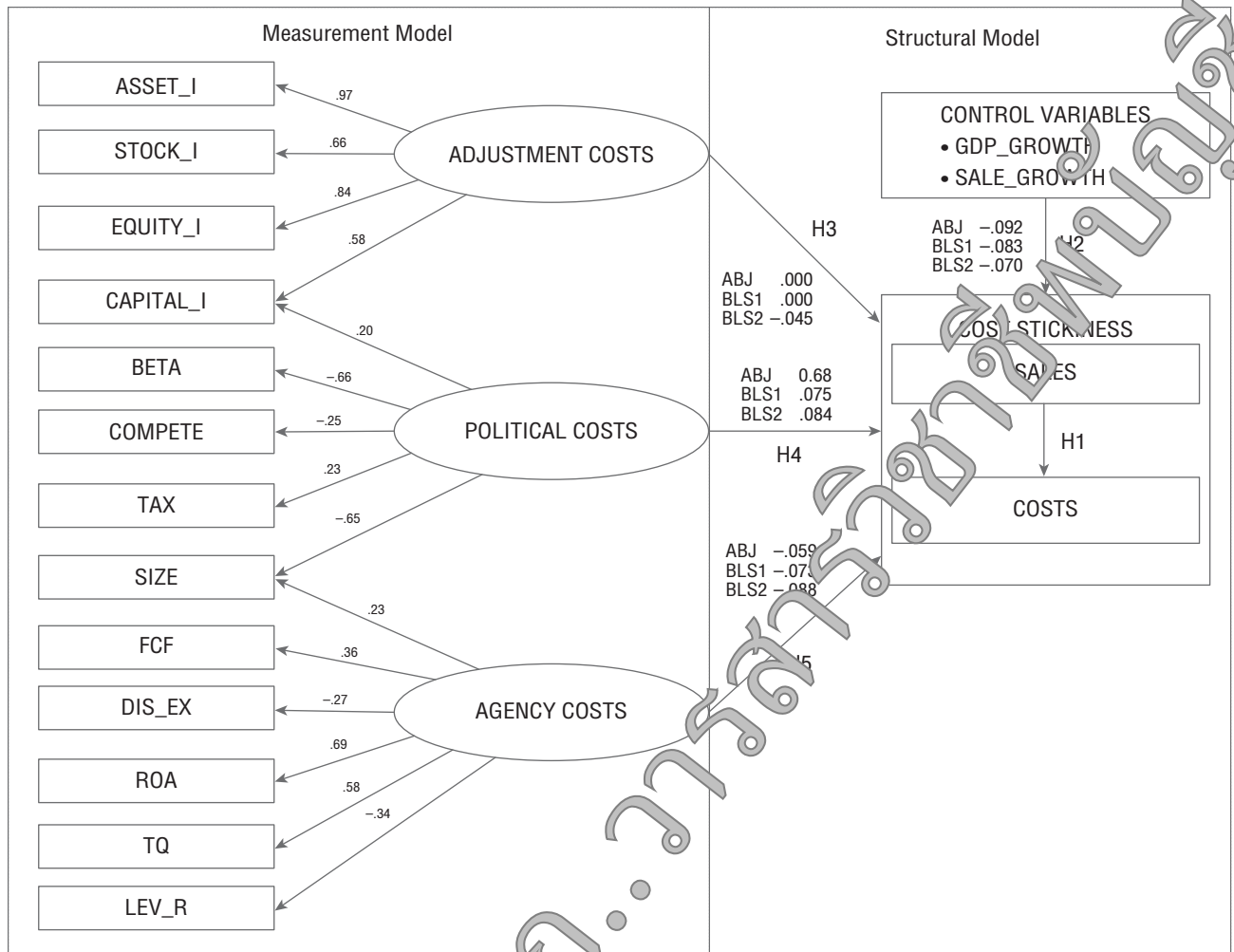


Figure 6 The Structural Model of Sticky Cost Behavior

ABJ Model:

$$\ln \left[\frac{TC_{i,t}}{TC_{i,t-1}} \right] = -.029 + .954 \text{ Sale Change} - .097 \text{ Dec}_{i,t} * \text{Sale Change} + .053 \text{ GDP_GROWTH} + .068 \text{ POLITICAL COSTS} - .059 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

BLS1 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{TC_{i,t-1}} \right] = -.020 + .941 \text{ Sale Change} - .085 \text{ Dec}_{i,t} * \text{Sale Change} + .050 \text{ GDP_GROWTH} + .075 \text{ POLITICAL COSTS} - .073 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

BLS2 Model:

$$\left[\frac{TC_{i,t} - TC_{i,t-1}}{TC_{i,t-1}} \right] = -.026 + .882 \text{ Sale Change} - .074 \text{ Dec}_{i,t} * \text{Sale Change} + .049 \text{ GDP_GROWTH} - .045 \text{ ADJUSTMENT COSTS} + .084 \text{ POLITICAL COSTS} - .088 \text{ AGENCY COSTS} + \epsilon_{i,t}$$

Table 6 Regression Analysis Results of Model (1), Model (2), and Model (3)

	ABJ Model			BLS1 Model			BLS2 Model		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
β_0	.000 (-0.202)	-.019 (-3.314)	-.020 (-3.239)	.000 (-0.220)	-.020 (-3.179)	-.020 (-3.239)	-.006 (-1.240)	-.026 (-3.319)	-.026 (-3.391)
β_1	.960 (43.851)	.945 (42.839)	.954 (42.711)	.942 (53.912)	.932 (52.957)	.941 (53.093)	.883 (41.881)	.872 (41.004)	.882 (41.146)
β_2	-.087 (-3.971)	-.092 (-4.214)	-.097 (-4.457)	-.073 (4.186)	-.083 (-4.706)	-.085 (-4.859)	-.060 (-2.868)	-.070 (-3.293)	-.074 (-3.502)
β_3	.053 (3.548)	.053 (3.548)	.053 (3.612)	.050 (3.389)	.050 (3.389)	.050 (3.456)	.049 (2.761)	.049 (2.761)	.049 (2.782)
β_4	.012 (.823)	.012 (.823)	.006 (.423)	.011 (.751)	.011 (.751)	.005 (.349)	.015 (.897)	.015 (.897)	.010 (.611)
β_5	-.020 (-1.331)	-.020 (-1.331)	-.020 (-1.366)	-.020 (-1.366)	-.020 (-1.366)	-.020 (-1.366)	-.045 (-2.496)	-.045 (-2.496)	-.045 (-2.496)
β_6	.068 (3.644)	.068 (3.644)	.071 (3.711)	.071 (3.711)	.071 (3.711)	.071 (3.711)	.084 (3.759)	.084 (3.759)	.084 (3.759)
β_7	-.059 (-3.107)	-.059 (-3.107)	-.073 (-3.894)	-.073 (-3.894)	-.073 (-3.894)	-.073 (-3.894)	-.088 (-3.914)	-.088 (-3.914)	-.088 (-3.914)
Adj. R ²	79.6%	79.9%	80.1%	80.2%	80.4%	80.7%	71.4%	71.4%	71.8%
D-W	2.341	2.352	2.330	2.416	2.426	2.406	2.464	2.471	2.899

Note: *, **, *** represent significance levels of .05, .01 and .001, respectively.

4.5 Hypotheses Testing

Research Question: 1. Is cost behavior of Thai listed companies sticky?

The results revealed that total operating costs are sticky. Total operating costs increased 0.88–0.96% per 1% increase in sales revenue but decreased only 0.82–.087% per 1% decrease in sales revenue (see Model (1) in Table 6).

Research Hypothesis:

H1_a. Cost behavior of Thai listed companies is sticky.

Hypothesis 1a predicted that cost behavior of Thai listed companies is sticky. To test this hypothesis, change in costs was regressed on change in sales.

Total operating costs are sticky for all models (ABJ Model, BLS1 Model, and BLS2 Model). Thereby, hypothesis 1a was supported by behavior of total operating costs.

Research Question: 2. Is cost behavior still sticky, after controlling for economic variables?

As can see in Figure 6 and Model (2) in Table 6, total operating costs are still sticky.

Research Hypothesis:

H2_a. Cost behavior is still sticky, after controlling for economic variables.

Hypothesis 2a predicted that cost behavior is still sticky, after controlling for economic variables. Hypothesis 2a was supported for all models.

Research Question: 3. Do adjustment costs affect the degree of cost stickiness?

The results indicated that adjustment costs

affect the degree of cost stickiness.

Research Hypothesis:

H3_a. Adjustment costs affect the degree of cost stickiness in a positive direction.

Hypothesis 3a proposed that the more adjustment costs will influence the higher degree of cost stickiness. According to Figure 6 and Model (3) in Table 6, hypothesis 3a was supported with statistical significance for BLS2 model. Hypothesis 3a was not supported for ABJ model and BLS1 model.

Research Question: 4. Do political costs affect the degree of cost stickiness?

The results demonstrated that political costs affect the degree of cost stickiness.

Research Hypothesis:

H4_a: Political costs affect the degree of cost stickiness.

Hypothesis 4a proposed that political costs will affect the degree of cost stickiness. Hypothesis 4a demonstrated strong effect that were statistically significant and indicated that political costs influence the degree of cost stickiness in negative direction.

Research Question: 5. Do agency costs affect the degree of cost stickiness?

The results displayed in Figure 6 and Table 6 indicated that agency costs affect the degree of cost stickiness.

Research Hypothesis:

H5: Agency costs affect the degree of cost stickiness in positive direction.

Hypothesis 5a proposed that agency costs will affect the degree of cost stickiness. Hypothesis 5a was supported with statistically significant and indicated that agency costs influence the degree of cost stickiness in positive direction.

Research Question: 6. Does corporate governance affect the degree of cost stickiness?

The samples were divided into two groups; weak corporate governance and strong corporate governance based on corporate governance indexes (CGI). The results indicated that corporate

governance affects the degree of cost stickiness in negative direction.

Research Hypotheses:

H6_a: Corporate governance affects the degree of cost stickiness in negative direction.

Hypothesis 6a predicted that corporate governance will affect the degree of cost stickiness. Hypothesis 6a was supported with statistically significant and indicated that corporate governance influences the degree of cost stickiness in negative direction. Table 7 reveals that weak corporate governance group has higher cost stickiness while

Table 7 Regression Analysis Results of ABJ Model, BLS1 Model and BLS2 Model

	ABJ Model				BLS1 Model				BLS2 Model			
	Weak CG (CGI<4)		Strong CG (CGI4)		Weak CG (CGI<4)		Strong CG (CGI4)		Weak CG (CGI<4)		Strong CG (CGI4)	
	Coeff.	Sig	Coeff.	Sig	Coeff.	Sig	Coeff.	Sig	Coeff.	Sig	Coeff.	Sig
β_0	-0.27 (-2.738)		-0.13 (-1.951)		-0.32 (-2.906)		-0.14 (-1.879)		-0.46 (-3.126)		-0.16 (-2.215)	
β_1	.932 (24.292)	***	.966 (37.031)	***	.028 (1.194)	***	.949 (46.791)	***	.881 (24.276)	***	.903 (39.961)	***
β_2	-.130 (-3.423)	***	-.071 (-2.819)	**	-.129 (-4.168)	***	-.052 (-2.616)	**	-.144 (-3.937)	***	-.023 (-1.047)	
β_3	.070 (2.869)	**	.045 (2.571)	*	.062 (2.540)	**	.048 (2.778)	**	.051 (1.782)		.059 (3.102)	**
β_4	.025 (1.046)		-.012 (-0.32)		.025 (1.089)		-.016 (-0.965)		.029 (1.071)		-.016 (-0.873)	
β_5	-.055 (-1.959)		-.07 (-1.400)		-.047 (-1.707)		-.012 (-0.707)		-.066 (-2.019)	*	-.037 (-2.006)	*
β_6	.109 (3.624)	***	.040 (1.776)		.110 (3.696)	***	.041 (1.896)		.115 (3.277)	***	.032 (1.334)	
β_7	-.096 (-3.732)	***	-.027 (-1.181)		-.120 (-4.144)	***	-.024 (-1.089)		-.141 (-4.104)	***	-.008 (-0.322)	
Adj. R ²	74.56%		85.50%		75.00%		86.00%		65.10%		82.60%	
D-W	2.908		2.203		2.479		2.195		2.685		1.911	

Note: * ** *** represent significance levels of .05, .01 and .001, respectively.

cost behavior of strong corporate governance group is less sticky. The results indicated that the determinants of cost stickiness are political costs and agency costs, when companies are weak in corporate governance. These findings implied that good corporate governance can reduce agency cost.

5. Conclusions and Discussions

This study was designed to investigate the determinants of sticky cost behavior by using the structural equation modeling (SEM) approach. The measurement models of adjustment costs, political costs, and agency costs were developed and tested. The results suggested that total operating costs are sticky for all sticky cost behavior models (ABJ Model, BLS1 Model, and BLS2 Model). Total operating costs increase by around 0.93% per 1% increase in sale revenue, but decrease only 0.86% per 1% decrease in sale revenue. Cost behavior is still sticky after controlling economic growth for all models. Only BLS2 model demonstrated a effect of adjustment costs on the degree of cost stickiness in positive direction while agency costs affect the degree of cost stickiness in positive direction for all models. Political costs and corporate governance affect the degree of cost stickiness in negative direction.

Cost behavior of Thai listed companies is sticky. This finding provided support to prior research (Anderson et al., 2003; Subramaniam & Weidenmier, 2003; Medeiros and Costa, 2004; Banker et al., 2008; Balakrishnan & Gruca, 2008). The results revealed that they are not only economic variables but

also other factors which affect the degree of cost stickiness. Several research studied supported the effects of economic growth on sticky cost behavior (Anderson et al., 2003; Banker & Chen, 2006; Anderson & Lanen, 2007; Banker et al., 2008; Chen et al., 2008). Therefore, these findings implied that the degree of cost stickiness is subjected to the deliberate resource adjustment decision made by managers. The effects of adjustment costs on the degree of cost stickiness partially supported the findings in the existing literature. The premise of adjustment cost theory, which managers will be hesitant about making decision to decrease resources when sales decrease, is confirmed by these findings.

The results from this study demonstrated that political costs were related to the degree of cost stickiness. This provided further evidence to support the accounting research which found that high political cost companies have a greater incentive to adjust accounting number and financial ratios to desired target (Seay et al., 2004). Agency costs showed significant effects on sticky cost behavior, and therefore provided support for the existing literature (Anderson et al., 2003; Banker et al., 2008; Chen et al., 2008; Banker et al., 2011). This result confirmed agency theory which proposed that managers may not behave in the way that aligned with shareholders' interests. Then, sticky costs may occur from the role of manager in adjusting committed resources in response to change in activities. The evidence from this study has revealed that higher agency costs were associated with a significantly higher

degree of cost stickiness. Even though CGI cannot be a variable in the model, the findings are consistent with earlier studies (Chen et al., 2008). It proved that corporate governance can reduce agency costs and the degree of cost stickiness. It makes managers to act aligned with shareholders' interests instead of their own interests.

It is the most important to understand the limitations of this research so that circumspection can be exercised when interpreting and referring the results. To begin with new methodology that introduced in this study is only Semi-SEM, so indirect effects of the variables cannot be examined. The measurement models of adjustment costs, political costs, and agency costs were constructed with confirmatory factor analysis (CFA). The adjustment cost model, agency cost model, and political cost model are good fit. However, measurement model of political costs has construct reliability only 63%. It is recommended that future studies, which utilize political costs as variables, continue to develop an appropriate and reliable measurement model of political costs.

This study has implication for practice. To increase potential for competition, Thai companies should have accounting systems that are consistent with international standards, transparent and verifiable (Trairatvorakul, 2011). Information is therefore important. Management accounting is a part of the information system. Managers need economic information in order to make decisions efficiently concerning the allocation of scarce economic resources (Atrill & McLaney, 2009). An understanding cost behavior is critical to managers

so that they can predict accurate future costs. Knowing that cost behavior is sticky can help managers and accountants to realize and be careful when they apply cost estimation method that based on tradition model of cost behavior in cost analysis.

Another consideration in understanding managers' behavior, the determinants of sticky cost behavior may reveal behavior of managers which is not disclosed in financial reports. This is material information for investors and financial analysts when they analyze financial statements. They can make informed decision so that they will receive highest returns from investment.

In this study, the political costs were shown to be associated with the degree of cost stickiness. The result implied that the government policies have an influence on cost behavior of companies. Hence, the government should consider policies and regulations in macroeconomic and microeconomic perspectives.

As reported above, this study proved that good corporate governance can reduce agency cost. Thai Institute of Directors Association (IOD) should encourage and invite companies to engage in the IOD's project which has reported the results of the evaluation of corporate governance practices of Thai listed companies since 2001.

A further important implication is the research model. Political process theory was incorporated into the model via political costs and was a major addition that has not been adequately addressed in the existing literature in regard to the effects it has on cost stickiness. In addition, the new method

and alternative models were utilized to develop cost behavior models. Although the results of the models relations were mixed, there were a sufficient number of paths which had statistically significant interaction between constructs to support the complex relationships.

Lastly, it is recommended to confirm the findings of this study with non-listed companies. Additional research results that utilize different samples would validate that these results found here could be generalized to all Thai companies.

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