

# **The Stickiness of SG&A Costs, Agency Problems and Competition Intensity**

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## **ABSTRACT**

In an attempt to understand the underlying reason of the sticky cost phenomenon, this paper examines the association between agency problems and sticky cost phenomenon and estimates the moderating effect of competition intensity on this association. This study includes 9,575 observations from North America during the period 2005-2014. The results show that selling, general and administrative (SG&A) expenses are sticky on average and agency problems are positively associated with the stickiness of SG&A costs. In addition, regarded as the supplement of corporate governance, low competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. However, high competition intensity does not weaken the impact of agency problems on the stickiness of SG&A costs. These results suggest that competition intensity has an external and indirect influence on agency problems and corporate governance still matters when competition intensity is high.

### **Keywords:**

Cost stickiness, anti-stickiness, agency problems, corporate governance, competition intensity

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## Chapter 1 Introduction

Management accounting focuses on cost behavior because cost is an important aspect of profit analysis. Recently, the growing literatures on asymmetric cost behavior give a new way of thinking about costs. Anderson, Banker, & Janakiraman (2003; hereafter ABJ) find that selling, general and administrative costs do not increase or decrease with the same volume of changes in sales revenue. ABJ interpret this phenomenon as cost stickiness phenomenon. Cost stickiness phenomenon is defined as the degree of increase in costs with the volume of sales increase is larger than the degree of decrease in costs with the same volume or sales decrease. The cost stickiness phenomenon rejects the traditional view of cost behavior and provides opportunities to investigate the drivers and influences of sticky costs.

The differences between the traditional view of cost behavior and cost stickiness phenomenon depend on whether the decisions of managers are taken into account. Managerial intervention affects resource adjustments in a company. When sales revenue decreases, managers need to decide whether to retain the unutilized costs or to reduce costs into optimal levels. Based on these concerns, managers have to consider market movements, the development of macro economy, the performance of companies in prior periods and the likelihood of fluctuation in sales revenue.

Prior researches find one driver of cost stickiness phenomenon is the self-interested incentives of managers. Selling, general and administrative costs include beneficial items for managers. Managers are hired as agents by shareholders to perform work, which means that the interests between managers and shareholders are different. In order to chase their personal benefits, managers have little incentives to optimize the operating efficiency of companies. Managers may retain unutilized costs which are beneficial for their compensation and reputation. Thus, managers could make decisions to retain costs away from the optimal levels, which would give rise to cost stickiness phenomenon.

Furthermore, product market competition is also an important factor that influences considerations of managers. When managers need to reach profit targets, they would reduce unutilized costs into optimal levels. In the competitive product market, costs reduction is common among companies because fierce competition is accompanied by falling prices. Managers in more competitive industries have more incentives to reduce slack resources in order to maximize profits. To make companies survive in fierce competition, managers have to restrict their self-interested incentives.

Product market competition can be regarded as the supplement of corporate governance as it reduces the agency problems and improves information symmetry. When competition intensity is high, incentives of managers have to be better aligned with interests of shareholders. This paper extends prior research which concludes that corporate governance has a moderating effect on the association between agency problems and the stickiness of SG&A costs. As competition intensity is regarded as the supplement of corporate governance, this paper tests the moderating effect of competition intensity on the association between agency problems and the stickiness of SG&A costs.

This paper tests the research questions whether agency problems are positively associated with the stickiness of SG&A costs and whether competition intensity has a moderating effect on the association between agency problems and the stickiness of SG&A costs in the past decade. Addressing the self-interested incentives of managers which are interpreted as agency problems, I test research questions with 9,575 firm-year observations between 2005 and 2014 in North America. I use free cash flow, CEO tenure, CEO age and CEO fixed pay to capture the self-interested incentives of managers. Moreover, I measure competition intensity with Herfindahl-Hirschman Index (HHI). The results can be summarized as follows: SG&A costs are sticky on average in the past decade and agency problems are positively associated with the stickiness of SG&A costs. The higher level of free cash flow, the longer CEO tenure, the higher level of CEO age and the higher proportion of CEO fixed pay in total compensation shift the stickiness of SG&A costs into higher degree.

Moreover, I test the moderating effect of competition intensity by splitting samples with median HHI. The evidence presented in this paper indicates that low competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs; however, high competition intensity does not weaken the impact of agency problems on the stickiness of SG&A costs. When competition intensity is low, SG&A costs are significantly sticky and the higher level of CEO age leads to a higher degree of stickiness of SG&A costs. However, when competition intensity is high, SG&A costs are not sticky on average. Inconsistent with hypothesis, when competition intensity is high, free cash flow, CEO tenure and CEO fixed pay is positively associated with the stickiness of SG&A costs. These findings suggest that competition intensity, regarded as an external monitoring function, does not have the same impact as corporate governance does on agency problems.

In addition, to further analyze the impact of competition intensity, I test whether the degree of competition intensity would affect the association between agency problems and the stickiness of SG&A costs. I split the sample into lower competition intensity, low competition intensity, high competition intensity and higher competition intensity by upper quantile HHI, median HHI and lower quantile HHI. The results support that lower competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. The results answer the research question that higher competition intensity weakens the impact of agency problems on the anti-stickiness of SG&A cost in the past decade.

When the competition intensity is low and even lower, SG&A costs are sticky and CEO age is positively associated with the stickiness of SG&A costs during the past decade. However, when competition intensity is higher, SG&A costs become anti-sticky. Cost anti-stickiness phenomenon is defined as the costs decrease more when sales revenue decreases but costs increase less when sales revenue increases. In terms of agency problems, the results show that when competition intensity is higher, the higher level of free cash flow, the longer CEO tenure and the higher level of CEO age does not reduce the degree of anti-stickiness of SG&A costs. When agency problems exist, the anti-stickiness of costs is beneficial to companies because the unutilized costs are better reduced by managers. Cost anti-stickiness phenomenon demonstrates that the higher degree of competition intensity assists restricting the self-interested incentives of managers.

This paper contributes to the literatures on asymmetric costs in four ways. First, the results provide a robust proof for the impact of agency problems on cost behavior in the past decade. The topic of asymmetric cost is relatively new. The phenomenon of asymmetric costs matters not only to researchers but also to companies and shareholders. Understanding the drivers and impacts of asymmetric costs could give us a new angle to investigate cost behavior and to support improving the efficiency of companies. Second, the investigation on the moderating effect of competition intensity fills the gap between cost behavior and product market competition. Prior researches usually link competition intensity with corporate governance and suggest that competition intensity acts as a substitute for corporate governance. By extending the monitoring function of competition intensity, this paper gives some implications about the impact of competition intensity on agency problems.

Third, this paper also investigates the influence of higher and lower competition intensity and gives some explanations on cost anti-stickiness phenomenon. Although the moderating effect of high competition intensity on the association between agency problems and the stickiness of SG&A costs is not prominent, the higher competition intensity weakens the influence of agency problems on the anti-stickiness of SG&A costs. Last, this paper also gives some implications for the corporate governance. Costs are on average sticky but agency problems would lead the stickiness of costs to a greater extend. Therefore, when the stickiness of costs shifts to a higher degree, shareholders need to develop their monitoring function on agency problems. Besides, when competition intensity is low in an industry, shareholders need to have more awareness on monitoring the behavior of managers as competition among companies could not fully release its monitoring ability.

The rest of this paper is organized as follows. Chapter 2 reviews prior literatures and chapter 3 develops main hypotheses. Chapter 4 covers the research design of this paper. Chapter 5 discusses the empirical results and further analyses. Chapter 6 provides conclusions.



## Chapter 2 Theoretical Background

This chapter mainly summarizes the prior researches on asymmetric cost phenomenon, drivers of asymmetric cost and the association between agency problems and asymmetric cost. Prior researches suggest that product market competition could influence agency problems as well. Thus, the product market competition could be regarded as a supplement for corporate governance.

### *2.1 Asymmetric Cost Phenomenon*

Asymmetric cost is relatively a new research topic, which does not apply the same logic with the traditional cost system. Traditional activity-based cost system links costs with activities and generates the concept of fixed costs and variable costs. Fixed and variable costs are allocated to products based on different cost drivers (Noreen 1991). Fixed costs generated from buildings and equipment can be predetermined as the values are settled once they are bought. But variable costs such as materials and expenses of employees can be allocated by the volume due to the flexibility. From the perspective of traditional cost system, costs change automatically with the changes of activity volume. The changes of costs are symmetric with the changes of activity volume. Thus, in the traditional cost system, variable costs change proportionally with the changes in activity volume.

However, some researches find that costs increase more when activity volume increases but costs decrease less when activity volume decreases (Cooper and R 1998; Noreen and N January 1994). Recently, ABJ support by empirical research that the magnitude of a change in costs depends not only on the extent of a change in the level of activity, but also on the direction of the change. ABJ find that selling, general and administration costs increase more when sales revenue increases but decrease less when sales revenue decreases. ABJ label this phenomenon as “cost stickiness”. Thus, cost stickiness phenomenon is defined as “costs are sticky if the magnitude of the increase in costs associated with an increase in volume is greater than the magnitude of the decrease in costs associated with an equivalent decrease in volume (Anderson, Banker and Janakiraman 2003)”.

Consistently, Subramaniam and Weidenmier (2003) also find that cost of goods sold is sticky and the degree of the stickiness is more prominent when sales revenue changes by more than 10%. Prior researches find that the degree of cost stickiness is different in different countries. Calleja, Stelarios and Thomas (2006) support that companies experience sticky operating costs in US, UK, France and Germany and the degree of cost stickiness in French and German companies is larger than that in other countries. They explain that the different magnitude of cost stickiness in different countries is the consequence of the differences in corporate governance system and managerial oversight. Generally, researches present that costs are sticky on average and the degree of cost stickiness varies in different countries.

Another component of asymmetric cost phenomenon is the cost anti-stickiness. In opposite of cost stickiness, cost anti-stickiness phenomenon is defined as costs increase less when sales revenue increases, but costs decrease more when sales revenue decreases. Researches demonstrate that SG&A costs are anti-sticky when economy is weak (Banker, Fang and Mehta 2013). Researchers explain that managers would

adjust resources when they do not have a powerful expectation on the increase of sales revenue. Consistently, Banker and Byzalov (2014) find that costs are anti-sticky when managers anticipate lower resource requirements. By showing that asymmetric cost is related to changes in costs over a prior period, Banker and Byzalov (2014) support that costs of current period are average anti-sticky conditional on a prior decrease of sales revenue.

Furthermore, Weiss (2010) links asymmetric cost phenomenon with analysts' earnings forecasts by classifying costs into sticky and anti-sticky costs. The research shows that earnings forecast accuracy of analysts is 25% less in companies committing sticky costs than in companies with anti-sticky costs. The finding suggests that companies with sticky costs may experience more future volatile earnings than companies with anti-sticky costs. Weiss (2010) also illustrates that the degree of asymmetric cost has an impact on the behavior of analysts and investors. The research finds that companies with stickier costs have lower analyst coverage and have a weaker market response to earnings surprise.

To sum up, asymmetric cost phenomenon provides a new angle to investigate cost behavior. Researches demonstrate that selling, general and administrative costs and cost of goods sold are sticky on average. The degree of cost stickiness is different among countries due to different corporate governance systems and managerial oversight. Prior researches suggest that cost anti-stickiness is associated with the pessimistic economic environment and managerial expectation. Researches consider that cost anti-stickiness is beneficial to companies and investors because cost stickiness could affect analyst' earnings forecast and investors' beliefs.

## ***2.2 Drivers of Cost Stickiness***

While the traditional cost model envisions a mechanism between costs and activity volume, the asymmetric cost phenomenon is based on resource adjustment costs and resource commitment decisions by managers. In traditional cost system, resource adjustments cannot be affected by decisions of managers. The asymmetric cost phenomenon provides an opportunity to take managerial intervention into account. In the past few years, empirical researches find three drivers of asymmetric cost: adjustment costs (Anderson, Banker and Janakiraman 2003; Banker, Byzalov and J. M. 2011; Subramaniam and Weidenmier 2003), manager's optimism (Banker and Chen 2006); (Banker, Byzalov, and J. M. 2011) and managers' incentives (Dierynck and Renders 2009; Chen, Lu and Sougiannis 2012; (Kama and Weiss 2013).

### ***2.2.1 Adjustment Costs***

Costs increase with the rising in sales revenue, which is necessary to generate more values for companies. When sales decrease, costs ideally need to be deducted into the optimal level. However, ABJ hold the view that "sticky costs occur because there are asymmetric frictions in making resource adjustments – forces acting to restrain or slow the downward adjustment process more than the upward adjustment process". It is costly to commit resources adjustment frequently in short run. ABJ hold the view that some adjustment costs, for instance severance pay when employees are dismissed and searching and training costs when new

employees are hired, are neither fixed nor variable costs. In this case, managers need to deliberately make decisions whether to retain the unutilized costs or to reduce costs sufficiently. Managers may consider the present and past operation levels of the companies, the forecast of sales revenue and the market conditions in subsequent period. Thus, asymmetric costs exist due to the managerial interventions on costs. ABJ argue that managers need to consider whether the reduction of cost is necessary or whether the cost should be retained at same level for future operation. If managers make decisions to retain the unutilized costs, cost will be sticky. Consistent with the sticky costs assumption, ABJ find that managers prefer waiting for longer time to obtain more information when they make decisions, thus the time gap between making decision and actual changes in sales revenue also leads to cost stickiness phenomenon.

### ***2.2.2 Managers' Optimism***

Another driver of sticky costs is related to managers' optimism on market conditions. When managers hold optimistic expectations based on market conditions, they will keep unutilized costs. The optimistic expectations of managers would shift stickiness of costs to a higher degree. On the contrary, when market shows pessimistic signals, managers tend to reduce unutilized costs to reach certain profit targets. Holding the unutilized costs is unnecessary and would be a burden to survive in pessimistic economic environment. ABJ predict that managers would reduce unutilized cost when market conditions show pessimistic signal. Consistent with their prediction, ABJ find the degree of stickiness of SG&A costs reduces when there is successive decrease in sales revenue during the consistent two years.

Consistently, Banker, Flasher and Zhang (2014) illustrate that companies with different development strategy show different degree of cost stickiness. Although differentiation strategy leads to greater degree of cost stickiness, this positive association between differentiation strategy and the stickiness of costs is moderated by optimistic or pessimistic sales expectations. Chen, Lu and Sougiannis (2012) find that overconfident managers are more likely to extend the sales demand and tend to retain SG&A costs away from the optimal level. Overconfident managers usually have a higher expectation on sales increase or lower expectation on future decreases of sales. Managers choose to retain the unutilized costs because costs would increase with the sales increase in the subsequent period. Thus, managers' optimism on market conditions is a driver of asymmetric cost as well.

### ***2.2.3 Managers' Incentives***

ABJ hold the view that managers' decisions to retain unutilized costs may also be caused by the personal considerations of managers. Managers act as agents for shareholders. The interests of managers and interests of shareholders are different. On one hand, shareholders would like to reduce costs, improve sales revenue and improve operating efficiency in order to maximize the value of companies. On the other hand, managers have a propensity to chase their own goals which may not always be aligned with those of the shareholders. The conflict of interests between managers and shareholders gives managers incentives to pursue their personal benefits.

As discussed above, managers can make managerial intervention on reducing or maintaining unutilized costs. Managers can choose to reduce costs by considering the development for the companies; on the contrary, managers may choose to retain unutilized costs for their personal benefits. ABJ predict self-interested incentives of managers may shift cost stickiness to a higher degree. Dierynck, Landsman and Renders (2012) find that the degree of cost stickiness is lower when managers need to meet or beat earnings target. This finding indicates that managers have to reduce unutilized costs when they experience earnings pressure. Consistently, Kama and Weiss (2013) find that when managers want to meet the forecasts of the analysts or to avoid earnings decrease, they reduce unutilized costs with the decrease of sales revenue. These results indicate that the self-interested incentives of managers shift the stickiness of costs to a higher degree; and the degree of cost stickiness can be reduced when the behavior of the managers is restricted.

Thus, the managers with the self-interested incentives would not choose to maximize the value of companies but to commit a value-destroying behavior. Researchers argue that the self-interested incentives of managers are one key aspect to analyze cost structure of companies. Consistent with prior researches, the finding of Chen, Lu and Sougiannis (2012) illustrates that empire building incentives which are interpreted as agency problems are positively associated with the stickiness of SG&A costs.

### ***2.3 Agency Problems***

As discussed above, managers can make rational analysis to adjust costs based on the expectation of sales revenue and market conditions. However, managers also have incentives to adjust costs deliberately in order to chase their personal benefits. The self-interested incentives of managers could be explained by agency theory.

Jensen and Meckling (1976) provide an underlying theory that the values of companies could be reduced by potential interest conflicts between shareholders and managers. Shareholders as the owners of companies would like to maximize the value of companies. But interests of the managers cannot be fully aligned with the interests of shareholders, which gives rise to agency problem. Healy and Palepu (2001) state that when shareholders do not play an active role in the management, agency problems will arise. Managers are given authorization to operate companies and have incentives to maximize their personal benefits at expenses of shareholders. When they have little incentives to fully enhance the value of companies, they may exhibit value-destroying behaviors which would affect the competence of companies.

Thus, agency theory predicts that interests of managers cannot be fully aligned with interests of shareholders. Managers tend to pursue their personal benefits rather than fully contributing to the value of the companies.

Based on the concerns of agency problems, ABJ suggest that sticky costs could exist due to the fact that managers deliberately adjust costs in response to the changes in sales revenue. Managers have incentives to avoid the pressure of downsizing in sales revenue or the potential complains from dismissed employees. ABJ argue that managers have incentives to keep unutilized costs in certain levels in order to retain personal benefits. From the agency conflicts perspective, Chen, Lu and Sougiannis (2012) demonstrate by empirical

research that empire building incentives are positively associated with the stickiness of SG&A costs, which supports that the self-interested incentives of the managers increase the degree of cost stickiness.

#### ***2.4 Corporate Governance and Competition Intensity***

By extending agency theory, Jensen and Meckling (1976) point that owners of companies should find a mechanism to monitor the behavior of the managers. The governance structure formed by board of directors, audit committee and auditors could mitigate the agency problems between managers and shareholders. Hart (1983) states that corporate governance matters when agency problems are at present or the contracts are incomplete. Because it is costly to write a complete contract to restrict agency conflicts, corporate governance could mitigate the gaps in contracts. Dey (2008) illustrates that the greater effect of governance mechanism is positively related with greater level of agency conflicts; in other words, companies with higher level of agency conflicts have higher demand to mitigate agency problems. Prior research illustrates that the positive association between agency problems and the stickiness of SG&A costs can be moderated by the mechanism of corporate governance (Chen, Lu and Sougiannis 2012). Chen, Lu and Sougiannis (2012) support that the stickiness of SG&A costs is positively associated with agency problems in companies with weak corporate governance; however, agency problems do not have impact on the stickiness of SG&A costs among companies with strong corporate governance.

Being different from corporate governance which is recognized as monitoring mechanisms within a company, competition intensity is regarded as the external monitoring mechanism. Because competition among companies could improve information symmetry and reduce agency costs, competition intensity reduces interest conflicts between managers and shareholders. Researchers hold the view that managers have pressure when they meet fierce competition among companies (Alchian 1950; Stigler 1958). They cannot commit value-destroying activities because companies need to survive in markets with fierce competition. So competition intensity is a powerful factor to avoid deliberately wasting the resources of the companies.

Hart (1983) and Scharfstein (1988) find that product market competition is able to reduce managerial slack and to increase the information symmetry between shareholders and managers. Shareholders could analyze the financial information of competitors in the industry, which provides an opportunity to monitor whether managers retain the slack resources. Chou, Ng and Sibilkov (2011) find that companies in competitive industries have weaker corporate governance structures, illustrating the fact that product market competition can act as an external monitoring mechanism.

Moreover, from the perspective of market return, Giroud and Mueller (2011) demonstrate that companies in non-competitive industries usually have weak corporate governance function and experience lower market returns, lower firm value and weak firm performance. By investigating the reasons, Giroud and Mueller (2011) find that companies in non-competitive industries with weak corporate governance have lower labor productivity and higher input costs. Consistently, Ammann, Oesch and Schmid (2013) suggest that product market competition acts as a substitute for corporate governance. They find that corporate

governance significantly increases firm value in non-competitive industry. Overall, competition intensity can be regarded as a supplement of corporate governance and has an external monitoring function on agency problems.

## Chapter 3 Hypothesis Development

This chapter presents hypotheses on association between agency problems and the stickiness of SG&A costs and the moderate effect of competition intensity on this association.

### *3.1 Cost Stickiness and Agency Problems*

As stated above, prior researches find SG&A costs are sticky on average and one of the drivers is the self-interested incentives of managers. By focusing on the self-interested incentives, the first hypothesis interprets whether agency problems are positively associated with the stickiness of SG&A costs. I follow the literatures that interpret agency problems and use free cash flow, CEO tenure, CEO age and CEO fixed pay to measure agency problems.

#### *3.1.1 Free Cash Flow*

Managers who act as agents of shareholders have authorization to make adjustment on costs. When they make decisions deliberately and ignore the optimal development level for companies, agency problems arise. Free cash flow is defined as “cash flow in excess of that required to fund all projects that have positive NPV when discounted at the relevant cost of capital (Jensen, 1986)”. Free cash flow interprets the cash which a company generates after laying out the expenses to maintain operation. Free cash flow is a measurement of financial performance and gives opportunities to improve the value of companies.

Jensen (1986) finds that when holding unused large amount of free cash flow, managers choose to overinvest and to undertake low-benefit or sometime value-destroying mergers. This finding suggests that more severe agency conflicts could happen in companies with larger amount of free cash flow. Consistently, Richardson (2006) shows that over-investment is more prominent in companies with larger amount of free cash flow, which indicates that managers would make deliberately decisions with excess free cash flow.

Consistent with the association between free cash flow and agency theory, Lehn and Poulsen (1989) conclude that free cash flow which is associated with agency problems has a major impact on shareholder gains in going private transactions. The way in which managers use free cash flow reflects the incentives of managers. Based on agency theory and prior literatures, managers with self-interested incentives would make use of the free cash flow for their personal benefits instead of for the development of companies. The large amount of free cash flow gives managers opportunities to over-invest in operation costs which are beneficial to their personal benefits.

Therefore, managers have incentives to retain unutilized costs in certain levels when sales revenue decreases, which leads to a higher degree of cost stickiness. In contrast, when free cash flow is low, managers do not have opportunities to maintain unutilized costs for their personal benefits. They need to reduce unutilized costs with the decrease of sales revenue to avoid negative impact on their career development. Based on prior researches, managers have incentives to retain unutilized costs with excess free cash flow. Thus, the hypothesis between agency problems and cost stickiness is:

*H1a: the stickiness of SG&A costs is positively associated with companies' free cash flow.*

### **3.1.2 CEO Tenure**

CEO tenure is interpreted as the years when managers act as CEOs. CEOs usually need time to build up their power and gain influence on the inside companies. From the entrenchment perspective, Finkelstein and Hambrick (1989) find that CEOs with longer tenure have greater personal benefits as it takes time to gain bases of power. This finding suggests that CEOs have incentives to seek for personal benefits after they gain power in companies. John and Senbet (1998) find that short CEO tenure does not show too much influence on firm performance but higher CEO tenure (more than 15 years) reduces firm performance.

Ali and Zhang (2015) find that CEOs would execute greater extend of earnings management in the early years and this association can be mitigated by internal and external monitoring mechanisms. They conclude that the CEO tenure is positively associated with agency problems. A longer CEO tenure could lead to agency problems as CEOs have greater power and more opportunities to chase their personal benefits. Gregory-Smith, Thompson and Wright (2009) find that the likelihood of forced departure decreases after the fourth year of CEO tenure. With a longer period staying in companies, CEOs will have more time make entrenchment in career. A longer CEO tenure gives managers more opportunities to gain personal benefits. SG&A costs contain beneficial items for managers. CEOs with self-interested incentives would not reduce unutilized SG&A costs, therefore leading to a higher degree of the stickiness of SG&A costs.

Thus, from the agency theory perspective, I make the following hypothesis:

*H1b: the stickiness of SG&A costs is positively associated with CEO's tenure.*

### **3.1.3 CEO Age**

CEO age could be regarded as another proxy for agency problems. Personal characteristics that change with age would influence the decisions of CEOs. Bertrand and Mullainathan (2003) hold the view that CEOs prefer a quiet life when they grow older. The costly assignments which could bring pressure or destroy their reputation would not be considered seriously by CEOs. When CEOs grow older, the energy level declines (Roberts and Rosenberg 2006) and CEOs would avoid costly activities which could be beneficial to companies.

Another factor which is influenced by CEO age is the risk-averse behavior. When CEOs get older, they do not prefer to execute risky projects. This behavior gives rise to agency conflicts because shareholders may require CEOs to take relatively risky strategies which could bring companies payoffs in order to maximize the potential competence of companies (Holmström 1999). McClelland and O'Brien (2011) hold the view that although stock holdings could align the interests of managers with the interests of shareholders, this function is reduced by the greater age. Supporting this assumption, they find that CEOs with more undiversified portfolios become more risk-adverse, which comprises maximal value of shareholders. CEOs with older age have more incentives to chase easier projects which could not be too risky for companies

Therefore, CEOs with older age have more incentives to protect their personal benefits and reputation. Managers would keep unutilized costs to avoid more costly projects. Furthermore, when CEOs have more



risk-adverse incentives with older age, they would prefer protecting their present benefits rather than gaining more potential value for companies.

Thus, I propose the following hypothesis:

*H1c: the stickiness of SG&A costs is positively associated with CEO's age.*

#### **3.1.4 CEO Fixed Pay**

Salary is recognized as CEO fixed pay. Consistent with agency theory, Goldberg and Idson (1995) find significant agency problems on CEO compensations, and the impact of agency problems is greatest on the most liquid of compensations such as salaries.

Regarding to agency conflicts, one approach to better align interests between managers and shareholders is to include equity-based competition in the competition package of managers. Mehran (1995) holds the view that it is the form of compensation instead of the level of competition that gives managers motivation to increase value of the companies. Mehran (1995) shows the result that firm performance is positively related with equity-based competition. By aligning the interests between managers and shareholders, equity-based compensation have a positive influence on the value of companies (Kumar and Sopariwala 1992). Prior researches illustrate that the equity-based competition can enhance the performance of a company because equity-based competition will fluctuate with the changes of firm value. Thus, equity-based competition can better align the interests between managers and shareholders because the equity-based compensation is related with the performance of company.

Being different from the equity-based competition, fixed salary cannot provide enough incentives to align the interests between managers and shareholders. Fixed salary is not directly linked with performance of companies. Thus, managers with higher proportion of fixed salary in their competition package do not have enough motivations to devote more costly activities or to make further operation improvements. The whole compensation structure is composed by fixed salary and equity-based compensation such as bonus, shares and options. The higher proportion of CEO fixed salary in the compensation structure would not give managers sufficient incentives to reduce unutilized costs, which generates higher degree of cost stickiness.

Thus, I make the following hypothesis:

*H1d: the stickiness of SG&A costs is positively associated with CEO's fixed pay.*

#### **3.2 The Moderating Effect of Competition Intensity on the Association between Agency Problems and Cost Stickiness**

The second hypothesis interprets whether competition intensity could moderate the association between agency problems and the stickiness of SG&A costs.

Banker, Flasher and Zhang (2014) illustrate that the different strategic positioning leads to different degree of cost stickiness. Companies need to enhance their competition ability to survive in the intense competitive environment. By applying the different strategic positioning, companies choose the best

strategy to operate and make costs adjustments. Most economic researchers state that competition as a market mechanism assists achieving an efficient allocation of resources, which could reduce the agency problems.

Machlup (1967) holds the view that a higher degree of product market competition reduces managerial slack. Consistently, Hart (1983) develops that the relation between competition and managerial slack is result of the interest conflicts between managers and shareholders. Chhaochharia, Grullon and Grinstein (2009) find that companies in less competitive industries are less efficiency. Companies in less competitive industries experience more agency problems than those in more competitive industries. Furthermore, Sarbanes Oxley Law enacts provisions such as increase penalties related with frauds in order to reduce information asymmetry and to increase efficiency of companies. Due to the increase of information symmetry, Sarbanes Oxley Law gives shareholders and auditors opportunities to monitor behavior of managers. Due to the positive influence of Sarbanes Oxley Law on efficiency improvement for companies, SOX provides an additional powerful influence on reducing agency problems. Thus, Chhaochharia, Grullon and Grinstein (2009) also illustrate that through the increasing impact of SOX Law on activities of companies, the efficiency of companies in less competitive industries is significantly improved; however SOX law does not show too much influence on more competitive industries. Sarbanes Oxley Law, as an external monitoring mechanism, has a significant impact on mitigating the agency problems in less competitive industries.

Furthermore, prior researches demonstrate that corporate governance can reduce the agency conflicts and give an efficient monitoring function. Efficient corporate governance can reduce the stickiness of SG&A costs caused by empire building incentives (Chen, Lu and Sougiannis, 2012). Competition intensity, regarded as the supplement of corporate governance, can reduce information asymmetry between managers and shareholders and provide shareholders an opportunity to compare the performance of companies with the performance of competitors (Machlup 1967; Ammann, Oesch and Schmid 2013; Giroud and Mueller 2011). Competition intensity could give shareholders, board directors and auditors more information which they could notice by comparing the operation level and financial information of peer companies. Moreover, when competition is fierce in an industry, managers experience more pressure due to the falling prices. Managers have more incentives to keep profits in order to survive in fierce competition. The self-interested incentives have to be restricted due to the high competition level. As fierce competition intensity reduces prices of products, the sales revenue of companies would decrease. Managers have to reduce unutilized costs which are beneficial to themselves, and therefore performance of companies could be enhanced.

The higher level of competition generates more information for shareholders, board directors and auditors to analyze operation efficiency of companies. When information symmetry improves, the self-interested incentives of managers are restricted. Managers have to reduce the slack resources which could generate more personal benefits for themselves, and therefore the value-destroying activities are avoided. When the competition intensity is low, managers experience less pressure from peer companies. Low competition intensity could not bring as much information as high competition intensity does. Managers

have incentives to retain unutilized costs which can be beneficial to themselves, leading to a higher degree of cost stickiness. Therefore, I propose the following hypothesis:

*H2: the association between agency problems and the stickiness of SG&A costs is moderated by competition intensity.*

## Chapter 4 Research Design

This chapter describes the sample selection process, the definitions of variables and the explanations on regressions.

### *4.1 Sample Selection*

I obtain selling, general and administration expenses, sales revenue and other financial variables from Compustat - North America database. Besides, CEO tenure, CEO age and other executive related variables are obtained from Execucomp database. As the newest available data from Execucomp database are until 2014, I set the research period from 2005 to 2014.

Table 1 states the sample selection process. Following the research of Anderson, Banker and Janakiraman (2003), I obtain 158,029 firm-year observations from Compustat - North America for the period 2003-2014. Because the control variable - Success Decrease requires the comparison between the previous year and the year before that, I select data from fiscal year 2003 to 2014. I exclude the data from financial institutions (SIC 6000-6999) and public utilities (SIC 4900-4999) to reduce the extreme values in samples. Then, I drop missing data on SG&A costs and sales revenue for the current year and the previous year to meet the requirement of regression. Furthermore, I also drop the data when sales revenue is smaller than SG&A costs and get 57,735 observations. Next, I merge the data from Compustat - North America with those from Execucomp database. After merging, there are 16,592 observations in my sample. Then, I trim the top and the bottom 0.5% of the observations with extreme values in the change of SG&A costs and the change of sales revenue. After dropping the missing data on all variables, there are 12,212 observations in my sample. Especially, I exclude the samples with the inconsistent directions of sales revenue and SG&A costs because these observations will increase the degree of sticky costs (Anderson and Lanen 2009). Finally, the sample has 9,575 observations in total.

## Tables:

**Table 1: Sample Selection Procedures**

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Sample Selection Procedures:	Number of Observations
(1) Unique observations in Compustat North America database from fiscal year 2005 to fiscal year 2014	158,029
(2) Exclude financial institutions and public utilities (SIC 6000-6999, SIC 4000-4999)	87,038
(3) Drop observations with missing data on SGA costs and sales revenue for the current year and previous year	75,613
(4) Drop observations for which sales revenue is smaller than SGA costs	57,735
(5) Merge the Compustat variables with Execucomp variables	16,592
(6) Trim top and bottom 0.5% of the observations with extreme values in the change of SG&A costs and the change of sales revenue	12,701
(7) Drop observations with missing data on variables	12,212
(8) Exclude observations where sales and SGA costs move in the opposite directions	9,575

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## **4.2 Variable Measurements**

### **4.2.1 Agency Variables**

Table 2 panel A presents the measurements for agency variables. I use free cash flow, CEO tenure, CEO age and CEO fixed pay as proxies for agency problems. Free cash flow is a common proxy for measuring agency problem (Jensen 1986; Masulis, Wang and Xie 2007; Stulz 1990; Shleifer and Vishny 1997). It is defined as cash flow from operating activities (OANCF) minus common and preferred dividends (DVC, DVP respectively) scaled by total assets (AT). CEO tenure is the time period when executive acts as CEO. CEO tenure is calculated as Data Date minus Date became CEO for each fiscal year. CEO age is defined as the age when executive acts as CEO. CEO fixed pay is calculated as salary scaled by total competition (TDC1)(Goldberg and Idson 1995).

### **4.2.2 Competition Intensity Variable**

Table 2 panel B presents the measurement for competition intensity variable. Competition intensity presents the level of competition within an industry. There are several measurements of competition intensity, such as numbers of companies in an industry and concentration ratio. The most popular measurement of competition intensity is Herfindahl-Hirschman Index (HHI). HHI is used by U.S. Department of Justice, Federal Trade Commission and empirical researchers because HHI takes both the number of companies in one industry and the size of specific company into consideration. HHI is defined as the sum of the squared markets shares (expressed as proportions) of all companies in the market. In this way HHI combines the number of companies in the industry and their size of distribution. HHI is a reverse code. When HHI approaches to 1, the competition intensity is low and the industry tends to be monopolized; when HHI approaches to 0, the competition intensity is high and the industry tends to present perfect competition. Thus, HHI is measured as below:

$$HHI = \sum_{i=1}^{N_j} S_{ijt}^2$$

; where  $S_{ijt}^2$  is the sales level of companies  $i$  in industry  $j$  year  $t$ ,  $N_j$  is the number of companies in industry  $j$  in year  $t$ . The sales level of an individual company represents net sales revenue divided by total sales revenue of the entire industry.

### **4.2.3 Control Variables**

Table 2 panel C presents the measurements for control variables. I use employee intensity, asset intensity and success decrease as control variables. ABJ find that the number of employees in a company is positively associated with cost stickiness as the dismissing, training or restricting are more time consuming and costly. Employee intensity is measured as the total number of employees (EMP) divided by sales revenue. ABJ also conclude that companies with more fixed assets have more sticky costs because fixed assets are hard and costly to change, drop or fix. Asset intensity is defined as total assets (AT) divided by sales revenue.

Another finding of ABJ is that managers would scale down resources when sales continuously decrease, and therefore the degree of cost stickiness decreases. Consistent with ABJ's measurement, success decrease is a dummy variable which equals 1 if sales revenue in year t-1 is less than sales revenue in year t-2; and otherwise equals 0.

**Table 2: Variable Definitions**

Variable Definitions	
Panel A: Variable definitions for the agency problems	
Free Cash Flow	$Free\ Cash\ Flow = \frac{OANCF - DVP - DVC}{AT}$
CEO Tenure	$CEO\ Tenure = Data\ Date - Date\ Become\ CEO$
CEO Age	$CEO\ Age = Executive's\ Age, where\ Executive\ is\ restricted\ to\ CEO$
CEO Fixed Pay	$CEO\ Fixed\ Pay = \frac{Salary}{TDC1}$
Panel B: Variable definitions for competition intensity	
Competition Intensity	$HHI = \sum_{i=1}^{N_j} S_{ijt}^2$
	where $S_{ijt}^2$ is the sales level of companies i in industry j year t; $N_j$ s the number of companies in industry j in year t
Panel C: Variable definitions for control variables	
Employee Intensity	$Employee\ Intensity = \frac{EMP}{Sales}$
Asset Intensity	$Asset\ Intensity = \frac{AT}{Sales}$
Success Decrease	$Success\ Decrease = 1, if\ Sale_t < Sale_{t-1};$ $= 0\ if\ Sale_t \geq Sale_{t-1}$

### 4.3 Regression Explanation

The basic regression derived by ABJ is:

$$\log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) + \beta_2 Decrease\_Dummy_{i,t} * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) + \epsilon_{i,t}$$

This model derived by ABJ provides a basic test for whether SG&A costs are sticky. The *Decrease\_Dummy<sub>i,t</sub>* variable equals 0 if sales revenue in year t-1 is lower than sales revenue in year t, which means that sales revenue increases. Thus, the coefficient of *SaleChang* ( $\beta_1$ ) measures the percentage increase in SG&A costs with a one percentage increase in sales revenue. The *Decrease\_Dummy<sub>i,t</sub>* variable equals 1 if sales revenue in year t-1 is higher than sales revenue in year t, indicating the sales revenue decreases. Thus, the sum of coefficient  $\beta_1$  and  $\beta_2$  measures the percentage increase in SG&A costs with a 1% decrease in sales revenue. In this regression, if costs are sticky, the degree of costs increase should be greater than the degree of costs decrease. Therefore, when costs are sticky,  $\beta_1 > 0$  and  $\beta_2 < 0$  will support this phenomenon.

Following this basic regression, I extended my regression as below:

$$\begin{aligned} \log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) &= \beta_0 + \beta_1 \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) + \beta_2 Decrease\_Dummy_{i,t} * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) \\ &+ \beta_{3-6} Decrease\_Dummy_{i,t} * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) * AgencyVar_{i,t} + \beta_{7-10} AgencyVar_{i,t} \\ &+ \beta_{11-13} ConVar_{i,t} + \epsilon_{i,t} \end{aligned}$$

In this regression, *AgencyVar<sub>i,t</sub>* stands for free cash flow, CEO tenure, CEO age and CEO fixed pay. *ConVar<sub>i,t</sub>* stands for employee intensity, asset intensity and success decrease. Followed prior researches, continuous variables in interaction terms are mean-centered before they are regressed (Aiken, West and Reno 1991). I also included year dummies and industry dummies for all regressions.



## Chapter 5 Empirical Results

This chapter shows the descriptive statistics for all variables from 2005 to 2014, the empirical results on the positive association between agency problems and the stickiness of SG&A costs and the results on the moderating effect of competition intensity. Then, further analysis gives more details on cost anti-stickiness phenomenon and the impact of the degree of competition intensity.

### *5.1 Descriptive Statistics*

Table 3 reports the descriptive statistics for all variables. Sample includes 9,575 firm-year observations for the period 2005-2014. Focusing on Panel A, the mean of sales revenue is 4,739 million (median=1,616 million) in 9,575 observations in the past decade; SG&A costs on average is 923 million (median=322 million). The mean of SG&A costs as a percentage of sales revenue is 25.57% with a median of 22.95%. These results are comparable with those of Anderson, Banker and Janakiraman (2003) and Chen, Lu and Sougiannis (2012).

Turning to Panel B, on average each firm has 5 employees (median =3.69) and 1.24 million asset (median=1.05) to arrange daily operation. The success decrease within continuous two years is not common in the past decade (mean=0.1) and the median company does not experience this continuous decrease in sales revenue (median=0).

Panel C provides statistics description on agency variables. On average free cash flow takes 11% of total asset (median=0.1). Managers act as CEO for 7.11 years averagely (median=5) and the mean age of CEO is 55.46 (median=55). CEO fixed pay only accounts 25% of total compensation (median =0.19).

Lastly, the competition intensity on average is 0.2915 with a median of 0.0106. The lower quantile of HHI is 0.009231 and the upper quantile of HHI is 0.037199.

**Table 3: Descriptive Statistics:**

	Mean	Media	Std. Dev	Lower Quantile	Upper Quantile
<b>Panel A: Sales Revenue and SG&amp;A Costs</b>					
Sales Revenue (\$mil)	4,739	1,616	8,980	-	-
SG&A Costs (\$mil)	923	322	1,799	-	-
SG&A as % of Sales Revenue	25.57%	22.95%	16.12%	-	-
<b>Panel B: Control Variables</b>					
Employee Intensity	5.19	3.69	6.61	-	-
Asset Intensity	1.24	1.05	0.82	-	-
Success Decrease	0.10	0.00	0.30	-	-
<b>Panel C: Agency Variables</b>					
Free Cash Flow	0.11	0.10	0.07	-	-
CEO Tenure	7.11	5.00	7.11	-	-
CEO Age	55.46	55.00	7.11	-	-
CEO Fixed Pay	0.25	0.19	0.20	-	-
<b>Panel C: Competition Intensity</b>					
HHI	0.0291498	0.0106075	0.029603	0.009231	0.037199

## 5.2 Empirical Results:

### 5.2.1 The Association between Agency Problems and the Stickiness of SG&A Costs

The first hypothesis predicts that the stickiness of SG&A costs is positively associated with agency problems, which indicates that the agency problems could increase the degree of cost stickiness. Based on the regression, a significantly positive  $\beta_1$  and a significantly negative  $\beta_2$  can show a prominent support for cost stickiness phenomenon.

The results accept the hypothesis that agency problems are positively associated with the stickiness of SG&A costs in the past decade. Table 4 shows the results on the association between agency problems and the stickiness of SG&A costs. In Table 4, coefficient of *SaleChang* ( $\beta_1$ ) is significantly positive 0.693 ( $t=74.46$ ). The result indicates that SG&A costs increase 69.3% with 1% increase in sales revenue. Coefficient of *Decrease\_Dummy<sub>i,t</sub> \* SaleChange* ( $\beta_2=-0.0947$ ;  $t=-5.3$ ) provides strong support for cost stickiness phenomenon. The combined value of  $\beta_1$  and  $\beta_2$  ( $\beta_1 + \beta_2 = 0.5983$ ) shows that SG&A costs decrease 59.83% with 1% decrease in sales revenue. Therefore, based on these results, SG&A costs are sticky during this decade among companies in North America.

In terms of the hypotheses of agency problems, hypothesis 1a predicts that a higher level of free cash flow would lead to a higher degree of sticky costs. Thus, the significantly negative coefficient of free cash flow could support that free cash flow is positively associated with the stickiness of SG&A costs. The result accepts the hypothesis. The significantly negative coefficient of free cash flow ( $\beta=-0.699$ ;  $t=-3.22$ ) shows that the higher level of free cash flow shift the stickiness of SG&A costs to a higher degree.

Hypothesis 1b interprets a positive association between CEO tenure and the stickiness of SG&A costs, which means that a longer period of CEO tenure would lead to a higher degree of stickiness of SG&A costs. To be consistent with this hypothesis, the interaction term of CEO tenure need to acquire a significantly negative coefficient. The result accepts the hypothesis that the longer period of CEO tenure ( $\beta=-0.00456$ ;  $t=-1.79$ ) increases the degree of the stickiness of SG&A costs.

Hypothesis 1c predicts a positive association between CEO age and the stickiness of SG&A costs as the older CEOs would have more self-interested incentives. Thus, I expect a negative coefficient to interpret the association between CEO age and the stickiness of SG&A costs. Supporting hypothesis 1c, the significantly negative coefficient of CEO age ( $\beta=-0.00657$ ;  $t=-2.65$ ) shows that CEO age is positively associated with the stickiness of SG&A costs.

Hypothesis 1d assumes that a higher proportion of CEO fixed pay in CEO's total compensation package would lead to a higher degree of stickiness of SG&A costs, thus I expect the coefficient of CEO fixed pay to be negative. Table B shows that the coefficient of CEO fixed pay ( $\beta=-0.419$ ;  $t=-5.4$ ) is significantly negative. The result accepts the hypothesis that a higher proportion of CEO fixed pay in CEO's total compensation package lead to a higher degree of stickiness of SG&A costs.

Being different from the results of Chen, Lu and Sougiannis (2012) which have a significantly positive coefficient of CEO fixed pay, the significantly negative coefficient of CEO fixed pay shows the degree of

stickiness of SG&A costs is higher when CEO fixed pay occupies a larger proportion in compensation package. Chen, Lu and Sougiannis (2012) include bonus and salary as components of CEO fixed pay. However, bonus is usually regarded as equity based compensation. In terms of agency problems, equity based compensation is an effective method to align interests between managers and shareholders. Managers would consider their personal benefits which are tied with the performance of companies. Consistently, Jackson and Lopez (2008) find that bonus compensation is more related with firm performance than critics claim. Thus, CEOs would have more incentives to align interests with shareholders, reducing the agency conflicts.

To sum up, the statistic results show that the higher proportion of CEO fixed pay leads to a higher degree of stickiness of SG&A costs. This finding supports the assumption that compensation structure matters to reduce the agency conflicts; and higher proportion of CEO fixed pay cannot better align interests between shareholders and managers.

ABJ hold the view that the number of employees is a factor which could influence cost stickiness because it is costly and time consuming to reduce the costs which are related with employees. Consistent with their prediction, ABJ find that the number of employees in companies is positively associated with the stickiness of SG&A costs. However, in Table 4, the coefficient of control variable - employee intensity is insignificant ( $\beta=-0.279$ ;  $t=-1.51$ ), which means that more employees in a company could not lead to a higher degree of stickiness of SG&A costs. This inconsistent result can be explained by the fact that as the technology improves in recent decade, the productivity of labor and organization of companies are more optimized. So managers can decrease requirement of labor resources even when sales revenue decreases.

$$\begin{aligned}
& \log\left(\frac{SG\&A_{i,t}}{SG\&A_{i,t-1}}\right) \\
&= \beta_0 + \beta_1 \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) + \beta_2 Decrease\_Dummy_{i,t} * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) \\
&+ \beta_{3-6} Decrease\_Dummy_{i,t} * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) * AgencyVar_{i,t} + \beta_{7-10} AgencyVar_{i,t} \\
&+ \beta_{11-13} ConVar_{i,t} + \epsilon_{i,t}
\end{aligned}$$

**Table 4: the Association between Agency Problems and the Stickiness of SG&A Costs**

	Coefficient Estimates	
	Coefficient	T-Stat
Sales Change $\beta_1$	+ 0.693***	74.46
DecreaseDummy*Sales Change $\beta_2$	- -0.0947***	-5.3
<b>Interactions: (Variable*DecreaseDummy*Sales Change)</b>		
Free Cash Flow	- -0.699***	-3.22
CEO Tenure	- -0.00456*	-1.79
CEO Age	- -0.00657***	-2.65
CEO Fixed Pay	- -0.419***	-5.4
<b>Control Variables:</b>		
Free Cash Flow	0.0373**	2.01
CEO Tenure	0.000836***	4.61
CEO Age	-0.000765***	-4.22
CEO Fixed Pay	-0.0112*	-1.81
Employee Intensity	-0.279	-1.51
Asset Intensity	0.0111***	6.71
Success Decrease	-0.0442***	-10.4
Industry Dummies	Controlled	
Year Dummies	Controlled	
Observations	9,575	
R-squared	0.596	

### 5.2.2 The Moderating Effect of Competition Intensity

Hypothesis 2 predicts that competition intensity could moderate the association between agency problems and the stickiness of SG&A costs. To test the moderating effect of competition intensity, I split the sample into low and high competition intensity subsamples by median of Herfindahl-Hirschman Index. When HHI approaches to 1, the competition intensity is low and the industry tends to be monopolized. When HHI approaches to 0, the competition intensity is high and the industry tends to present perfect competition. Thus, I define low and high competition intensity as follows: competition intensity is low when HHI is smaller than the median HHI; and competition intensity is high when HHI is bigger than median HHI. I estimate for each subsample and compare the coefficients on the agency variable interaction terms  $Dec\_Dummy_{i,t} * SaleChange * AgencyVar$  between the high and low competition intensity subsample.

The results accept the hypothesis that low competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. Table 5 presents the results of moderating effect of competition intensity. The first column shows the results when competition intensity is low ( $HHI > \text{median HHI}$ ). The coefficient of *SaleChang* ( $\beta_1=0.735$ ;  $t=43.2$ ) is positively significant. This result indicates that costs increase 73.5% with 1% increase in sales revenue. The coefficient of  $Dec\_Dummy_{i,t} * SaleChange$  ( $\beta_2=-0.213$ ;  $t=6.43$ ) is negatively significant. The combined value of  $\beta_1$  and  $\beta_2$  ( $\beta_1 + \beta_2=0.522$ ) shows that costs decrease 52.2% with 1% decrease of sales revenue. Thus, these results show that with 1% increase in sales revenue, SG&A costs increase 74.4%; but with the same volume of sales decrease, SG&A costs only decrease 52.2%. Thus, when companies experience low competition level, SG&A costs are sticky on average.

In terms of the association between agency problems and the stickiness of SG&A costs, the coefficient of CEO age ( $\beta=-0.0106$ ;  $t=-2.35$ ) is negatively significant. The result indicates that CEO age is positively associated with the stickiness of SG&A costs among companies in low competition intensity. When competition intensity is low, the higher level of CEO age leads to a higher degree of stickiness of SG&A costs.

Furthermore, the results reject the hypothesis that high competition intensity weakens the impact of agency problems on the stickiness of SG&A costs. The second column shows the results when competition intensity is high ( $HHI < \text{median HHI}$ ). The significantly positive coefficient of *SaleChang* ( $\beta_1=0.644$ ;  $t=61.16$ ) illustrates that costs increase 64.4% with 1% increase in sales revenue; however, the coefficient of  $Decrease\_Dummy_{i,t} * SaleChange$  ( $\beta_2=0.013$ ;  $t=0.61$ ) is not statistically significant. This insignificant coefficient means that when competition intensity is high, there is no sticky costs phenomenon among companies in the period 2004-2015.

Regarding to the impact of agency problems on SG&A costs, the coefficients of free cash flow ( $\beta=-0.751$ ;  $t=-2.5$ ), CEO tenure ( $\beta=-0.0347$ ;  $t=-1.77$ ) and CEO fixed pay ( $\beta=-0.74$ ;  $t=-8.19$ ) are all significantly negative. Inconsistent with hypothesis, these results show that when competition intensity is high, agency problems caused by free cash flow, CEO tenure and CEO fixed pay are positively associated with the

stickiness of SG&A costs. These results suggest that when competition intensity is high, the higher level of free cash flow, the longer CEO tenure and the higher CEO fixed pay lead to a higher degree of stickiness of SG&A costs.

One explanation of these results is that competition intensity does not play the same role as corporate governance does. Chen, Lu and Sougiannis (2012) find that when corporate governance is strong, empire building incentives cannot give significant impact on the stickiness of SG&A costs. However, although competition intensity has the monitoring function on agency problems, the impact of competition intensity is indirect and external. Randøy and Jenssen (2004) find that boards tend to be more independent in companies among less competition industries. Chhaochharia, Grullon and Grinstein (2009) who focus on the interaction between product competition and governance mechanism provide with the same idea that companies in competitive industries experience less sufficient corporate governance mechanism.

Corporate governance mechanism, acting as internal monitoring function, can provide a more direct effect on agency problems than competition intensity does. The board directors, internal and external auditors and shareholders have sufficient opportunities to understand CEO's management. Besides, competition intensity, which is possible to reflect the performance and efficiency of companies, provides an external method for board members, auditors and even shareholders to analyze the operation level of the companies. Because the selling, general and administrative expenses are related to internal operating conditions of the company, if corporate governance mechanism is less sufficient in competitive industries, the high competition intensity could not fully develop its monitoring ability.

As the impact of competition intensity is not as strong as that of corporate governance, another explanation is that the competition intensity is not fierce enough to restrict the self-interested incentives of the managers. As the external monitoring mechanism to reduce agency problems, competition intensity gives an indirect method to reduce agency problems by improving information symmetry and providing comparable information for shareholders, board directors and auditors. Thus, I made further analysis to test whether the degree of competition intensity could influence the association between agency problems and the stickiness of SG&A costs.

**Table 5: the Moderating Effect of High and Low Competition Intensity**

	Low competition intensity HHI>median(0.0106075)		High competition intensity HHI<median (0.0106075)	
	Coefficient	t-stat	Coefficient	t-stat
Sales change $\beta_1$	0.735***	43.2	0.644***	61.16
DecreaseDummy*sales change $\beta_2$	-0.213***	-6.43	0.013	0.61
<b>Interactions: (Variable*decreasedummy* sales change)</b>				
Free Cash Flow	-0.172	-0.47	-0.751**	-2.5
CEO Tenure	0.000637	0.23	-0.00347*	-1.77
CEO Age	-0.0106**	-2.35	-0.00142	-0.49
CEO Fixed Pay	-0.0137	-0.09	-0.740***	-8.19
<b>Control variables:</b>				
Free Cash Flow	0.0413	1.35	0.0429*	1.84
CEO Tenure	0.000862***	2.71	0.000733***	3.38
CEO Age	-0.000986***	-3.12	-0.000467**	-2.18
CEO Fixed Pay	0.00135	0.13	-0.0268***	-3.51
Employee Intensity	-0.437*	-1.91	0.541	1.01
Asset Intensity	0.00638**	2.51	0.0169***	7.5
Success Decrease	-0.0571***	-7.64	-0.0352***	-6.99
Year Dummies	Controlled		Controlled	
Industry Dummies	Controlled		Controlled	
Observations	4215		4,776	
R-squared	0.524		0.682	



### **5.3 Further Analysis**

The further analysis tests the research question whether the degree of competition intensity shows moderating effect on association between agency problems and the stickiness of SG&A costs.

Nowadays, as the market and industries become more mature and experienced, averagely the competition intensity is higher than it was in past decades. Previous researchers focus more on non-competitive industries or the low competition intensity. As the substitute for corporate governance mechanism, competition intensity has some impacts on agency conflicts. Based on previous researches that corporate governance mechanism is not as strong as it is recognized in high competition industries, I make further analysis on whether the lower or higher degree of competition intensity could moderate the association between agency problems and the stickiness of SG&A costs.

Even though high competition intensity could not fully develop its impact on agency problems, the higher degree of competition intensity could mitigate the deficiency of corporate governance mechanism. When competition intensity is higher, companies tend to experience perfect competition. Experiencing more pressure from competitors, managers have to keep their performance and reputation. Managers have to reduce the unutilized costs into optimal levels, which indicates that their self-interested incentives are restricted.

Furthermore, the shareholders will experience more pressure among fierce competition because the possibilities of bankruptcy and risks in investment are higher than usual. The higher competition intensity also gives shareholders more information in the industry, indicating that information asymmetry is better reduced. Thus, shareholders could better monitor the operation of companies.

Based on these assumptions, I make further analysis on whether the degree of competition intensity would affect the association between agency problems and the stickiness of SG&A costs. Using the same sample during the period 2005-2014, I split sample into higher competition intensity, high and low competition intensity and lower competition intensity subsamples by lower quantile, median and upper quantile of HHI. As showing in Table 2 Panel C, the lower quantile of HHI is 0.0092309 and the upper quantile of HHI is 0.037199. I define lower and higher competition intensity as follows: competition intensity is lower when HHI is smaller than the lower quantile of HHI; and competition intensity is higher when HHI is bigger than higher quantile of HHI.

#### **5.3.1 The Comparison between Results of Low and Lower Competition Intensity**

Table 6 shows the comparable results between low competition (HHI>median) and lower competition (HHI>upper quantile).

The results in Table 6 accept the hypothesis that lower competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. In terms of low competition intensity, the significantly positive coefficient of *SaleChange* ( $\beta_1=0.735$ ;  $t=43.2$ ) illustrate that SG&A costs increase 73.5% with 1% increase in sales revenue. The coefficient of *Decrease\_Dummy<sub>i,t</sub> \* SaleChange* ( $\beta_2=-0.213$ ;  $t=-6.43$ ) is

negative and significant. The combined value of  $\beta_1$  and  $\beta_2$  ( $\beta_1 + \beta_2=0.522$ ) indicates that SG&A costs decrease 52.2% with 1% decrease in sales revenue.

Regarding to lower competition intensity, the coefficient of *SaleChange* is 0.673 ( $\beta_1=0.673$ ;  $t=31.32$ ), which means that SG&A costs increase 67.3% with 1% increase in sales revenue. The coefficient of *Decrease\_Dummy<sub>i,t</sub> \* SaleChange* is -0.190 ( $\beta_2=-0.19$ ;  $t=-4.73$ ). The combined value of  $\beta_1$  and  $\beta_2$  ( $\beta_1 + \beta_2=0.483$ ) shows that SG&A costs decrease 48.3% with a 1% decrease in sales revenue. Overall, in both the low and lower competition intensity, SG&A costs are sticky on average.

Consistent with hypothesis 2, when competition intensity is low, the negative and significant coefficient ( $\beta=-0.0106$ ;  $t=-2.35$ ) of CEO age shows that CEO age is positively associated with the stickiness of SG&A costs. When competition intensity is lower, the coefficient of CEO age is negative and significant ( $\beta=-0.0185$ ;  $t=-3.44$ ). This result means that when competition intensity is lower, only the higher level of CEO age will lead to a higher degree of stickiness of SG&A costs. This result gives support to hypothesis that when competition intensity is low and even lower, the higher level of CEO age would shift the stickiness of SG&A costs to a higher degree.

**Table 6: the Moderating Effect of Low and Lower Competition Intensity**

	Low Intensity HHI>Median(0.0106075)	Competition T-Stat	Lower Intensity HHI>P75 (0.0371994)	Competition t-stat
	Coefficient		Coefficient	
Sales Change $\beta_1$	0.735***	43.2	0.673***	31.23
DecreaseDummy*Sales Change $\beta_2$	-0.213***	-6.43	-0.190***	-4.73
<b>Interactions: (Variable*DecreaseDummy*Sales Change)</b>				
Free Cash Flow	-0.172	-0.47	0.0499	0.12
CEO Tenure	0.000637	0.23	0.00445	1.42
CEO Age	-0.0106**	-2.35	-0.0185***	-3.44
CEO Fixed Pay	-0.0137	-0.09	0.00151	0.01
<b>Control Variables:</b>				
Free Cash Flow	0.0413	1.35	0.0524	1.18
CEO Tenure	0.000862** *	2.71	0.000861*	1.89
CEO Age	- 0.000986** *	-3.12	-0.00112**	-2.45
CEO Fixed Pay	0.00135	0.13	-0.0104	-0.64
Employee Intensity	-0.437*	-1.91	-0.600*	-1.67
Asset Intensity	0.00638**	2.51	0.00550*	1.79
Success Decrease	-0.0571***	-7.64	-0.0713***	-6.77
Year Dummies	Controlled		Controlled	
Industry Dummies	Controlled		Controlled	
Observations	4465		2,314	
R-squared	0.524		0.546	

### 5.3.2 The Comparison between Results of High and Higher Competition Intensity

The results in table 7 show that when competition intensity is higher, SG&A costs become anti-sticky in the past decade. Table 7 shows the comparable results between high competition (HHI<median) and higher competition (HHI<lower quantile). As discussed above, when competition intensity is high, SG&A costs are not sticky on average. However, when competition intensity is higher (HHI<lower quantile HHI), SG&A cost becomes anti-stickiness. The positive and significant coefficient of *SaleChang* is 0.612 ( $\beta_1=0.612$ ;  $t=43.34$ ), which indicates that SG&A costs increase 61.2% with 1% increase in sales revenue. However, the coefficient of *Decrease\_Dummy<sub>i,t</sub> \* SaleChange* is positive and significant ( $\beta_2=0.166$ ;  $t=3.83$ ). The combined value of  $\beta_1$  and  $\beta_2$  ( $\beta_1 + \beta_2=0.778$ ) indicates that SG&A costs decrease 77.8% with 1% decrease in sales revenue.

The phenomenon which costs decrease more than increase with the same fluctuation in volume of sales revenue is called cost anti-stickiness. Cost anti-stickiness is labelled by researches as costs increase less in response to sales increases than costs decrease when sales decrease equally (Weiss, 2010). Prior researches find that cost anti-stickiness is closely linked with future sales forecast and expectation of the managers. They explain that managers would reduce unutilized costs when sales are not expected to grow continuously. However, from the impact of competition intensity perspective, managers have to decrease unutilized costs to better meet competition requirements on profits. Thus, companies in higher competition intensity experience the cost anti-stickiness phenomenon.

The results in Table 7 accept the hypothesis that higher competition intensity weakens the impact of agency problems on the anti-stickiness of SG&A costs. In terms of the moderating effect of competition intensity, table 7 shows the results of the association between agency problems and the anti-stickiness of SG&A costs when competition intensity is higher. The coefficients of free cash flow ( $\beta=-0.47$ ;  $t=-0.72$ ), CEO tenure ( $\beta=-0.00424$ ;  $t=-0.99$ ) and CEO age ( $\beta=-0.00632$ ;  $t=-1.21$ ) are insignificant. These results support that the higher competition intensity could weaken the impact of agency problems on cost anti-stickiness. When competition is extremely fierce, managers have to reduce more unutilized costs. From the agency theory perspective, cost anti-stickiness phenomenon can be explained by the fact that the self-interested incentives of the managers are restricted and the interests between managers and shareholders are better aligned. Thus, the insignificant coefficients of agency variables (free cash flow, CEO age and CEO tenure) indicate that when competition intensity is higher, agency problems could not affect the anti-stickiness of SG&A costs.

However, table 7 shows that the coefficient of CEO fixed pay is negatively significant ( $\beta=0.882$ ;  $t=-4.21$ ) when competition intensity is higher. This result indicates that the degree of anti-stickiness of SG&A costs is lower with a larger proportion of CEO fixed pay in the total compensation package. The higher proportion of CEO fixed pay indicates that CEOs have more incentives to chase for their personal benefits. When the competition intensity is higher, the degree of anti-stickiness of SG&A costs is reduced by CEO's self-interested incentives. This finding suggests that even when competition intensity is higher, CEOs who have

self-interested incentives does not reduce more unutilized SG&A costs. Overall, when competition intensity is higher, agency problems caused by free cash flow, CEO tenure and CEO age is not associated of SG&A cost anti-stickiness.

**Table 7: the Moderating Effect of High and Higher Competition Intensity**

	High Intensity HHI<Median(0.0106075)	Competition T-Stat	Higher Competition Intensity HHI<P75 (0.0092309)	t-stat
	Coefficient		Coefficient	
Sales Change $\beta_1$	0.644***	61.16	0.612***	43.34
DecreaseDummy*Sales Change $\beta_2$	0.013	0.61	0.166***	3.83
<b>Interactions: (Variable*DecreaseDummy*Sales Change)</b>				
Free Cash Flow	-0.751**	-2.5	-0.47	-0.72
CEO Tenure	-0.00347*	-1.77	-0.00424	-0.99
CEO Age	-0.00142	-0.49	-0.00632	-1.21
CEO Fixed Pay	-0.740***	-8.19	-0.882***	-4.21
<b>Control variables:</b>				
Free Cash Flow	0.0429*	1.84	0.0511	1.54
CEO Tenure	0.000733***	3.38	0.000789**	2.57
CEO Age	-0.000467**	-2.18	-0.000458	-1.55
CEO Fixed Pay	-0.0268***	-3.51	-0.0112	-0.98
Employee Intensity	0.541	1.01	0.675	0.87
Asset Intensity	0.0169***	7.5	0.0205***	6.58
Success Decrease	-0.0352***	-6.99	-0.0357***	-5.05
Year Dummies	Controlled		Controlled	
Industry Dummies	Controlled		Controlled	
Observations	4,776		2,440	
R-squared	0.682		0.666	

## Chapter 6 Conclusion

In this paper, I examine whether agency problems are positively associated with cost stickiness and whether competition intensity has a moderating effect on this association. Based on prior researches, I assume that agency problems, as one of the drivers of cost stickiness, could shift the stickiness of SG&A costs to a higher degree in the past decade. In addition, prior researches find that corporate governance could moderate the association between agency problems and cost stickiness. As competition intensity is regarded as the supplement of corporate governance, I assume that competition intensity could moderate the association between agency problems and cost stickiness.

The findings of this paper answer the research question that agency problems are positively associated with the stickiness of SG&A costs in the past decade. In addition, the findings show that low competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs; but high competition does not weaken the impact of agency problems on the stickiness of SG&A costs.

Supporting the hypothesis, the results show that during the past decade companies in North America experience the stickiness of SG&A costs on average and agency problems shift the stickiness of SG&A costs to a higher degree. Furthermore, low competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. When competition intensity is low, CEO age is positively associated with the stickiness of SG&A costs. Moreover, when competition intensity is high, SG&A costs are not sticky. However, agency problems lead SG&A costs to be sticky. When competition intensity is high, free cash flow, CEO tenure and CEO fixed pay is positively associated with the stickiness of SG&A costs. High competition intensity does not weaken the impact of agency problems on the stickiness of SG&A costs, indicating that the impact of competition intensity is indirect and corporate governance still matters.

Thus, the results suggest that competition intensity has some influence on agency conflicts when competition level is low; but it cannot replace the influence of corporate governance.

Considering the compounding results of the moderating effect of competition intensity, I make further analysis to test whether the degree of competition intensity would influence the association between agency problems and the stickiness of SG&A costs. These findings support the hypothesis that competition intensity has a moderating effect on association between agency problems and the stickiness of SG&A costs. Lower competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs; and higher competition intensity weakens the impact of agency problems on the anti-stickiness of SG&A costs.

When competition intensity is lower, SG&A costs are on average sticky and the higher level of CEO age shift the stickiness of SG&A costs to a higher degree. Thus, when competition intensity is low or even lower, competition intensity strengthens the impact of agency problems on the stickiness of SG&A costs. However, when competition intensity is higher, SG&A costs become anti-sticky. The anti-stickiness of SG&A costs can be explained as managers choose to reduce more unutilized costs when sales revenue

decreases and decide to increase less unutilized costs when sales revenue increases. Anti-stickiness of costs could be beneficial to companies because the unutilized costs are reduced significantly.

In terms of agency problems, free cash flow, CEO tenure and CEO age do not have a significant impact on reducing the degree of anti-stickiness of SG&A costs, which suggests that the higher degree of competition intensity weakens impact of agency problems on the anti-stickiness of SG&A costs. Under more fierce competition level, the industry may reach perfect competition. In this condition, managers have to reduce unutilized costs and their self-interested incentives are restricted by the fierce competition level. Moreover, the higher level of competition intensity also gives interests-related parties such as shareholders, board directors and auditors opportunities to compare information with competitors, which may be another contributor to increase the level of information symmetry.

This paper contributes to researches on the stickiness and anti-stickiness of SG&A costs and the impact of agency problems; besides, it also expands the scope of companies in North America during the past decade. By investigating on free cash flow, CEO tenure, CEO age and CEO fixed pay, this paper also gives some potential factors which may contribute to agency problems. Furthermore, a well-documented supplement of corporate governance is competition intensity. This paper fills the gap between competition intensity and asymmetric cost phenomenon and links the cost behavior with market competition. Due to the fact that the anti-stickiness phenomenon is relatively a new finding among literatures, the findings of this paper give an explanation on the association between the degree of competition intensity and cost anti-stickiness.

The caveats of this paper can be summarized as follows. First, due to the complexity of reality in this topic, I tried best to include control variables (such as employee intensity, asset intensity and success decrease) to figure out an impact on asymmetric cost, but they cannot be all the control variables. Second, the proxies for agency problem may be not good enough to reflect the self-interested incentives for managers. Third, because the theory of anti-stickiness of costs is not well documented and researchers only find anti-stickiness of costs is related with pessimistic economic environment, the anti-stickiness phenomenon is possible to make further analysis.

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