

# ARE MIDDLE MANAGERS' COST DECISIONS STICKY? EVIDENCE FROM THE FIELD

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**ABSTRACT:** *Anderson, Banker, and Janakiraman (2003) show that costs are “sticky” (i.e., costs change relatively less when sales decrease than when sales increase) because managers are reluctant to cut resources when sales decrease. We predict that cost behavior at the middle management level is sticky also when the magnitude of sales increase is sufficiently large, considering that middle managers have more limited ability in adding resources and are more risk averse. Using a survey instrument and interviews, we find evidence that middle managers’ cost decisions are sticky at both ends. Our findings are supported by empirical evidence based on segment-level data.*

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**Key words:** *cost stickiness; asymmetric cost behavior; middle manager; resource allocation; budget constraints; risk aversion; business segments*

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**JEL classification:** M10, M41, D24

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## 1 INTRODUCTION

Anderson, Banker, and Janakiraman (2003, hereafter ABJ) and subsequent studies in the management accounting literature document that costs decrease relatively less when sales decrease than they increase when sales increase by an equivalent amount; i.e., costs are “sticky”. While the literature explains such asymmetric cost behavior as a result of asymmetric cost decisions by managers, most studies in cost stickiness literature either examine cost behavior at the corporate level or focus on CEOs as decision makers. In this study, we focus on middle managers who have significant influence on the corporate strategy through day-to-day operational decisions and also have characteristics distinct from those of CEOs or other top managers. Unlike prior studies that rely heavily on archival data to examine cost stickiness, we take a behavioral approach and more directly ask middle managers in practice about their cost decisions, using a survey instrument and interviews in addition to a regression analysis. We find that middle managers’ cost decisions are sticky not only when sales decrease but also when the magnitude of sales increase is sufficiently large.

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Cost decisions at the middle management level are important and thus worth examining because of two reasons. First, middle managers are more involved in the day-to-day operations of a company than top managers and are also likely to be the ultimate decision makers for the business unit and thus can have significant influence on the firm's overall costs (Kanter, 1982). Second, at the same time, middle managers' cost decisions are likely to be different from those of top managers because middle managers are likely to (1) have more limited ability in adding resources due to limited annual budgets and corporate-level policies or strategies to follow, which are typically set by top managers (Williamson, 1975; Mueller, 2003), and (2) be more risk averse because of their compensation structure, which is focused relatively more on fixed salary and less on incentives such as cash bonus and equity-based compensation.

To examine cost behavior at the middle management level, we conducted both a survey and field interviews, directly asking middle managers in practice to describe their decisions related to various types of costs, including overall SG&A costs, under various situations regarding the change in sales revenue. The analysis results based on the detailed interviews and 152 survey responses indicate that middle managers' cost decisions are sticky when sales decrease (or, to be more accurate, when the magnitude of sales decrease is sufficiently large), consistent with the findings in the previous empirical studies, and also when the magnitude of sales *increase* is sufficiently large. To complement our behavioral findings, we also conducted an empirical analysis using segment level data. The regression results based on 26,050 segment/year observations support our prediction and behavioral findings.

Our study contributes to the accounting and management literature in several ways. First, using a survey instrument and field interviews, we provide direct evidence that managers' resource capacity decisions are sticky, which supports the explanations in the previous studies based on empirical models and archival data (e.g., ABJ). Second, more importantly, we provide an additional insight that at least at the middle management level costs are sticky not only when sales decrease but also when a firm experiences a sufficiently large increase in sales revenue.

The rest of the paper is organized as follows. In Section 2, we review the prior literature on cost stickiness and middle managers and provide our research hypothesis. In Section 3, we describe the design and procedures of the survey instrument and interviews. Section 4 presents our data and summary statistics. In Section 5, the results of the quantitative and qualitative analyses are presented, followed by the conclusion in Section 6.

## 2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1 Cost stickiness

The asymmetric cost behavior, called “cost stickiness,” was first documented by ABJ. Using archival data spanning 20 years (from 1979 to 1998), ABJ showed that costs decrease less when sales fall than they increase when sales rise by an equivalent amount. ABJ argued that the fundamental reason for cost stickiness is that changing the levels of committed resources is costly. Adjustment costs include severance pay when employees are laid off, recruiting and training costs when new employees are hired, as well as organizational costs such as loss of morale among the remaining employees when colleagues are terminated. Because of the adjustment costs, managers will choose to retain unutilized resources to some extent when sales decline and there is uncertainty about the permanence of a decline in demand. In contrast, when demand increases beyond the available resource capacity, managers do not have as much discretion in adding resources because not doing so would result in losing not only current sales but also future sales because of disappointed customers. As a result of the asymmetry in resource capacity decisions, costs become sticky, i.e., costs decrease relatively less when sales fall than they increase when sales increase by an equivalent amount.

Consistent with this explanation, previous studies have shown that the degree of cost stickiness is related to macroeconomic factors and firm-specific factors which constrain resource adjustment. For instance, ABJ find that the cost stickiness is weaker when sales revenue also declined in the preceding period, stronger during periods of macroeconomic growth, and positively associated with the asset intensity and the employee intensity. Balakrishnan, Petersen, and Soderstrom (2004) find that the degree of cost stickiness is influenced by capacity utilization. Banker, Byzalov, and Chen (2013) focus on cross-country differences and find that the degree of cost stickiness is increasing in the strictness of employment protection legislation, consistent with ABJ’s adjustment cost theory.

While the literature explains the asymmetric cost behavior using asymmetric cost decisions of managers, behavioral factors affecting the cost decisions have been largely ignored in the prior literature. A few exceptions are Dierynck, Landsman, and Renders (2012), Kama and Weiss (2013), Chen, Lu, and Sougiannis (2012), and Banker, Jin, and Mehta (2018), all of whom focused, either explicitly or implicitly, on CEOs as the ultimate decision makers. Dierynck, Landsman, and Renders (2012), and Kama and Weiss (2013) find that incentives to avoid losses and earnings decreases or to meet financial analysts’ earnings forecasts managers expedite downward adjustments of slack resources when sales fall, lessening cost stickiness. Chen, Lu, and Sougiannis (2012) find that managers’ incentives to grow the firm beyond its optimal size or to maintain unutilized resources with the purpose of increasing personal utility from status, power, compensation, and prestige (i.e., empire building incentives) induce greater cost stickiness. Banker, Jin, and Mehta (2018) focus on managerial decision horizon and show that short-term cash bonus provides managers with incentives to cut more slack resources and thus induce less cost stickiness while long-

term incentives, such as stock option and restricted stock award, extend the managerial decision horizon and thus induce more cost stickiness.

## 2.2 Middle managers

While prior studies in the cost stickiness literature generally regard a firm's cost behavior as a result of the asymmetry in the cost decisions either at the corporate level or by top management, many cost-related decisions, including employment, asset acquisition, and overall SG&A spending decisions, are made by middle managers, such as department managers and regional managers, especially in decentralized firms. Middle managers and their business decisions are important mainly because middle managers have significant influence on strategic decision making process of the company. Middle managers are more involved in the day-to-day operations of a company than top managers and are often said to have their fingers on the "pulse of operation" (Kanter, 1982). Because of their deep involvement into the day-to-day operations, middle managers have the opportunity to report valuable information and suggestions from the inside of a company (Likert, 1961), which makes them play a critical role in the corporate level decision making process. By using bottom-up management processes, they communicate information and propose issues for top management (Floyd & Wooldridge, 1994; Dutton & Ashford, 1993; Dutton et al., 1997).<sup>3</sup> The significant influence of middle managers on corporate decisions, including investment in resource capacity decisions, suggests that firm-level cost behavior is also heavily affected by middle management decisions.

What makes middle managers and their cost decisions even more important and thus worth examining is that middle managers have characteristics distinct from those of top managers. First, middle managers are likely to have more constraints in the decision making process than top managers. The primary responsibility of a middle manager is to implement a strategy, set by the top management, in an effective and efficient manner (Floyd & Wooldridge, 1997; Huy, 2002; Delmestri & Walgenbach, 2005). During the implementation process, however, middle managers tend to have limited ability in adding resources, including human resources and long-term assets. Such a limit is typically set by top managers only. Managerial discretion arises, at least partly, from the authority to allocate the funds of the company to pursue their own interests (Mueller, 2003). This suggests that if middle managers are given too much power on resource allocation and pursue their own interests, for example, performance of the department, fewer resources or funds will be left for top managers who have their own interests, for example, company-level performance (Fama & Jensen, 1983; Eisenhardt, 1989). Thus, top managers tend to restrict middle managers' ability and monitor their behaviors in order to prevent middle managers from wasting the resources of the company and thereby limiting the top management's ability to utilize such resources (Williamson, 1975; Mueller, 2003).

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<sup>3</sup> For more insights into middle managers' involvement in the strategy or decision making process, see Burgelman (1983), Floyd & Wooldridge (1992a, 1992b, 1997, 1999), Huy (2001, 2002), Kanter (1988), Westley (1990), and Wooldridge & Floyd (1990).

Another distinctive characteristic of middle managers is that they are generally more risk averse than top managers because their future is narrowly dependent on their current tasks (Eisenhardt, 1989; Gomez-Mejia & Balkin, 1992; Shimizu, 2012). According to the agency theory, principals use various forms of non-salary components in the compensation package, such as cash bonus or long-term equity incentives, to provide risk-averse agents with incentives to take risk (Jensen & Meckling, 1976; DeFusco, Johnson, & Zorn, 1990; Murphy, 1999; Rajgopal & Shevlin, 2002). However, the portion of non-salary incentives is substantially smaller for middle managers compared to CEOs and other top managers (Belcher & Atchison, 1987), suggesting that managerial decisions of middle managers are likely to be more risk averse than those of top managers.

### 2.3 Research hypothesis

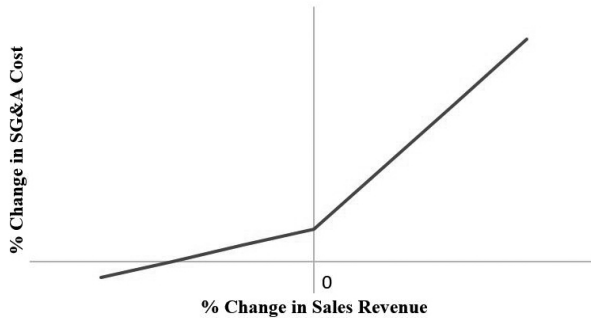
The distinctive characteristics of middle managers suggest that cost behavior at the middle management level may look different from that at the company or top management level. In specific, the cost stickiness theory assumes that companies' or top managers' ability to add resources are relatively less limited than their ability to cut slack resources, and as a result the relation between sales change and cost change is kinked at the point where sales change equals zero, as illustrated in Figure 1A. On the other hand, the middle managers' ability to change the level of cost or investment is limited for both adding and cutting as discussed above. In addition, middle managers, who are relatively more risk averse than top managers, are less likely to increase cost or investment substantially when the company or the business unit experiences a huge increase in revenue, concerning the permanence of the increase in demand. Based on this intuition, we formulate our main hypothesis as follows:

Hypothesis: Middle managers' decisions to change the level of cost or investment are "sticky" when the magnitude of sales change is sufficiently large.

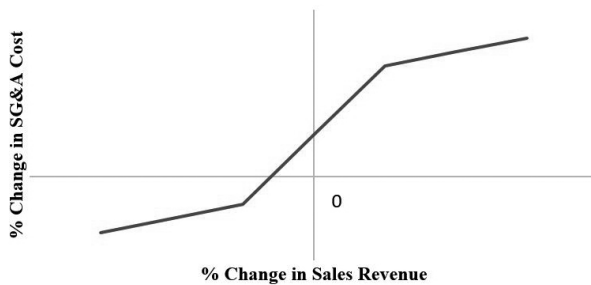
In other words, we predict that at the middle management level, costs change relatively less not only when sales decrease (or when the magnitude of sales decrease is large), but also when the magnitude of sales *increase* is sufficiently large. This suggests that the relation between sales change and cost change at the middle management level is expected to be kinked at two different points as illustrated in Figure 1B. The main objectives of this study include (1) examining how costs behave at the middle management level (and especially if the cost behavior is consistent with our prediction) and (2) providing an explanation for the observed behavior based on qualitative information obtained through the survey and the interviews.

Figure 1: Graphical illustrations of SG&A cost behavior

**Figure 1A** Asymmetric SG&A cost behavior  
(Anderson et al., 2003)



**Figure 1B** Middle management's SG&A cost behavior  
with two kinks



Note: Figure 1A, drawn based on the theory of Anderson, Banker, and Janakiraman (2003), illustrates the asymmetric SG&A cost behavior, “cost stickiness”. The relation can be described as SG&A costs changing relatively less when sales decrease than when sales increase by an equivalent amount. The line is kinked at % change in sales revenue = 0. The y-intercept is not necessarily zero.

Figure 1B illustrates the behavior of SG&A costs at the middle management level. The non-linear costs-sales relation can be described as SG&A cost changing relatively less when the change in sales revenue is sufficiently large in magnitude. The flatter parts at both ends are not necessarily parallel to each other.

### 3 METHODOLOGY

#### 3.1 Surveys and interviews

To examine the characteristics of middle management cost decisions and also to complement prior studies in the cost stickiness literature, we use a combination of a survey instrument and field interviews in this study. The prior literature on cost stickiness relies heavily on archival firm-level data. The main advantage of using archival data is

that it enables researchers to perform relatively objective analyses based on historical real data. As discussed by Graham, Harvey, and Rajgopal (2005), however, studies based on archival analyses can also suffer from several weaknesses related to model/variable specification. In most cases, a regression analysis cannot be entirely free from model/variable misspecification or measurement error. Sometimes it is also difficult to develop a good economic proxy. Another weakness of archival studies is the inability to ask qualitative questions. In contrast, surveys and interviews provide an opportunity to ask managers very specific and qualitative questions about the motivation behind managerial decisions without relying on potentially misspecified regression models (Graham, Harvey, & Rajgopal, 2005). On the other hand, potential caveats related to surveys and interviews include subjective or biased inputs from survey respondents or interviewees.

In this study, we mainly use a combination of a survey instrument and field interviews for the purpose of complementing those archival studies in the prior literature. Specifically, surveys and interviews enable us to examine the characteristics of middle managers' resource capacity decisions without worrying about any model specification issues which have been previously addressed in the literature (e.g., Balakrishnan, Labro, & Soderstrom, 2014; Banker & Byzalov, 2014). In addition, surveys and field interviews provide us with an opportunity to identify factors affecting managerial resource capacity decisions, which are not easily identifiable using archival data. Considering the potential caveats associated with surveys and interviews, we also conduct an empirical analysis based on archival data as an additional analysis to back up our main findings from the surveys and interviews.<sup>4</sup>

### 3.2 Research design

We developed a survey instrument based on a review of the cost stickiness literature. In specific, we designed the main survey questions to ask how a manager's decisions to adjust overall SG&A expenditure, as well as the capacity level of individual resources, including human resources, long-term assets, raw materials and merchandises, vary under hypothetical scenarios regarding sales change. In addition, qualitative questions were asked to identify limitations in the resource capacity decisions and other affecting factors. The survey contained 25 questions including: 13 questions about respondents and their companies and 12 quantitative and qualitative questions addressing their cost decisions.

The interviews were designed to obtain more detailed qualitative information about decision behavior at the middle management level, as well as impact factors and limitations in the decision making process. The potential interviewees were contacted using our personal network, a basic introduction was provided through a telephone/email briefing and then the 25 survey questions were sent. The main telephone interviews asking about detailed decision-making mechanisms were conducted about a week after the survey questionnaires were sent.

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<sup>4</sup> See Section 5.3 for the detailed model and sample data for the empirical analysis.

## 4 DATA

We used the Cint service to recruit 175 U.S.-based respondents who were identified as middle managers.<sup>5,6</sup> After manually identifying 23 responses with an error (e.g., using dollar amounts instead of percentages) and spam responses, 152 valid responses remained for quantitative and qualitative analyses. Table 1 presents self-reported summary information about demographic characteristics of the sample companies and respondents. The survey gathered information frequently used in empirical research for subsample analyses to consider potential conditioning effects.

Table 1: *Summary statistics*

<i>Panel A – Demographic characteristics of sample companies (n = 152)</i>			
<i>Avg. sales revenue for past 5 years</i>	<i>Percent</i>	<i>Years of operation</i>	<i>Percent</i>
< \$200,000	4.6	0-5 years	3.9
\$200,000 - \$500,000	7.9	5-10 years	25.0
\$500,000 - \$1,000,000	17.8	10-20 years	28.9
\$1,000,000 - \$1,500,000	21.1	20-30 years	21.7
\$1,500,000 - \$2,000,000	15.8	> 30 years	20.4
> \$2,000,000	32.9		
<i>SG&amp;A as % of sales revenue</i>		<i>Industry</i>	
0-5%	3.9	Construction	17.8
5-10%	21.7	Manufacturing	15.1
10-20%	27.6	Transportation and Utilities	5.3
20-30%	23.0	Wholesalers and Retailers	7.9
30-50%	16.4	Financial Services	12.5
> 50%	7.2	Business Services	17.8
		Consumer Services	13.8
		Public Administration and Other	9.9
<i>Number of employees</i>			
≤ 10	2.6		
11-50	18.4		
51-100	17.8		
101-500	28.9		
> 500	32.2		

<sup>5</sup> Cint is a market research company which has access to a large number of preregistered members who vary in demographics and other social characteristics (e.g., occupation or title). Once a client selects a target respondent group, Cint sends the client's survey until it collects a predetermined number of responses. Our survey was sent to 459 middle managers in the U.S. and completed by 175 of them (i.e., the response rate was 38.3%).

<sup>6</sup> In the survey, a qualifying question asking respondents to self-identify their job title was also included.



<i>Panel B – Demographic characteristics of sample managers (n = 152)</i>			
<i>Primary responsibility</i>	Percent	<i>Gender</i>	Percent
Hiring	5.9	Male	64.5
Purchasing	7.2	Female	35.5
Production	15.1		
Sales & Marketing	11.2	<i>Age</i>	Year
Accounting & Finance	11.8	Mean	39
Administration	19.1	25 <sup>th</sup> percentile	32
General management	29.6	50 <sup>th</sup> percentile (median)	36
		75 <sup>th</sup> percentile	42
<i>Experience at current position</i>			
0-3 years	15.1	<i>Total annual compensation</i>	\$ thousand
3-5 years	21.7	Mean	82.6
5-10 years	40.1	25 <sup>th</sup> percentile	60.0
10-15 years	17.8	50 <sup>th</sup> percentile (median)	80.0
> 15 years	5.3	75 <sup>th</sup> percentile	100.0
<i>Experience in current industry</i>		<i>Composition of compensation package (as % of total comp.)</i>	Avg. Percent
0-3 years	5.3	Fixed salary	70.9
3-5 years	14.5	Short-term cash bonus	11.7
5-10 years	32.9	Long-term incentives	7.0
10-15 years	23.7	Pension	5.3
> 15 years	23.7	Perks and other	5.1

Note: Table 1 presents demographic characteristics of sample companies (Panel A) and managers (Panel B). Revealing the dollar amount of total annual compensation was optional. 151 out of 152 respondents chose to answer this question.

For the mean calculation, all amounts greater than \$150,000 were treated equal to \$150,000. Considering only six out of 151 valid responses were \$150,000, the effect of potential understatement is expected to be minimal.

Panel A of Table 1 presents descriptive statistics of the sample companies. Our sample companies range from small to large in terms of average sales revenue and number of employees. In specific, 30.3% of the sample firms were relatively small with less than \$1 million of average sales revenue, while 32.9% were relatively large firms earning more than \$2 million of sales revenue per year. Also, 32.2% of the firms had more than 500 employees. For more than half of the companies, SG&A costs were between 10% and 30% of sales revenue, comparable to the statistics reported in the previous archival studies (e.g., ABJ). Most of the companies (96.1%) have operated for more than five years. The industry

distribution indicates that the sample firms are from a wide range of industries, which reduces the concern with sample clustering.

Panel B reports demographic information of the sample managers (i.e., survey respondents). While various roles are played by sample managers, the largest group consists of general managers (29.6%), who are expected to have the most influence over SG&A spending for the business unit. Most of the respondents have experience of 3 years or longer either at their current position or in the current industry. The mean age was 39 and about two thirds of the sample managers were male. On average, total annual compensation was \$82.6 thousand, which consists of 70.9% of fixed annual salary, 18.7% of short-term or long-term incentives, and 10.4% of other types. The large portion of fixed salary suggests that the compensation structure of middle managers is very different from that of top executives who typically receive significant portions of total compensation as incentives.<sup>7</sup>

## 5 RESULTS

### 5.1 Quantitative analysis

#### 5.1.1 *SG&A cost decisions of middle managers*

To gauge the degree to which middle managers are willing to change the overall SG&A spending for a given sales change, we asked the following hypothetical question:

Hypothetical question: Assume sales have been increasing for the past five years. How much change in SG&A costs would you make under the following situations?<sup>8</sup>

1. when sales growth this year is 0%?
2. when sales increase by 5%? 10%? 15%?
3. when sales decrease by 5%? 10%? 15%?

The two extreme situations, 15% increase and 15% decrease, are still considered within the normal range of annual sales change, which also means that the responses for these scenarios are considered a normal operational decision. The assumption of past sales

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<sup>7</sup> Banker, Jin, and Mehta (2018) report that on average, a CEO of a S&P 1500 company receives 68.2% of the total compensation in the form of incentives.

<sup>8</sup> The survey asked respondents' decisions regarding SG&A costs, as well as other cost items. The responses for SG&A cost, the main cost item in the cost stickiness literature, are separated from others for reporting purposes. See Table 3 for responses for the rest of the cost items.

increase was given considering that managers' positive expectation for future sales is the main assumption in the cost stickiness theory (ABJ).<sup>9</sup>

Table 2: Survey responses to the question: "How much change in SG&A costs would you make under the following situations?"

Hypothetical situation	Change in SG&A costs (%)					
	Mean	Comparison with prior range	One-tailed p-value	25 <sup>th</sup> percentile	50 <sup>th</sup> percentile (median)	75 <sup>th</sup> percentile
When sales growth this year is 0%	4.53%			0.00%	5.00%	5.00%
When sales increase by ...						
5%	6.40%	+1.87%***	0.01	0.75%	5.00%	6.00%
10%	7.03%	+0.63%	0.31	1.00%	5.00%	7.25%
15%	7.28%	+0.26%	0.39	2.00%	5.00%	10.00%
When sales decrease by ...						
5%	2.78%	-1.75%***	< 0.01	0.00%	0.00%	5.00%
10%	2.85%	+0.07%	0.54	0.00%	0.00%	5.00%
15%	2.06%	-0.79%*	0.07	0.00%	0.00%	5.00%

Note: Table 2 summarizes the survey response to the question "How much change in SG&A costs would you make" under various scenarios regarding sales change. Respondents are given the assumption that sales have been increasing for the past five years.

"Comparison with prior range" column presents the mean comparison between ranges regarding sales change. For ranges of sales *increase*, it is tested whether the mean SG&A cost change for the range is statistically *larger* than that for the previous sales increase range. (E.g., for the situation of +10% sales change, it is tested whether the mean response is statistically greater than the mean response for the +5% sales change.) For ranges of sales *decrease*, it is tested whether the mean SG&A cost change for the range is statistically *smaller* than that for the previous sales decrease range. (E.g., for the situation of -10% sales change, it is tested whether the mean response is statistically *smaller* than the mean response for the -5% sales change.) \*, \*\*, and \*\*\* denote significance at levels of 0.1, 0.05, and 0.01, respectively.

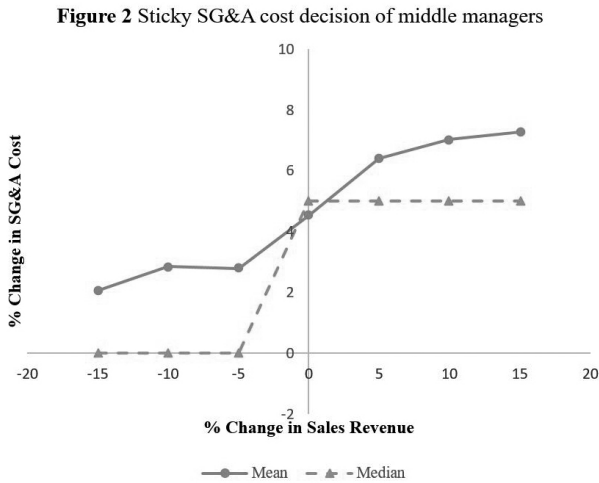
Table 2 presents the summary of the responses. Empirical studies in the cost stickiness literature generally use the zero sales change as the point where the slope of the sales-costs relation changes, meaning the cost decisions at zero sales growth may serve as a benchmark when examining whether the cost behavior is sticky. On average, the respondents indicate that they are willing to increase overall SG&A costs by 4.53% even when sales revenue does not grow at all in the current period. A potential explanation for this positive cost change is that the managers are optimistic and believe the sales will rise in the future. Considering

<sup>9</sup> Prior literature also finds that costs are "anti-sticky" (i.e., costs change relatively more when sales decrease than when sales increase) when managers are pessimistic about future sales revenue (Banker et al., 2014).

the respondents are middle managers, another explanation is that there is a corporate-level strategy or policy to follow regarding the minimum level of SG&A spending.

Next, the responses for the scenarios of sales increase indicate that middle managers tend to increase overall SG&A spending as expected sales growth increases, as intuitively expected. More interestingly, the increase in SG&A cost change is mitigated as sales growth increases, suggesting that middle managers increase SG&A spending relatively less when the magnitude of sales increase is large compared to when the magnitude of sales increase is small. In particular, the mean response was to add 1.87% (= 6.40% - 4.53%) extra SG&A spending when sales growth changes from 0% to +5%. However, the extra increase in SG&A spending drops to 0.63% (= 7.03% - 6.40%) when sales growth changes from +5% to +10% and further drops to 0.25% (= 7.28% - 7.03%) when sales growth changes from +10% to +15%. The difference in means was statistically significant only for 0% vs. +5% and insignificant at the conventional level of significance for +5% vs. +10% and +10% vs. +15%. This is consistent with our expectation based on the characteristics of middle management including limited ability in adding resources and risk aversion.

Last, the responses for the scenarios of sales decrease indicate that middle managers tend to reduce the increase in overall SG&A spending as sales decrease, again, as intuitively expected. Similarly to the case of sales increase, the degree of the SG&A cost change is relatively smaller when the sales decrease is large compared to when the sales decrease is small. In particular, the extra cut in the SG&A spending was 1.75% (= 4.53% - 2.78%,  $p$ -value < 0.01) when sales growth changes from 0% to -5%. However, the cut in the SG&A cost is substantially mitigated when sales growth drops further. In particular, the difference in mean cost changes between -10% and -15% sales growth scenarios is statistically insignificant. The additional SG&A cut when sales growth further drops from -10% to -15% was 0.79% (= 2.85% - 2.06%,  $p$ -value = 0.07), which is insignificant at the conventional level of significance ( $p$ -value < 0.05) and much smaller in magnitude compared to 1.75%, the SG&A cut for the sales growth range between 0% and -5%. The relatively smaller decrease in SG&A costs for a large sales decrease is consistent with the empirical findings in the prior cost stickiness literature (e.g., ABJ). It is also consistent with our expectation based on (1) limited ability of middle managers and (2) risk aversion by middle managers.

Figure 2: *Sticky SG&A cost decision of middle managers*

Note: Figure 2 presents the mean and median survey responses to the question “How much change in SG&A costs would you make?” given the sales growth in this year is 0%, +5%, +10%, +15%, -5%, -10%, and -15%. The respondents are given the assumption that sales have been increasing for the past five years.

Figure 2 graphically summarizes the non-linear SG&A cost decisions of middle managers observed from the survey responses. For the line representing the mean responses, the slope is relatively steeper when the sales change is relatively small in magnitude (from -5% to +5%) and relatively flatter when the sales change is relatively large in magnitude (-5% or lower and +5% or higher). Similarly, the median response of 0% of SG&A cost change for -5% sales change does not decrease further when the magnitude of sales decrease gets larger and the median response of 5% for zero sales growth does not rise when the expected sales growth increases. Overall, the non-linear cost behavior of middle managers shown in Figure 2 is consistent with our expectation.

The shape of the two plots in Figure 2 also suggests that while the empirical models in the prior cost stickiness literature generally use zero sales growth as the point where the slope changes, the change in managerial behavior may not be triggered by a mere sales decrease. Figure 2 suggests that it is rather a “sufficiently large” sales decrease. More generally, the cost behavior at the middle management level can be described as costs changing relatively less when the magnitude of sales change (i.e., sales increase or decrease) is sufficiently large.<sup>10</sup>

<sup>10</sup> The criteria for being “sufficiently large” are not necessarily the same for sales increase and for sales decrease.

### ***5.1.2 Other cost and investment decisions of middle managers***

While the prior literature on cost stickiness focuses on SG&A costs, where managers are supposed to have the most discretion, we also examine middle managers' decisions regarding other cost and investment items. Similarly to the main questions about SG&A cost decisions, we asked the following question for (1) human resources (i.e., hiring and firing), (2) investment in fixed assets (e.g., machine and equipment), and (3) investment in intangible assets (e.g., patent and software):

Hypothetical question: Assume sales have been increasing for the past five years. How much change in cost or investment would you make under the following situations?

1. when sales growth this year is 0%?
2. when sales increase by 5%? 10%? 15%?
3. when sales decrease by 5%? 10%? 15%?

For these cost and investment decisions on which managers are supposed to have relatively smaller discretion compared to that on SG&A cost decisions, we excluded responses of the managers who self-reported that they have weak or no discretion on the corresponding decision.

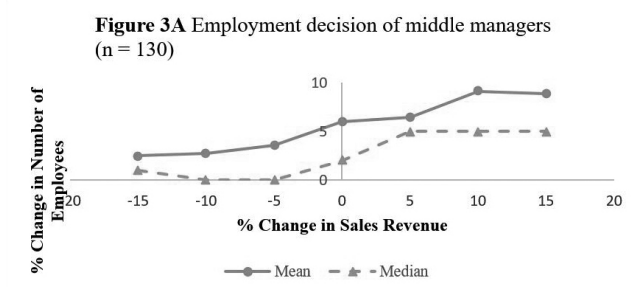
The survey responses summarized in Table 3 and Figure 3 show a pattern very similar to that of SG&A cost decisions shown in Table 2 and Figure 2. In specific, the mean and median responses show that the change in the cost or investment is less sensitive to the change in sales revenue when the magnitude of sales change is relatively large. This suggests that first, similarly to the case of SG&A costs, the magnitude of employee layoffs or cut in asset investments by middle managers is relatively small when the magnitude of sales decline is sufficiently large, consistent with the cost stickiness theory and our prediction. Second, also similarly to the case of SG&A costs, middle managers do not want to substantially increase the number of employees or investments in assets when experiencing a sales boom, which is consistent with our hypothesis.

Table 3: Survey responses to the question: “How much change in cost or investment would you make under the following situations?”

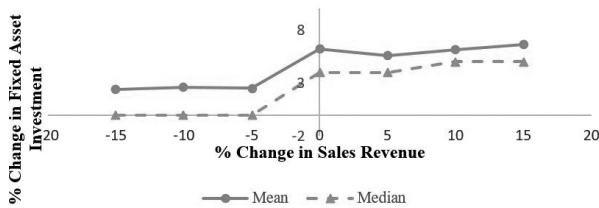
Hypothetical situation	Change in number of employees (%)		Change in fixed asset investment (%)		Change in intangible asset investment (%)	
	Mean	Median	Mean	Median	Mean	Median
When sales growth this year is 0%	6.02%	2.00%	6.24%	4.00%	4.98%	5.00%
When sales increase by ...						
5%	6.48%	5.00%	5.58%	4.00%	6.40%	5.00%
10%	9.15%	5.00%	7.03%	5.00%	7.03%	5.00%
15%	8.92%	5.00%	7.28%	5.00%	7.28%	5.00%
When sales decrease by ...						
5%	3.58%	0.00%	2.78%	0.00%	2.78%	0.00%
10%	2.75%	0.00%	2.85%	0.00%	2.85%	0.00%
15%	2.52%	1.00%	2.06%	0.00%	2.06%	0.00%

Note: Table 3 summarizes survey responses to the question asking the intended level of change in number of employees, fixed asset investment, and intangible asset investment. The responses of managers who self-reported that they have weak or no discretion on the corresponding cost or investment item are excluded. The number of responses is 130 for employment, 117 for fixed asset investment, and 126 for intangible asset investment. Respondents are given the assumption that sales have been increasing for the past five years.

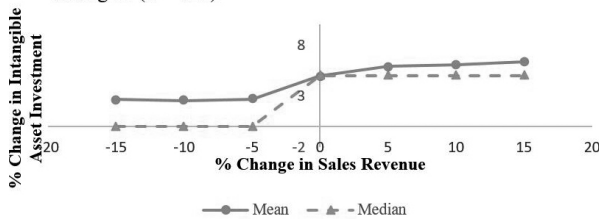
Figure 3: Employment and asset investment decisions of middle managers



**Figure 3B** Fixed asset investment decision of middle managers (n = 117)



**Figure 3C** Intangible asset investment decision of middle managers (n = 126)



Note: Figure 3 presents the mean and median survey responses to the question “How much change in cost or investment would you make?” given the sales growth in this year is 0%, +5%, +10%, +15%, -5%, -10%, and -15%. The respondents are given the assumption that sales have been increasing for the past five years. Figures 3A, 3B, and 3C are for the number of employees, fixed asset investment, and intangible asset investment, respectively.

### 5.1.3 Subsample analysis of the impact of compensation structure

One of our explanations for the reverse Z-shaped cost behavior at the middle management level is that middle managers are likely to be more risk averse than top managers, due to their compensation structure which includes a relatively small portion of incentives. To test the validity of this explanation, we conducted a subsample analysis. Using the median value of total incentives as a percentage of total annual compensation (20.0%), we constructed two subsamples and repeated the main analysis described above for each of the two subsamples.<sup>11</sup>

<sup>11</sup> Total incentive is defined as the sum of short-term cash bonus and long-term incentives.

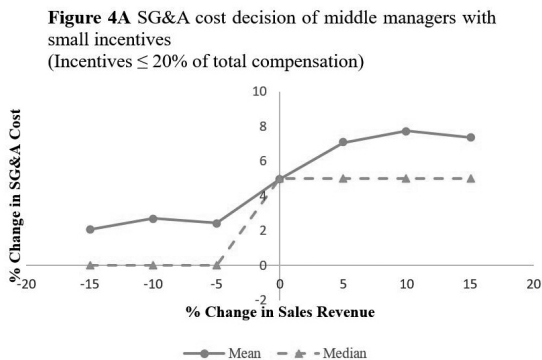


Table 4: Subsample analysis of the impact of the compensation structure

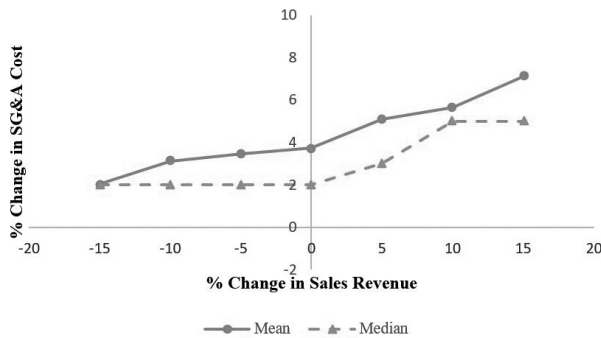
Hypothetical situation	Change in SG&A costs (%)					
	Managers with small incentives (≤ 20% of total compensation) (n = 101)			Managers with large incentives (> 20% of total compensation) (n = 51)		
	Mean	Comparison with prior range	50 <sup>th</sup> percentile (median)	Mean	Comparison with prior range	50 <sup>th</sup> percentile (median)
When sales growth this year is 0%	4.94%		5.00%	3.73%		2.00%
When sales increase by ...						
5%	7.06%	+2.12%**	5.00%	5.10%	+1.37%**	3.00%
10%	7.72%	+0.66%	5.00%	5.65%	+0.55%	5.00%
15%	7.37%	-0.36%	5.00%	7.12%	+1.47%**	5.00%
When sales decrease by ...						
5%	2.45%	-2.49%***	0.00%	3.45%	-0.27%	2.00%
10%	2.71%	+0.27%	0.00%	3.12%	-0.33%	2.00%
15%	2.07%	-0.64%	0.00%	2.04%	-1.08%	2.00%

Note: Table 4 presents the results of the subsample analysis performed to examine the impact of the compensation structure on cost decisions. Using the median value of total incentives (= cash bonus + long-term incentives) as a percentage of total compensation, two subsamples have been constructed. “Comparison with prior range” column presents the mean comparison between ranges regarding sales change. For ranges of sales *increase*, it is tested whether the mean SG&A cost change for the range is statistically *larger* than that for the previous sales increase range. (E.g., for the situation of +10% sales change, it is tested whether the mean response is statistically greater than the mean response for the +5% sales change.) For ranges of sales *decrease*, it is tested whether the mean SG&A cost change for the range is statistically *smaller* than that for the previous sales decrease range. (E.g., for the situation of -10% sales change, it is tested whether the mean response is statistically smaller than the mean response for the -5% sales change.) \*, \*\*, and \*\*\* denote significance at levels of 0.1, 0.05, and 0.01, respectively.

Figure 4: Subsample analysis of the impact of compensation structure



**Figure 4B** SG&A cost decision of middle managers with large incentives  
(Incentives > 20% of total compensation)



Note: Figure 4 presents the mean and median survey responses to the question “How much change in SG&A costs would you make?” for two subsamples constructed based on the compensation structure. The respondents are given the assumption that sales have been increasing for the past five years. Figure 4A summarizes the responses of the managers who receive equal to or less than 20% of total compensation as incentives. Figure 4B summarizes the responses of the managers who receive more than 20% of total compensation as incentives.

Table 4 and Figure 4 present the results of the subsample analysis. For the middle managers who receive relatively small incentives (equal to or less than 20% of total compensation), the responses remain very similar to those for the main sample (i.e., change in SG&A costs is relatively small when the magnitude of sales change is large). On the other hand, the responses of the middle managers who receive relatively large incentives (greater than 20% of total compensation) show that the “sticky” cost behavior at the higher end is less significant. In specific, Table 4 shows that the increase in the mean response when sales growth increases from 10% to 15% is statistically significant (one-tailed  $p$ -value = 0.025), suggesting that the increase in SG&A spending is not mitigated even when sales growth reaches 15%. The median also rises at least until the sales growth reaches 10%, unlike the case for the main sample or the subsample of middle managers with small incentives where the median does not increase at all in the range of increasing sales. The difference in the cost behavior between the two subsamples can be more easily identified in Figure 4. Overall, the result of the subsample analysis suggests that middle managers who receive compensation relatively more in the form of incentives are less likely to slow down in adding resources when experiencing a sales boom, which supports our expectation that incentive compensation mitigates the risk-averse behavior of managers.

## 5.2 Qualitative analysis

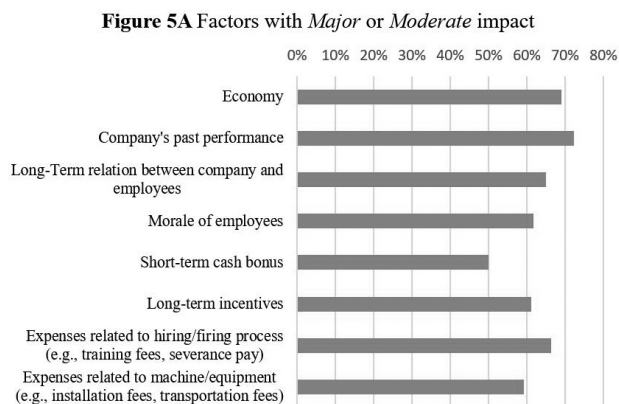
### 5.2.1 Survey

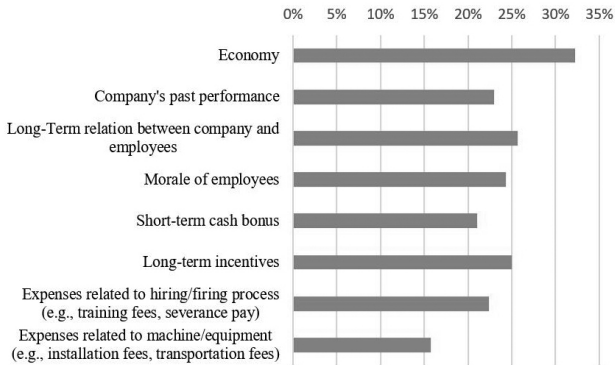
To obtain a better understanding of the cost behavior at middle management level, we also asked qualitative questions in the survey in addition to the quantitative questions discussed above. First, we asked which factors affected their cost decisions in the quantitative section. From the prior literature on cost stickiness, we obtained potential factors as follows:

- Economy
- Company's past performance
- Long-term relation between company and employees
- Morale of employees
- Short-term cash bonus
- Long-term incentives
- Expenses related to hiring/firing process (e.g., training fees, severance pay)
- Expenses related to machine/equipment (e.g., installation fees, transportation fees)

The question has been asked using a 5-point Likert scale from 1 to 5 (1=No impact, 2=Minor impact, 3=Neutral, 4=Moderate impact, 5=Major impact). In addition, we also asked if there were any other factors which affected their decision-making process.

Figure 5: *Factors affecting middle managers' cost decisions*



**Figure 5B** Factors with *Major* impact

Note: Figure 5 summarizes the survey responses regarding factors affecting cost decisions at the middle management level. For each factor obtained from the prior literature, respondents were asked to indicate the significance of the impact using a 5-point Likert scale (1=No impact, 2=Minor impact, 3=Neutral, 4=Moderate impact, 5=Major impact).

Figure 5 summarizes the responses regarding the impact of each factor. Figure 5A shows that all the potential factors were identified to have at least a moderate impact by 50% or more respondents. A relatively small number of respondents indicated short-term cash bonus (50.0%) or long-term incentives (61.2%) as a factor with a major or moderate impact, consistent with the fact that only 11.7% and 7.0% of total compensation are received in the form of short-term cash bonus and long-term incentives, respectively. Figure 5B shows that the most respondents (32.2%) selected the economy as a factor with a major impact on their cost decisions, which supports the argument in the prior literature that the economic condition affects managers' belief about permanence of the current sales decline, ultimately affecting their cost decisions (ABJ; Banker et al., 2014). Again, a relatively small number of respondents (21.1%) chose short-term cash bonus as a factor with a major impact on their cost decisions.

The respondents also indicated that their cost and investment decisions are affected by several factors in addition to those provided from the survey. Based on their nature, we classified those additional factors as follows:

- Factors restricting middle managers' cost or investment decisions
  - Annual budget or availability of cash
  - Minimum acceptable rate of return
  - Availability of qualified labor force
  - Long-standing contracts with suppliers
  - Corporate level strategy

- Other additional factors
  - General trend in business or market
  - Behavior or strategy of main competitor(s)
  - Needs from customers or clients

Consistent with our prediction, many respondents indicated that there are factors which limit their cost or investment decisions. First, annual budget and availability of cash directly limit the middle managers' ability to add resources. Also, minimum acceptable rate of return, which is often demanded by top managers, forces middle managers to limit their expenses to maintain a high return. In addition, middle managers' employment-related decisions are also affected by availability of qualified labor force for the current period. These factors are likely to set the upper limit in increasing costs, consistent with the relatively small increase in costs when the sales increase is large as shown in Table 2 and Figure 2. On the other hand, long-standing contracts with suppliers are likely to set a contractual minimum (i.e., the lower limit) for raw material or merchandise purchase per year, resulting in limited ability in cutting resources, consistent with the relatively small change in costs when the magnitude of sales decrease is large. Many respondents also indicated their decisions are significantly affected by corporate- or top management-level strategy such as globalization or increasing market share, which can set either an upward limit or a downward limit, depending on its nature.

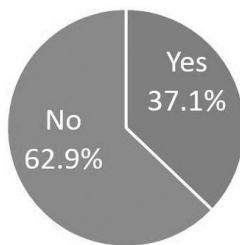
Respondents also reported additional factors which do not necessarily restrict their decisions. Those factors include (1) general trends in the market or industry, (2) strategy or behavior of their major competitors, and (3) needs from their clients or customers. These responses confirm the widely-accepted fact that management decisions are heavily influenced by Porter's (1979) five forces (i.e., industry rivalry, bargain powers of buyers/suppliers, threats of new entrants/substitutes).

Last, the survey directly asked the participants if there was any personal or corporate policy or strategy to follow regarding the maximum and minimum levels of cost or investment. The results summarized in Figure 6 show that a significant number of respondents have a certain policy to follow when making cost or investment decisions. In specific, 37.1% of valid responses indicated the existence of a personal or corporate policy regarding the maximum level of cost or investment. Specific examples include an increase in SG&A expenses by a maximum of 5% from the prior period's expenses, a maximum number of line workers limited due to factory or equipment capacity, maximum SG&A spending limited to the annual budget, etc. Regarding the minimum level of cost or investment, 42.3% of valid responses indicated the existence of a restricting policy. Examples include an increasing number of temporary workers by 1% every year, not cutting SG&A spending regardless of performance, spending all the budget given for the period, etc. Interestingly, the annual budget seems to serve as both the upper limit and the lower limit for cost and investment decisions.

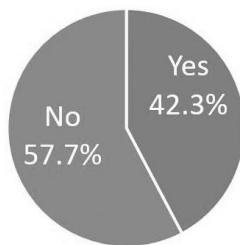
Overall, the result of the qualitative analysis suggests that middle managers are likely to face the upper limit and/or the lower limit when making a cost or investment decision, which explains the reverse Z-shape of cost-sales relation identified from the quantitative analysis.

Figure 6: *Existence of policy, strategy, or norm regarding the minimum or maximum level of annual investment*

**Figure 6A** Existence of policy or strategy for *Maximum* level of cost or investment



**Figure 6B** Existence of policy or strategy for *Minimum* level of cost or investment



Note: Figure 6 summarizes the survey responses to the question asking if there is any policy, strategy, or norm regarding the minimum or maximum level of annual investment. Many of the respondents who answered “Yes” to the question also provided a description of the policy or strategy. The examples of policies for the maximum level include (1) the increase in SG&A cost limited to a certain percentage of prior SG&A costs and (2) the maximum number of line workers limited due to the factory capacity. The examples for the minimum level include (1) not cutting SG&A cost regardless of the current performance and (2) spending all the budget given for the period.

### 5.2.2 Interview

To obtain an even deeper understanding of the decision-making mechanism at the middle management level, we conducted interviews with two middle managers currently in

practice, who were selected and approached using our personal network; Manager A is a director of client services at a company which provides seismic data to the oil and gas industry; Manager B is a production manager at a manufacturer of custom molded plastic parts. As a part of the briefing, our survey questionnaires were provided to each of the interviewees and the actual interviews were conducted a few days later through telephone. Similarly to the survey respondents, both of the interviewees indicated that their decisions to add or cut resources are affected by top management and/or other factors, although the degree varies.

Manager A, who self-reported that he has “a great deal of discretion” in terms of spending and resource allocation, stated:

“If I think a \$500 resource is needed for an operation or a project, I simply spend the capital and continue. However, if the resource needed approaches the \$10,000 mark, I send it to upper management for confirmation before executing the order ... My discretion range to give raises (to the employees) is 3-5%, without consulting or push-back from top management. If I want to consider an employee for a 10% raise, then this requires approval at the executive level and from upper management.”

Similarly, Manager B, who exercises a “moderate level of discretion” in terms of spending and human resource allocation, stated:

“(SG&A spending) is rarely my complete decision but rather the committee’s that I work and consult with. I need to go through upper management for most of the major decisions.”

These statements suggest that their managerial decisions to increase spending are limited by top management, although the degree varies, which is consistent with the survey responses in general.

Regarding the factors affecting their resource allocation decisions, Manager A stated:

“We are in a “sales driven” business and have to maintain an operation that can react and bring a deal to fruition within a quick delivery window, closing out the few competitors we do have. There are about ten other companies we compete with domestically, so this makes it easy for customers to work with us, as they know who has the services in this field.”

This implies that competitors and customers are limiting his discretion in cutting resources to a certain degree, as many survey respondents also indicated. On the other hand, Manager B stressed the significant influence of company-level strategy:

“Prior to 2009, the company was in a growth stage as was the industry (and thus my discretion in cutting resources was limited) ... On the contrary, subsequent to the 2009 economic upheaval, the industry, and my company as well, have yet to truly recover from the recession (meaning my discretion in increasing costs is somewhat limited.)”

To summarize, the interview statements are consistent with our intuition and observation from the survey. Although the real world decision making processes, identified during the interviews, are much more complicated and dynamic compared to the simplified plots we have drawn from the survey results, the interviews confirmed at least that middle managers’ discretion in spending decisions is limited both upward and downward and the limiting factors include top managers and their strategies.

### 5.3 Empirical analysis

Middle managers include heads of business segments, such as division managers and regional managers, who can be reasonably considered to have the most significant influence on the segment level cost decisions. As such, we also conducted an empirical analysis using segment level data obtained from Compustat, which covers all publicly traded companies in the U.S., to complement our findings from the survey and field interviews. Our sample period spans fiscal years 2008–2015 and the number of segment/year observations was 26,050.<sup>12</sup>

Cost behavior at the middle management (or segment) level was examined using the following regression model:

$$\begin{aligned} \Delta \ln SG\&A_t = & \beta_0 + \beta_1 \Delta \ln REV_t + \beta_2 DEC_t \times \Delta \ln REV_t + \beta_3 DEC_t \times \Delta \ln REV_t \times SUCCESSIVE\_DEC_t \\ & + \beta_4 DEC_t \times \Delta \ln REV_t \times ASSETINT_t + \beta_5 LARGE\_INC_t \times \Delta \ln REV_t \\ & + Industry/Year Fixed Effects \end{aligned} \quad (1)$$

where  $\Delta \ln SG\&A$  is natural logarithm of current SG&A costs over prior SG&A costs and  $\Delta \ln REV$  is natural logarithm of current sales revenue over prior sales revenue. Both  $\Delta \ln SG\&A$  and  $\Delta \ln REV$  are winsorized at the 1% level.  $DEC$  is a dummy variable which takes the value of 1 if sales revenue of the firm decreases in the current period, and 0 otherwise. Similar to ABJ, a negative  $\beta_2$  would indicate that costs decrease relatively less when sales decrease. We also include interaction terms containing a dummy variable for successive sales decrease ( $SUCCESSIVE\_DEC = 1$  if sales decrease for two consecutive years) and asset intensity ( $ASSETINT = \log(\text{total assets} / \text{sales revenue})$ ), considering the factors affecting the degree of cost stickiness. We use dummy variables based on the two-digit Standard Industry Classification (SIC) codes and year dummies to control for the industry and year fixed effects, respectively. The main variable of interest is the interaction term containing

<sup>12</sup> Our sample period spans 8 years (2008–2015), since our data source, Compustat’s Current Segments database, provides information for the past 8 years.



*LARGE\_INC*, a dummy variable for a large sales increase, which is defined using different values of sales increase. (See Note for Table 5 for detailed variable definitions.) A negative  $\beta_5$  would indicate that SG&A costs become sticky when the magnitude of sales increase reaches a given level of sales increase.

Table 5: Regression analysis of SG&A cost behavior at the segment level

VARIABLES	(1)	(2)	(3)	(4)	(5)
	$\Delta SG\&A_t$	$\Delta SG\&A_t$	$\Delta SG\&A_t$	$\Delta SG\&A_t$	$\Delta SG\&A_t$
$\Delta REV_t$	0.403*** (68.93)	0.341*** (9.67)	0.424*** (14.07)	0.487*** (18.68)	0.537*** (23.30)
$DEC_t \times \Delta REV_t$	-0.093*** (-6.59)	-0.029 (-0.74)	-0.115*** (-3.37)	-0.182*** (-5.96)	-0.238*** (-8.50)
$DEC_t \times \Delta REV_t \times SUCCESSIVE\_DEC_t$	0.093*** (6.26)	0.094*** (6.29)	0.093*** (6.25)	0.093*** (6.21)	0.092*** (6.18)
$DEC_t \times \Delta REV_t \times ASSETINT_t$	-0.046*** (-15.31)	-0.047*** (-15.40)	-0.046*** (-15.18)	-0.046*** (-14.94)	-0.045*** (-14.68)
$LARGE\_INC15_t \times \Delta REV_t$		0.061* (1.79)			
$LARGE\_INC20_t \times \Delta REV_t$			-0.021 (-0.72)		
$LARGE\_INC25_t \times \Delta REV_t$				-0.083*** (-3.30)	
$LARGE\_INC30_t \times \Delta REV_t$					-0.133*** (-6.01)
Constant	0.033*** (13.78)	0.035*** (13.57)	0.032*** (12.21)	0.029*** (10.65)	0.025*** (9.08)
Industry/Year Fixed Effects	Included	Included	Included	Included	Included
Observations	26,050	26,050	26,050	26,050	26,050
Adjusted R-squared	0.217	0.217	0.217	0.218	0.218

Note: Table 5 presents the results of the multivariate regression analysis based on 26,050 segment/year observations.

\*, \*\*, and \*\*\* denote significance at levels of 0.1, 0.05, and 0.01, respectively. T-statistics are in parentheses.

$SG\&A_t$  = Selling, general, and administrative costs in year  $t$  (in million \$);  $\Delta SG\&A_t = \text{Log}(SG\&A_t / SG\&A_{t-1})$ ;  $REV_t$  = Sales revenue in year  $t$  (in million \$);  $\Delta REV_t = \text{Log}(REV_t / REV_{t-1})$ ;  $DEC_t = 1$  if  $REV_t < REV_{t-1}$ , = 0 otherwise;  $SUCCESSIVE\_DEC_t = 1$  if  $REV_{t-1} < REV_{t-2}$ , = 0 otherwise;  $TA_t$  = Total assets (in million \$);  $ASSETINT_t = \text{Log}(TA_t / REV_t)$ ;  $LARGE\_INC15_t = 1$  if  $\Delta REV_t > 0.15$ , = 0 otherwise;  $LARGE\_INC20_t = 1$  if  $\Delta REV_t > 0.20$ , = 0 otherwise;  $LARGE\_INC25_t = 1$  if  $\Delta REV_t > 0.25$ , = 0 otherwise;  $LARGE\_INC30_t = 1$  if  $\Delta REV_t > 0.30$ , = 0 otherwise.

The regression results are presented in Table 5. Consistent with the prior literature, the coefficient on  $DEC \times \Delta REV$  is significant and negative in general, indicating that cost becomes sticky when sales decrease. The coefficient on  $SUCCESSIVE\_DEC$  interaction term is significant and positive in general, suggesting a lower degree of SG&A cost stickiness at the lower end when sales decline for two consecutive years. The significant and negative coefficients on  $ASSETINT$  interaction term indicate that SG&A costs are stickier at the lower end for firms that require relatively more assets to support their sales.

Most interestingly, the coefficients on the interaction term for a large sales increase show that cost becomes sticky when the magnitude of sales increase is “sufficiently” large. In specific, the coefficients are not significantly negative when the sufficiently large sales increase is defined as  $\Delta REV$  of 0.15 or higher (Column (2)) or 0.2 or higher (Column (3)), suggesting that a sales increase up to about 20% does not trigger the cost stickiness at the higher end. The coefficient becomes significantly negative when the sufficiently large sales increase is defined as  $\Delta REV$  of 0.25 or higher (Column (4)), suggesting that approximately 25% change in sales revenue is sufficiently large to induce sticky cost behavior at the higher end. Considering that a significant portion of the sample (20.9%) has  $\Delta REV$  of 0.25 or higher (untabulated), the conditions that trigger sticky cost behavior at the higher end (e.g., 25% sales increase) are still considered normal rather than extreme. The negative coefficient becomes even more significant and larger in magnitude when  $\Delta REV$  of 0.3 is used to define the dummy variable (Column (5)), as intuitively expected. Overall, the regression results based on segment level data suggest that cost behavior at the segment level is sticky not only when sales decrease but also when the magnitude of sales increase is large, consistent with our findings from the survey instrument and the interviews.

## 6 DISCUSSION WITH CONCLUSIONS

### 6.1 Theoretical contributions

Decisions at the middle management level are different from those at the top management or corporate level because middle managers are likely to have limited ability in both adding and cutting resources and also because the salary-focused compensation structure for middle managers are likely to induce more risk-averse behavior. In this study, we examine cost behavior at the middle management level using two different approaches.

First, we take a behavioral approach and conduct a survey and field interviews. The analysis results based on the detailed interviews and 152 survey responses indicate that middle managers' cost decisions are sticky (i.e., change relatively less) when the magnitude of sales change is sufficiently large at both increasing and decreasing ends. Our findings contribute to the prior literature on cost stickiness by suggesting the existence of stickiness at the higher end (i.e., when the sales increase is large) at least at the middle management level and also by confirming the empirical findings in the literature using behavior approaches.

Second, we use archival data to empirically confirm our findings from the survey and the interviews. Using a regression analysis based on 26,050 segment-level observations for publicly traded companies in the U.S., we show that cost decisions at the segment level are sticky at both low and high ends, consistent with our findings from the survey and the interviews. Using segment level data also contributes to the prior literature which relies heavily on company level data and examines the cost asymmetry at the low end only (i.e., firms facing a sales decline).

## 6.2 Practical implications

Middle managers' cost decisions, which are sticky not only when sales decrease but also when the magnitude of sales increase is large, have practical implications for both top managers and investors. For top managers, the sticky cost behavior at the high end suggests that the cost decisions of middle managers are restricted by annual budgets and corporate-level strategies or policies, as evidenced by the survey results and the interviews. This further suggests that a company may face an undesirable situation of losing an opportunity to grow because investments or expenditures at the middle management level are restricted for internal reasons.

For investors and analysts, the sticky cost behavior at the high end suggests that analysts' earnings forecasts are likely to be biased when the magnitude of sales increase is large. Banker, Jin, and Mehta (2018) argue that if analysts fail to fully consider the cost stickiness (at the low end), costs of firms facing sales decline will be under-forecasted, and, by extension, earnings of those firms will be over-forecasted. In contrast, the cost stickiness at the high end that is documented in this study suggests that costs will be over-forecasted and thus earnings will be under-forecasted for firms facing a large increase in sales.

## 6.3 Limitations with future research directions

As this study mainly uses a survey instrument and interviews, it is subject to potential caveats associated with behavioral studies, such as biased inputs from the survey/interview respondents and/or samples not representative of the whole population. To mitigate this concern, we also conduct an empirical analysis using archival data for publicly traded companies in the U.S.

Another limitation in our study is that while we show that middle managers' cost decisions are sticky when the magnitude of sales increase is sufficiently large, whether the corporate-level cost behavior is also sticky at the higher end remains untested. This suggests that examining the corporate-level cost behavior at the high end will be an interesting venue for future research.

Also, our survey and interview responses suggest that Porter's (1979) five forces have significant influence on cost and investment decisions, consistent with the common belief

in the management literature. This suggests that it will be interesting and thus worth exploring to examine how the five forces affect non-linearity in cost decisions individually and collectively.

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