

## Rigidity of Selling, General, and Administrative Costs and Managerial Incentives to Meet Earnings Thresholds: Evidence from Conglomerates

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**Abstract:** Does the conventional wisdom of decreasing marginal cost in economics hold in the real world? Surprisingly, previous accounting literature has found opposite evidence and documented cost stickiness. This paper examines the effect of managerial incentives to avoid loss and earnings decrease on rigidity of selling, general, and administrative (SG&A) costs for conglomerates and parent companies, and the resultant implication for parent company's cost management decisions. The results show that the estimates of cost rigidity are negatively significant in the absence of managerial incentives to meet earnings thresholds for both parent company and conglomerate. In the presence of such managerial incentives for both parties, the estimates are significantly positive and indicate disappearance of cost rigidity. The results hold after controlling for asset intensity, employee intensity, ROA, and GDP growth. Additionally, parent company cuts its cost more aggressively to avoid either party's loss, but cuts conglomerate's cost more aggressively to avoid either party's decrease in earnings. This suggests that parent company is more concerned about its performance in cost management than for the conglomerate's. Overall, the evidence suggests that the decreasing marginal cost concept is conditional on managerial incentives to meet earnings thresholds and that parent company makes selective SG&A cost reduction decisions to meet earnings thresholds.

**Keywords:** Cost stickiness; Earnings benchmarks; Cost asymmetry; Asymmetric cost; Earnings decrease; Loss avoidance

**JEL Classifications:** D24, M41, M49

### 1. Introduction

A common concept in economics is that marginal cost is decreasing in volume because of economy of scale. If this is true, the marginal cost when volume is increased should be smaller than the savings in marginal cost when volume is decreased. However, Anderson *et al.* (2003) find opposite evidence: SG&A costs increase 0.55% per 1% increase in sales, but decrease 0.35% per 1% decrease in sales for U.S. listed companies from 1979 to 1998. This asymmetric cost behavior is referred to as cost rigidity (cost stickiness), i.e., marginal cost increases more when volume increases than savings in cost when volume decreases. This paper examines the relation between

cost rigidity and managerial incentives to meet earnings thresholds. We explore whether top management trade-offs the cost incurrences that affects the cost rigidity between parent company and conglomerate in the presence of two types of earnings thresholds, avoidance of loss and decrease in reported earnings.

Two features of this paper are SG&A costs and conglomerate. We focus on the business groups, as both parent company and subsidiaries altogether form one economic entity and in substance are under parent company's control or substantial influence. We focus on SG&A costs because some costs in this category change in proportion to changes in sales volume (Cooper and Kaplan, 1998), are incurred in the corporate office (Chen *et al.*, 2012), have considerable effect on profit (SG&A comprises 15% of net sales over our sample period), and are subject to managers' discretion for their incurrences. Moreover, managers do use advertising activities to meet earnings benchmarks (Cohen *et al.*, 2010), and have incentives to meet earnings targets using manufacturing costs and operating costs (Kama and Weiss, 2013). Accordingly, this paper extends these studies and investigates the effect of managers' incentives to meet earnings thresholds on the asymmetrical changes in SG&A costs particularly for the whole organization, i.e., conglomerate, and the trade-offs of cost incurrences between parent company and conglomerate.

Built on previous literature (see Section 2), we expect that managerial incentives to meet earnings thresholds would weaken the rigidity of SG&A costs. By earnings thresholds, we mean managers' incentives to avoid loss and decrease in earnings. SG&A costs provide managers an efficient means to avoid loss or earnings decrease for two reasons. First, the reduction of SG&A costs would not produce immediate and negative effect on sales revenues, and second, managers have discretion over the incurrences of SG&A costs in accordance with the generally accepted accounting principles. Increasing SG&A costs less rapidly and decreasing SG&A costs more rapidly for sales changes would increase earnings and weaken the cost rigidity for firms with incentives to meet earnings thresholds. Thus, in the presence of the need for meeting earnings thresholds, the cost rigidity of SG&A costs will be lessened for firms with incentives to meet earnings thresholds than for firms with no incentives to meet earnings thresholds.

Further, in this situation, we examine whether top management of parent company would trade-off the incurrences of SG&A costs between parent company and conglomerate for two reasons. First, firms that meet earnings targets or beat earnings expectations have higher stock returns, are perceived to better future performance (Bartov *et al.*, 2002), and achieve a performance benchmark (Degeorge *et al.*, 1999). Second, cost rigidity reduces the accuracy of analysts' earnings forecasts and negatively influences investors' assessment on firm value (Weiss, 2010). As such, we explore whether parent company would reduce cost rigidity more for itself than for the conglomerate to meet earnings thresholds.

Using a sample of Taiwanese firms, we find that SG&A cost rigidity appears in the absence of managerial incentive to meet earnings thresholds. In the presence of managerial incentive to avoid loss, SG&A costs increase less rapidly when sales go up, but reduce more rapidly when sales go down, leading to the disappearance of cost rigidity. Moreover, compared to firms with no incentive to avoid loss, firms with an incentive of loss avoidance increase less SG&A costs when sales increase and reduce more when sales decline to avoid loss, leading to less cost rigidity. The results still hold after controlling for asset intensity, employee intensity, ROA, and GDP growth. The evidence suggests that the occurrence of cost rigidity is conditional on the absence of managerial incentive to meet earnings thresholds and that marginal cost is decreasing in the presence of managerial incentives to avoid loss or decrease in earnings. In addition, if neither parent companies

nor conglomerates have an incentive to avoid loss, SG&A costs significantly increase more rapidly when sales rise and decrease less rapidly when sales drop, and thus cost rigidity appears. Conversely, if both parent companies and conglomerates have the incentive to avoid loss, the results are reversed and consistent with decreasing marginal cost concept. Overall, the evidence suggests that the decreasing marginal cost concept is conditional on managerial incentives to meet earnings thresholds and that parent company makes selective SG&A cost reduction decisions to meet earnings thresholds.

## 2. Literature and Hypothesis

Previous literature has documented the economic reason and agency problem for the incurrance of stickiness of SG&A costs. Anderson, *et al.* (2003) documented that managers deliberately adjust resources in response to changes in volume. When volume is increased, managers commit more resources for operations to meet the increased demand and accommodate increased sales. Conversely, when volume is decreased, given uncertain future market demand and costs for adjusting resources, managers do not proportionally reduce committee resources. Instead, they retain some un-utilized resources, for personal interest relating to agency costs, to cope with a change in the stochastic demand, which might be decline temporarily.<sup>1</sup> Banker, *et al.* (2014) use an analytical model to show and find empirical evidence that the short-run cost structure is more rigid (i.e., greater fixed costs and smaller variable costs) for firms with higher demand uncertainty. Managers delay the reduction of committed resources until a permanent decline in market demand becomes more certain. In addition, managers may retain resources for personal interest relating to agency costs, since cutting resources may trigger downsizing of their divisions. However, the adjustments of resources could be caused by self-interested managers' concern on their personal utility (Roychowdhury, 2006; Cohen, *et al.* 2008). Thus, the agency conflict induces managers who want to build their empires to expand the firm exceeding its optimal size or maintain unutilized resources for their own interests, leading to a higher degree of SG&A cost asymmetry (Chen *et al.*, 2012).<sup>2</sup> Additionally, Banker, *et al.* (2014) refine Anderson *et al.* (2003) and find that a prior sales increase leads to cost stickiness, whereas a prior sale decrease leads to anti-stickiness. They document that the cost stickiness leads to a confounding effect in the asymmetric timeliness models, i.e., conditional conservatism. Moreover, cost stickiness results in analysts earnings forecasts errors due to their inability to incorporate available information on cost behavior in earnings forecasts (Ciftci, *et al.* 2016). Besides, Chen, *et al.* (2012) find that managers' personal interests in the empire building relating to agency problems leads to the stickiness of SG&A costs.

As opposed to the above arguments, facing widespread perception of earnings as a symbol of firms' performance by investors and shareholders, managers have incentives to avoid loss and/or decrease in earnings, i.e., meeting earnings thresholds. That is, managers may adjust the utilization

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<sup>1</sup> Using data from a firm with a number of physical therapy clinics in the United States, Balakrishnan, *et al.* (2004) further find that the extent of cost stickiness is related to current usage of assets (i.e., capacity utilization). Firms experiencing excess capacity have less-sticky costs, whereas firms with current strained resources have more-sticky costs.

<sup>2</sup> These costs incurred in the corporate office, such as salespersons' salaries and commissions, office payroll and expenses, travel and entertainment such as status, power, compensation, and prestige (Jensen, 1986; Stulz, 1990; Masulis, *et al.*, 2007; Hope and Thomas, 2008; and Chen *et al.*, 2012).

of resources to meet earnings thresholds either for the benefit of the overall organization or to align with their interests, or for both.

Managers have incentives to meet earnings targets or beat earnings expectations for higher stock returns, perceived better future performance (Bartov *et al.*, 2002), or achieving a performance benchmark (Degeorge *et al.*, 1999). In addition, stakeholder's use of information-processing heuristics and prospect theory results in manager's motivation to avoid loss and decrease in earnings (Burgstahler and Dichev, 1997). Thus, firms manage earnings to avoid losses and small decrease in earnings, to achieve zero and small positive in earnings surprises, and to meet earnings forecasts or analysts' earnings expectations (Burgstahler and Eames, 2003; Burgstahler and Eames, 2006; Kasznik and McNichols, 2002). To avoid loss or earnings decrease, when sales decrease, managers have stronger incentives to reduce especially those expenditures that do not exhibit clear and positive relation with sales revenues, such as SG&A costs, and that managers have discretion over their incurrence.<sup>3</sup> As a result, in the presence of meeting earnings thresholds, SG&A costs will increase less rapidly when sales rise and decrease more rapidly when sales drop, which reduces cost rigidity more for firms with incentives to meet earnings thresholds than for firms with no incentives to meet earnings thresholds.

### 3. Research Design

#### 3.1 Model specifications

Following Anderson *et al.* (2003), we express SG&A costs as a function of changes in sales as follows:

$$\Delta \log SGA_t = \beta_0 + \beta_1 \Delta \log SALES_t + \beta_2 SDEC \times \Delta \log SALES_t + \varepsilon_t \quad (1)$$

where *SGA* is SG&A costs, *SALES* is the sales revenue in the year of *t*, *SDEC* is a dummy variable equal to one for firms with a decrease in sales in two successive years and zero otherwise. The dependent variable  $\log(SGA_t/SGA_{t-1})$  is the proportion of the change in SG&A costs in the year of *t*, while the dependent variable  $\log(SALES_t/SALES_{t-1})$  is the proportion of the change in sales revenues in the year of *t*. In this model, when sales revenue increases by 1%, SG&A costs increase by  $\beta_1\%$ . Conversely, when sales revenue decreases by 1%, SG&A costs reduce by  $(\beta_1 + \beta_2)\%$ . Asymmetric cost rigidity exists when the response of decrease in SG&A costs is smaller than the response of increase in SG&A costs, and so  $\beta_2 < 0$ . Thus,  $-\beta_2$  measures the degree of asymmetric rigidity of SG&A costs. In addition, following Kama and Weiss (2012), we add a variable for earnings thresholds and related interactive terms to the model as independent variables as follows:

$$\begin{aligned} \Delta \log SGA_t = & \beta_0 + \beta_1 \Delta \log SALES_t + \beta_2 SDEC \times \Delta \log SALES_t + \gamma_0 THRES_t \\ & + \gamma_1 THRES_t \times \Delta \log SALES_t + \gamma_2 THRES_t \times SDEC \times \Delta \log SALES_t + \varepsilon_t \end{aligned} \quad (2)$$

where *THRES* is a proxy for managers' incentive to meet earnings thresholds and measured in two ways: avoidance of loss and avoidance of earnings decrease. Following previous research, loss avoidance is a dummy variable taking one for a firm's loss, defined as earnings deflated by stockholders' equity, and falling within (0, 0.01) and zero otherwise, while earnings decrease is a

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<sup>3</sup> For example, whether advertising expenditure can create more sales depends on the success of the advertisement, which is unobservable. Conversely, manufacturing costs exhibit cause-and-effect relation with sales, given market demand.

dummy variable taking one for a firm's change in earnings deflated by stockholders' equity and falling within (0, 0.01), and zero otherwise.

In the presence of managerial incentive to meet earnings thresholds, when sales revenue increases by 1%, SG&A costs increase by  $(\beta_1 + \gamma_1)\%$ . In the absence of managerial incentive to meet earnings thresholds, SG&A costs reduce by  $\beta_1\%$ . If managerial incentive to meet earnings thresholds can reduce the increase of SG&A costs when sales increase, then the response of increase in SG&A costs is smaller, i.e.,  $\gamma_1 < 0$ . Contrarily, when sales revenue decreases by 1% and managers have an incentive to meet earnings thresholds, SG&A costs decrease by  $(\beta_1 + \gamma_1 + \beta_2 + \gamma_2)\%$ . Conversely, if managers have no incentive to meet earnings thresholds, SG&A costs reduce by  $(\beta_1 + \beta_2)\%$ . Thus, if managerial incentive to meet earnings thresholds can reduce the increase of SG&A costs when sales increase, then the response of decrease in SG&A costs is smaller, i.e.,  $\gamma_1 + \gamma_2 > 0$ . Additionally, in the absence of earnings thresholds, the asymmetric cost rigidity exists when the response of decrease in SG&A costs is smaller than the response of increase in SG&A costs, i.e.,  $\beta_2 < 0$ . Thus,  $-\beta_2$  measures the degree of cost rigidity. In the presence of earnings thresholds, the measure for the degree of cost rigidity is  $-(\beta_2 + \gamma_2)$ . If managerial incentive to meet earnings thresholds can reduce the degree of cost rigidity, then  $\gamma_2 > 0$ .

### 3.2 Data and sample

The data is taken from Taiwan Economic Journal. The sample comprises parent companies that have prepared consolidated financial statements with common stocks listed in Taiwan Stock market, with available and complete data on consolidated financial statements for variables used in this study from 2005 to 2012.<sup>4</sup> Our sample covers firms using calendar year and precludes those firms in the financial related industries or with insufficient data. Consequently, the final sample consists of 8,238 firm-year observations over the sample period 2005 to 2012. The sample distribution is provided in Table 1. Following related literature, we explore two types of earnings thresholds: avoidance of decrease in earnings, and avoidance of loss.

Table 1. Sample description

Type of Threshold		Parent company		Total
		No	Yes	
Avoidance of Loss	No	7,865	80	7,945
	Yes	43	250	293
	<b>Total</b>	7,908	330	8,238
Avoidance of Earnings Decrease	No	7,674	119	7,793
	Yes	90	355	445
	<b>Total</b>	7,764	474	8,238

## 4. Empirical Analysis

### 4.1 Descriptive statistics

Table 2 on the next page presents the descriptive statistics of variables used in this paper. For conglomerates, the average of changes in SG&A costs is 0.03 with a standard deviation of 0.24. The average of changes in sales is 0.023 with a standard deviation of 0.348. The average of sales

<sup>4</sup> The sample period begins with 2005, for listed firms must adopt IAS No. 27 concerning the preparation of consolidated financial statements.

decrease is 0.439 with a standard deviation of 0.496. In contrast, parent companies have smaller mean changes in SG&A costs and sales revenue and lower mean sales decrease and standard deviation. Similarly, the average and standard deviation of loss avoidance and avoidance of sales decrease are smaller than those of conglomerates. Table 3 presents Pearson correlations and shows that, for either parent companies or conglomerates, changes in SG&A costs are positively correlated with changes in sales revenue. Sales decrease is negatively correlated with changes in SG&A costs and changes in sales revenue.

**Table 2.** Descriptive statistics

Variable	Mean	S. D.	Median	Minimum	Maximum
Conglomerate					
$\Delta \log SG\&A_t$	0.030	0.240	0.028	-0.845	0.989
$\Delta \log Sales_t$	0.023	0.348	0.028	-1.522	1.708
<i>SalesDecrease</i>	0.439	0.496	0	0	1
<i>Avoidance of loss</i>	0.040	0.196	0	0	1
<i>Avoidance of earnings decrease</i>	0.058	0.233	0	0	1
Parent company					
$\Delta \log SG\&A_t$	0.060	0.235	0.051	-0.820	1.054
$\Delta \log Sales_t$	0.049	0.308	0.053	-1.282	1.341
<i>SalesDecrease</i>	0.392	0.488	0	0	1
<i>Avoidance of Loss</i>	0.036	0.185	0	0	1
<i>Avoidance of earnings decrease</i>	0.054	0.226	0	0	1

**Table 3.** Pearson correlation

Panel A: Conglomerate					
	a. $\Delta \log Sales_t$	b. $\Delta \log SG\&A_t$	c. <i>SalesDecrease</i>	d. <i>Loss Avoidance</i>	e. <i>Avoidance of Earnings Decrease</i>
a.	1.000				
b.	0.574***	1.000			
c.	-0.682***	-0.398***	1.000		
d.	-0.048***	-0.075***	0.077***	1.000	
e.	0.006	-0.007	-0.055***	0.003	1.000
Panel B: Parent company					
	a. $\Delta \log Sales_t$	b. $\Delta \log SG\&A_t$	c. <i>SalesDecrease</i>	d. <i>Loss Avoidance</i>	e. <i>Avoidance of Earnings Decrease</i>
a.	1.000				
b.	0.516***	1.000			
c.	-0.661***	-0.370***	1.000		
d.	-0.044***	-0.085***	0.071***	1.000	
e.	0.015	0.003	-0.040	0.000	1.000

**Note:** \*, \*\*, and \*\*\* denotes statistical significance of  $p < 0.10, 0.05, 0.01$ , respectively, at two-tails.

#### 4.2 Empirical analysis

The results shown in Table 4 indicate that for conglomerates with no managerial incentive to avoid loss, SG&A costs increase 0.5242% per 1% increase in sales, but decrease 0.3376% ( $p < 0.01$ ) per 1% decrease in sales, leading to the significantly negative estimate of cost rigidity (-0.1866%). In the presence of managerial incentive to avoid loss, SG&A costs increase less rapidly (0.1441,  $p < 0.05$ ) when sales go up, but reduce more rapidly (0.5032,  $p < 0.01$ ) when sales go down, leading to the disappearance of cost rigidity (0.3591,  $p < 0.01$ ). Moreover, Consistent with our predictions, managerial incentives to avoid loss significantly weakens the association between sales percentage increase and SG&A costs (-0.3801) and strengthens the association between sales percentage decrease and SG&A costs (0.1656). This evidence suggests that, compared to firms with no incentive to avoid loss, firms with an incentive of loss avoidance increase less SG&A costs when sales increase and reduce more when sales decline to avoid loss, leading to less cost rigidity. Additionally, the results are qualitatively the same when managers have the incentive to avoid decreases in earnings. Further, the above results hold for parent company as well. Taken together, the evidence suggests that the occurrence of cost rigidity is conditional on the absence of managerial incentive to meet earnings thresholds and that marginal cost is decreasing in the presence of managerial incentives to avoid loss or decrease in earnings.

**Table 4.** Regressions of SG&A costs on sales and thresholds

Managerial incentive (Threshold)		Conglomerate		Parent company	
		Avoidance of Loss	Avoidance of Earnings Decrease	Avoidance of Loss	Avoidance of Earnings Decrease
Coeff.	Explanatory variable				
$\beta_0$	constant	-0.0073	-0.008	-0.0365	-0.0445
	(T statistic)	(-0.28)	(-0.31)	(-1.30)	(-1.57)
$\gamma_0$	Threshold	-0.0094	0.0183	-0.0277 *	0.0197
		(-0.61)	(1.39)	(-1.72)	(1.56)
$\beta_1$	log $\Delta$ Sales	<b>0.5242</b> ***	<b>0.518</b> ***	<b>0.4137</b> ***	<b>0.4129</b> ***
		(45.15)	(44.64)	(37.18)	(37.01)
$\gamma_1$	Threshold*log $\Delta$ Sales	<b>-0.3801</b> ***	<b>-0.1399</b> *	<b>-0.2362</b> ***	<b>-0.1254</b> **
		(-5.80)	(-1.82)	(-3.86)	(-2.11)
$\beta_2$	SalesDecrease*log $\Delta$ Sales	<b>-0.1866</b> ***	<b>-0.1767</b> ***	<b>-0.1375</b> ***	<b>-0.1308</b> ***
		(-9.51)	(-9.00)	(-7.64)	(-7.24)
$\gamma_2$	Threshold* SalesDecrease*log $\Delta$ Sales	<b>0.5457</b> ***	<b>0.2515</b> *	<b>0.4432</b> ***	<b>0.1361</b>
		(4.91)	(1.80)	(4.29)	(1.23)
	Year effects	Yes	Yes	Yes	Yes
	Industry effects	Yes	Yes	Yes	Yes
	Adjusted R <sup>2</sup>	0.3625	0.3581	0.2918	0.2869
	No. of observations	8,238	8,238	8,238	8,238
<b>Significance tests:</b>					
	$\beta_1 + \beta_2$ (decrease in costs, no threshold)	<b>0.3376</b> ***	<b>0.3413</b> ***	<b>0.2762</b> ***	<b>0.2821</b> ***
		(26.35)	(26.65)	(24.08)	(24.56)
	$\beta_1 + \gamma_1$ (increase in costs, with threshold)	<b>0.1441</b> **	<b>0.3781</b> ***	<b>0.1775</b> ***	<b>0.2875</b> ***
		(2.23)	(4.95)	(2.95)	(4.90)

$\beta_2+\gamma_2$ (rigidity, with threshold)	<b>0.3591</b> *** (3.28)	0.0748 (0.54)	<b>0.3057</b> *** (3.00)	0.0053 (0.00)
$\gamma_1+\gamma_2$ ( $\Delta$ decrease in costs, $\Delta$ incentive)	<b>0.1656</b> ** (2.29)	0.1116 (1.17)	<b>0.207</b> *** (3.10)	0.0107 (0.14)
$\beta_1+\gamma_1+\beta_2+\gamma_2$ (decrease in costs, with threshold)	<b>0.5032</b> *** (7.05)	<b>0.4529</b> *** (4.75)	<b>0.4832</b> *** (7.33)	<b>0.2928</b> *** (3.74)

**Notes:** *t* statistics in parentheses. \*, \*\*, and \*\*\* denotes statistical significance of  $p < 0.10, 0.05, 0.01$ , respectively, at two-tails.

Table 5 presents the results of regressions for both parent companies and conglomerates. If neither parent companies nor conglomerates have an incentive to avoid loss, SG&A costs significantly increase more rapidly when sales rise (0.414 for parent company, 0.523 for conglomerate) and decrease less rapidly when sales drop (0.275 for parent company, 0.333 for conglomerate), and thus cost rigidity appears (-0.139 for parent company, -0.19 for conglomerate). Conversely, if both parent companies and conglomerates have the incentive to avoid loss, the results are reversed and consistent with decreasing marginal cost concept. SG&A costs increase less rapidly for sales increase (0.196 for parent company, 0.14 for conglomerate), which are smaller than the amounts when both do not have incentives to avoid loss, and decrease more rapidly for sales decrease (0.496 for parent company, 0.543 for conglomerate).<sup>5</sup> In addition, these results hold for the managerial incentive to avoid decrease in earnings. Furthermore, in the presence of earnings thresholds for either of the two parties, the results on cost rigidity are ambiguous. Taken together, the evidence suggests that cost rigidity is conditional on managers' incentive to avoid loss and earnings decrease.

**Table 5.** Differential managerial incentives to meet earnings thresholds

Subsample: Avoidance of loss		No		Yes	
Cost structure		Parent	Conglomerate	Parent	Conglomerate
$\beta_1$	$\log\Delta$ Sales	0.414*** (36.92)	0.523*** (44.94)	0.196*** (2.88)	0.140* (1.79)
$\beta_2$	SalesDecrease* $\log\Delta$ Sales	-0.139*** (-7.64)	-0.190*** (-9.65)	0.300** (2.49)	0.403*** (3.11)
$\beta_1+\beta_2$	(decrease in costs)	0.275*** (23.80)	0.333*** (25.89)	0.496*** (5.97)	0.543*** (25.89)
No. of observations		7,865	7,865	250	250
Subsample: Avoidance of earnings decrease		No		Yes	
Cost structure		Parent	Conglomerate	Parent	Conglomerate
$\beta_1$	$\log\Delta$ Sales	0.412*** (36.16)	0.517*** (43.5)	0.240*** (4.65)	0.297*** (4.33)
$\beta_2$	SalesDecrease* $\log\Delta$ Sales	-0.129*** (-7.01)	-0.175*** (-8.73)	0.105 (0.96)	0.214 (1.4)

<sup>5</sup> In this case, cost is "anti-sticky" (Weiss, 2010).

$\beta_1 + \beta_2$ (decrease in costs)	0.283 <sup>***</sup> (24.09)	0.342 <sup>***</sup> (26.11)	0.345 <sup>***</sup> (4.16)	0.511 <sup>***</sup> (4.57)
No. of observations	7,674	7,674	355	355

Notes: *t* statistics in parentheses. \*, \*\*, and \*\*\* denotes statistical significance of  $p < 0.10, 0.05, 0.01$ , respectively, at two-tails.

### 4.3 Robustness checks

In the sensitivity analysis, we investigate whether our results hold for the following economic factors (Anderson *et al.*, 2003, Chen *et al.*, 2012): (1) asset intensity and employee capacity vary positively with the resource adjustment costs, managers are more likely to retain idle capacity for temporary decline in product demand to avoid substantial resource adjustment costs. (2) If sales revenue is declined in successive periods, the demand for capacity utilization is less likely to be recovered and so managers are more likely to cut (retain) idle capacity. (3) Firms with good operating performance (ROA) may be more efficient in cutting unutilized resources. Asset intensity is measured as total assets scaled by sales revenue, employ intensity is measured as number of employees scaled by sales revenue, successive decrease in sales revenue (LSDEC) is taking one for firms with successive decrease in sales revenues in the last year, ROA is earnings before extraordinary items divided by total assets. GDP is the growth rate in real GDP.

The results as shown in Table 6 are qualitatively the same as those shown in Table 4. In the absence of managerial incentive to avoid loss, SG&A costs increase 0.4003% per 1% increase in sales, but decrease 0.2915% ( $p < 0.01$ ) per 1% decrease in sales, leading to the significantly negative estimate of cost rigidity (-0.1088%). In the presence of managerial incentive to avoid loss, SG&A costs increase less rapidly (0.2019,  $p < 0.01$ ) when sales go up, but reduce more rapidly (0.4618,  $p < 0.01$ ) when sales go down, leading to the disappearance of cost rigidity (0.2599,  $p < 0.05$ ). Moreover, the results for managerial incentive to avoid earnings decrease are generally the same. Managerial incentives to avoid loss significantly weakens the association between sales percentage increase and SG&A costs (-0.1983) and strengthens the association between sales percentage decrease and SG&A costs (0.1703). Overall, our results still hold after controlling for asset intensity, employee intensity, successive decrease in sales revenue, ROA, and GDP growth.

**Table 6.** Regressions of SG&A costs on sales and thresholds controlling for influencing factors for parent company

Managerial incentive (Threshold) Coeff. Explanatory variable	Avoidance of Loss		Avoidance of Earnings Decrease	
$\beta_0$ Constant (T statistic)	-0.0334	-(1.19)	-0.0407	-(1.45)
$\gamma_0$ Threshold	-0.0319	-(2.00) **	0.0165	(1.31)
$\beta_1$ log $\Delta$ Sales	<b>0.4003</b>	(35.14) ***	<b>0.4004</b>	(35.05) ***
$\gamma_1$ Threshold*log $\Delta$ Sales	<b>-0.1983</b>	-(3.16) ***	<b>-0.1227</b>	-(2.06) **
$\beta_2$ SalesDecrease*log $\Delta$ Sales	<b>-0.1088</b>	-(4.87) ***	<b>-0.1045</b>	-(4.66) ***
$\gamma_2$ Threshold* SalesDecrease*log $\Delta$ Sales	<b>0.3687</b>	(3.54) ***	<b>0.1011</b>	(0.92)
AssetIntensity* SalesDecrease*log $\Delta$ Sales	-0.0001	-(1.63)	-0.0001	-(1.80) *
EmployeeIntensity* SalesDecrease*log $\Delta$ Sales	-0.2616	-(0.06)	0.2682	(0.07)
LSDec* SalesDecrease*log $\Delta$ Sales	0.0301	(1.54)	0.0348	(1.78) *
ROA* SalesDecrease*log $\Delta$ Sales	0.1393	(4.12) ***	0.1536	(4.54) ***
GDPGW* SalesDecrease*log $\Delta$ Sales	-0.0006	-(0.19)	-0.0003	-(0.09)
Year effects	Yes		Yes	

Industry effects	Yes	Yes
Adjusted R <sup>2</sup>	0.2883	0.2843
No. of observations	8,146	8,146
<b>Significance tests:</b>		
$\beta_1 + \beta_2$ (decrease in costs, no threshold)	<b>0.2915</b> (16.93) ***	<b>0.2959</b> (17.11) ***
$\beta_1 + \gamma_1$ (increase in costs, with threshold)	<b>0.2019</b> (3.27) ***	<b>0.2778</b> (4.74) ***
$\beta_2 + \gamma_2$ (rigidity, with threshold)	<b>0.2599</b> (2.50) **	-0.0034 (0.00)
$\gamma_1 + \gamma_2$ ( $\Delta$ decrease in costs, $\Delta$ incentive)	<b>0.1703</b> (2.56) **	-0.0215 (0.28)
$\beta_1 + \gamma_1 + \beta_2 + \gamma_2$ (decrease in costs, with threshold)	<b>0.4618</b> (6.87) ***	<b>0.2744</b> (3.49) ***

**Notes:** *t* statistics in parentheses. \*, \*\*, \*\*\* denotes  $p < 0.10, 0.05, 0.01$ , respectively, at two-tails. AssetIntensity is measured as total assets scaled by sales revenue; EmployeeIntensity is measured as number of employees scaled by sales revenue; LSDec (successive decrease in sales revenue) is taking one for firms with successive decrease in sales revenues in the last year; ROA is earnings before extraordinary items divided by total assets; GDPGW is the growth rate in real GDP.

In addition, we further explore whether parent companies' incentives to cut costs in the presence of the incentive to avoid loss or earnings decrease. Untabulated results show that, if only the parent companies have the incentive to avoid loss, SG&A costs of the parent companies do not significantly increase when sales revenue increase. However, when sales decrease, SG&A costs of the parent companies significantly reduce, leading to no evidence for the cost rigidity for the parent companies. Further comparison indicates that, in the presence of loss avoidance for the parent companies, parent companies' SG&A costs increase less (from 0.414 to 0.380) when sales increase, but further reduce (from 0.275 to 0.354) when sales decrease, suggesting that the parent companies use accounting discretion to cut SG&A costs more aggressively in response to sales decline. In contrast, in the presence of loss avoidance only for the conglomerates, SG&A costs of the parent companies, but not the conglomerates, reduce significantly when sales decrease. Further comparison indicates that, in the presence of loss avoidance for the conglomerates, parent companies' SG&A costs increase less (from 0.414 to 0.118) when sales increase but further reduce (from 0.275 to 0.505) when sales decrease, suggesting that the parent company cuts its costs more aggressively when sales fall. Consequently, this evidence is consistent with parent companies cutting SG&A costs more aggressively to avoid loss. Thus, top management of parent company, who has control or substantial influence on conglomerate, makes selective SGA cost reduction decisions to meet earnings thresholds.

## 5. Concluding Remarks

This paper examines whether managers' incentives to avoid loss or decrease in earnings reduce the asymmetrical changes in cost structures, i.e., cost rigidity. The results show that the rigidity of SG&A costs appears when both parent company and conglomerate have no incentives to avoid loss or earnings decrease, but disappears when both parties have the incentives to meet earnings thresholds. If either party has the incentive to avoid loss, the decrease in costs is greater and exhibits significant relation with sales decrease for parent company, suggesting parent company cutting its costs more aggressively in this case. Overall, the evidence suggests that the decreasing marginal cost concept is conditional on the presence of managerial incentives to meet earnings thresholds, after controlling for influencing factors. How parent company selectively cut SG&A costs when either party has the incentive to meet earnings thresholds and how components of SG&A costs are cut await future research.

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### References

- [1] Anderson, M. C., Banker, R. D., and Janakiraman, S. N. (2003). “Are selling, general, and administrative costs ‘sticky’?”, *Journal of Accounting Research*, 41(1): 47–63.
- [2] Balakrishnan, R., Petersen, M. J., and Soderstrom, N. S. (2004). “Does capacity utilization affect the ‘stickiness’ of costs?”, *Journal of Accounting, Auditing and Finance*, 19(3): 283–300.
- [3] Banker, R. D., Basu, S., Byzalov, D., and Chen, J. Y. S. (2016). “The confounding effect of cost stickiness on conservatism estimates”, *Journal of Accounting and Economics*, 61(1): 203–220.
- [4] Banker, R. D., Byzalov, D., Ciftci, M., and Mashruwala, R. (2014). “The moderating effect of prior sales changes on asymmetric cost behavior”, *Journal of Management Accounting Research*, 26(2): 221–242.
- [5] Banker, R. D., Byzalov, D., and Plehn-Dujowich, J.M. (2014). “Demand uncertainty and cost behavior”, *The Accounting Review*, 89(3): 839–865.
- [6] Bartov, E., Givoly, D., and Hayn, C. (2002). “The rewards to meeting or beating earnings expectations”, *Journal of Accounting and Economics*, 33 (2): 173–204.
- [7] Burgstahler, D. and Dichev, I. (1997). “Earnings management to avoid earnings decreases and losses”, *Journal of Accounting and Economics*, 24(1): 99–126.
- [8] Burgstahler, D. and Eames, M. (2003). “Earnings management to avoid losses and small decreases: Are analysts fooled?”, *Contemporary Accounting Research*, 20(2): 253–294.
- [9] Burgstahler, D. and Eames, M. (2006). “Management of earnings and analysts’ forecasts to achieve zero and small positive earnings surprises”, *Journal of Business Finance and Accounting*, 33(5-6): 633–652.
- [10] Chen, C. L., Lu, H. and Sougiannis, T. (2012). “The agency problem, corporate governance, and the asymmetrical behavior of selling, general, and administrative costs”, *Contemporary Accounting Research*, 29(1): 252–282.
- [11] Ciftci, M., Mashruwala, R., and Weiss, D. (2016). “Implications of cost behavior for analysts’ earnings forecasts”, *Journal of Management Accounting Research*, 28(1): 57–80.
- [12] Cohen, D. A., Dey, A., and Lys, T. Z. (2008). “Real and accrual-based earnings management in the pre- and post-Sarbanes-Oxley periods”, *The Accounting Review*, 83(3): 757–787.
- [13] Cohen, D., Mashruwala, R., and Zach, T. (2010). “The use of advertising activities to meet earnings benchmarks: Evidence from monthly data”, *Review of Accounting Studies*, 15(4): 808–832.
- [14] Cooper, R. and Kaplan, R. S. (1991). *The design of cost management systems: texts, cases, and readings*, New Jersey: Prentice Hall.
- [15] DeGeorge, F., Patel, J., and Zeckhauser, R. (1999). “Earnings management to exceed thresholds”, *Journal of Business*, 72(1): 1–33.
- [16] Kama, I. and Weiss, D. (2013). “Do earnings targets and managerial incentives affect sticky costs?”, *Journal of Accounting Research*, 51(1): 201–224.
- [17] Kasznik, R. and McNichols, M. (2002). “Does meeting expectations matter: Evidence from analyst revisions and share prices”, *Journal of Accounting Research*, 40(3): 727–759.
- [18] Roychowdhury, S. (2006). “Earnings management through real activities manipulation”, *Journal of Accounting and Economics*, 42(3): 335–370.
- [19] Weiss, D. (2010). “Cost behavior and analysts’ earnings forecasts”, *The Accounting Review*, 85(4): 1441–1471.