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Cost Stickiness: Value Creating or Value Destroying (The Iranian Experience)

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ABSTRACT

This research reviews and tests two contradicting notions in cost stickiness literature by empirical recognition of the consequences of cost stickiness. Cost stickiness is consistent with both rational resource planning and opportunistic incentives of manager to increase personal benefits arising from status and power. Although both mechanisms involve asymmetric retention of slack, some of the implications are starkly different: the former, according to the optimal resource adjustment view, represents that retaining slack resources during sale decrease are optimal responses to future expectations and contributes to firm value, whereas the latter, according to agency theory-based view, reflects wasteful overspending which can be value-destroying. This research examined a sample of 124 companies listed in Tehran Stock Exchange over the period of 2002 to 2018. The results show that SG&A cost stickiness is generally a signal of self-interested managers who may grow a firm beyond its optimal size opportunistically while COGS stickiness can be a signal of far-sighted management in the interest of the firm. The results also indicate that investors may not fully recognize the managerial expectations underlying the resource adjustment decisions and mostly perceives SG&A cost stickiness and COGS stickiness as a signal of self-interested managers who decide to maximize their personal utility rather than the interests of the firm's shareholders.

Keywords:

Cost Stickiness, Optimal Resource Adjustment View, Agency Theory-Based View.

1. Introduction

Cost stickiness, i.e., the property of certain cost categories to decrease less for a sales decline than they increase for an equivalent sales growth, is a phenomenon not entirely understood yet (Brüggen and Zehnder, 2014). To foster a better understanding, this study examines two contradicting notions in cost stickiness literature by empirical recognition of the consequences of cost stickiness. Asymmetric cost behavior constitutes a new way of thinking about cost behavior (and, by extension, earnings behavior) which addressed by Anderson et al. (2003) for the first time.

While the traditional view of cost behavior envisions a mechanistic symmetric relation between costs and concurrent activity, modeled as fixed and variable costs, this new way of thinking is rooted in an explicit recognition of the role of deliberate managerial decisions in short-run cost behavior (Anderson et al, 2003; Subramaniam and Weidenmier, 2003; Calleja et al, 2006; Banker and byzalov, 2014). On the other hand, this approach considers the manager and her resource allocation decisions as an intervening variable in the relation of costs to sales (Brüggen and Zehnder, 2014). Resource commitment decisions are further influenced by managers' incentives and behavioral biases (Banker and byzalov ,2014). Anderson et al. (2003) suggest that sticky costs occur because managers act in the interest of the firm by retaining slack resources and avoiding adjustment costs. In this notion, observed cost stickiness is a "good" signal. On the contrary, Chen et al. (2012) make the valid point that the manager acts as a self-interested agent and might extract private benefits. They consequently argue that cost stickiness might to some extent be a signal of this benefit extraction in the form of managerial empire building. These results indicate that some of the cost stickiness observed might actually be "bad". Hence, documented cost stickiness is consistent with both rational resource planning and wasteful empire-building (Anderson et al. 2003; Chen et al. 2012). Although both mechanisms involve asymmetric retention of slack, some of the implications are starkly different: the former represents desirable managerial behavior that contributes to firm value in the long run by avoiding excessive adjustment costs, whereas the latter reflects value-destroying overspending. Therefore, it is important to develop empirical tests that can reliably discriminate between efficient and excessive cost stickiness (Banker et al., 2014). Although few prior researches in regard to good or bad cost stickiness using developed countries' data implied on good cost stickiness (Bruggen and Zender, 2014; Park, 2017), we can't expect to have the same results in Iran as a developing country for some reasons. These reasons refer to significant differences between Iran and other countries e.g. government's strong influence on economy, hyperinflation, monopolistic market and etc. In a country with government's strong influence on economy, managers must always set up firm plans in align with political and social orientations, which often contradicts the firm's efficiency, in order to have financial support from the government. In other words, public sector' executives do not raise any concerns about bankruptcy of the firm and they always rely on government financial support, in particular easy use of public resources or public banks (as opposed to private sector's managers who know well that all the problems of the firm must be solved by themselves, and if they are not successful in a way ahead, they will automatically eliminate from the market) which lead to wasteful overspending of resources and firm's inefficiency. Additionally, in a monopolistic market, companies will produce at a lower output and charge higher prices than a competitive market, with the same cost structure. This leads to a loss of economic welfare and efficiency as well. Given what mentioned earlier in regard to institutional background of Iran, it is necessary to reexamine two contrary notions of cost stickiness using Iranian companies' data.

Hence this paper aim to contribute to the debate on cost stickiness by developing and examining empirical models using data of companies listed in Tehran stock exchange to provide insight which of the two contrary notions in literature is more descriptive of reality in Iran. In this regard, this paper tests the consequences of cost stickiness by examining the impact of cost stickiness (SG&A cost and COGS) on future operating indicators (operating profit margin and return on asset). Also, this paper tries to find out the understanding of investors of cost stickiness notion by testing the impact of cost stickiness on future stock return.

The remainder of the paper is organized as follows: Section 2 presents the relevant concepts and gives a brief literature review of cost stickiness. Section 3 describes our hypothesis. Section 4 explains our research methodology and provides descriptive

statistics. Section 5 reports the results from the model estimations and Sect. 6 provides concluding comments and possible directions for further research.

2. Literature Review

Costs arise from managers' deliberate resource allocation decisions. Because earnings = sales – costs, examining cost behavior and earnings behavior allows understanding of managerial resource adjustment decisions (Park, 2017). This paper examines managers' resource adjustment decisions during a sales decline. Managers can respond to a sales decline in two opposite ways, resulting in sharply contrasting earnings behaviors.

Anderson, Banker, Janakiraman (2003) document sticky cost behavior. When sales decline, costs decrease more slowly than revenue declines, reflecting managers' decisions to retain slack resources in anticipation of future rebound in revenue. Weiss (2010), on the other hand, documents anti-sticky cost behavior. When manages aggressively reduce slack resources in a downturn, costs decrease faster than revenue declines. The literature finds that changes in financial numbers such as earnings and costs represent managers' resource adjustment decisions, and establish that financial numbers do not arise mechanically but result from deliberate resource adjustment decisions of managers.

Literature provides several drivers of managerial resource adjustments and resulting changes in profitability. Optimal resource adjustment view suggests that managers' expectations on future sales and profitability drive resource adjustment decisions and financial statements reflect such optimal adjustment decisions. When managers expect future sales to grow, removing slack resources incur adjustment costs in the future. For example, manufacturing firms that fire skilled employees in a temporary downturn need to spend extra resources to re-train them when demand conditions turn favorable. By contrast, when managers expect future sales to remain stagnant or to decline further, retaining slack resources only burdens the firm. Removing slack resources saves carrying costs of the resources, and continuously declining sales does not incur further adjustment costs in the future (Park, 2017). Banker et al. (2014) document that changes in sales affects managerial expectations. Managers remain optimistic on future sales in a temporary decline such as a sales decline in one year, but turn pessimistic if a sales decline persists over multiple years.

Alternatively, agency theory suggests managerial incentives as drivers behind the resource adjustments. Chen, Lu, and Sougiannis (2012) suggest managers' empire-building behavior induces the decision to retain slack resources and results in inefficient management of firms. Kama and Weiss (2013) suggests the incentives to meet or beat earnings benchmark lead to an aggressive reduction in slack resources.

Prior literature also provides conflicting views on the firm value implications of the resource adjustments. Managers' resource adjustments are optimal responses to future expectations according to the optimal resource adjustment view. Accordingly, managers' resource adjustments are optimal and enhance firm value on average. By contrast, agency theory-based view suggests such adjustments can be value-destroying. In a downturn, retaining slack resources that satisfy managers' private empire building incentives is a failure in cost management, potentially threatening the firms' viability. Thus this research aim to provide evidence supporting either view based on information from Iranian companies by examining the consequences of retaining slack resources when sales decrease.

Changes in profitability in similar magnitudes can imply a drastically different quality of firms. A large decrease in operating profitability when there has been a decline in sales may reflect the resource adjustment decisions of rationally optimistic managers (Anderson, Banker, Janakirman 2003), or it may indicate a failure to control operating costs (Chen, Lu, and Sougiannis 2012; Lev and Thiagarajan 1993). Similarly, a large increase in profits despite sales decline may imply efficient resource allocation, or it may suggest unsustainable, excessive cost-cutting. The firms' prospects are dim when underlying motivations of resource adjustment are either wasteful spending or unsustainable cost-cutting. As a result, investors face greater uncertainty in assessing future profitability of firms that undergo sales decreases and following resource adjustments (Park,2017). Thus, this paper also tests whether the stock market perceives managers' resource adjustments during a sales decline as value-creating or value-destroying by examining the consequences of retaining slack resources when sales decrease.

3. Methodology

Hypothesis development

The main object of this paper is to examine two contradicting view in prior literature: Optimal resource adjustment view suggests that managers' resource adjustment decisions to retain or remove slack resources are value-creating; and the view based on agency theory suggests that the decisions to retain slack resources may represent an agency problem. On the other hand this paper test whether firms' resource adjustment behaviors are consistent with the optimal resource adjustment view by examining the impact of cost stickiness on operating profit margin and return on asset- the main two operating indicators. Also this paper examine the impact of cost stickiness on stock return to understand whether the market perceives resource adjustment decisions as value-creating consistent with the optimal resource adjustment view. Based on what is discussed earlier about the institutional back ground of Iran, we predict that current cost stickiness is negatively associate with future operating indicators which is consistent with the view based on agency theory. But we can't anticipate the market perceives from cost stickiness as it is almost a new subject to be considered in investing decisions in stock market of Iran. We formulate our hypothesis as follow:

H_1: stickiness of current SG&A costs are negatively associate with future operating profit margin and return on asset.

H_2: stickiness of current CGS are negatively associate with future operating profit margin and return on asset.

H_3: stickiness of current SG&A are associate with future stock return.

H_4: stickiness of current CGS are associate with future stock return.

Research methodology

3.1. Cost Stickiness

To calculate cost stickiness we use Weiss model (2010) as follow:

$$STICKY_{i,t} = \log\left(\frac{\Delta COST}{\Delta SALE}\right) i, \underline{\tau} - \log\left(\frac{\Delta COST}{\Delta SALE}\right) i, \overline{\tau}$$
$$\underline{\tau}, \overline{\tau} \in \{t, \dots, t-3\}$$

Where $\underline{\tau}$ is the most recent of the last four quarters with a decrease in sales and $\overline{\tau}$ is the most recent of the last four quarters with an increase in sales. *STICKY* is defined as the difference in the cost function slope between the two most recent quarters from quarter *t*−3 through quarter *t*, such that sales decrease in one quarter and increase in the other. If costs are sticky, meaning that they increase *more* when activity rises than they decrease when activity falls by an equivalent amount, then the proposed measure has a negative value. A *lower* value of *STICKY* expresses *more* sticky cost behavior. That is, a negative (positive) value of *STICKY* indicates that managers are less (more) inclined to respond to sales drops by reducing costs than they are to increase costs when sales rise (Weiss, 2010). Note that COST and SALES data should be based on deflated numbers to control for inflation (Banker and et al., 2014). Since negative value of *STICKY* indicates cost stickiness and a lower value of *STICKY* expresses more sticky cost behavior, we multiply the SG&A_STICKY and COGS_STICKY variables by -1, so that a large value of these variables indicates higher cost stickiness.

3.2. Model specification and variable description

To test our hypothesis, we developed following models:

Model (1)

$$PM_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Model (2)

$$ROA_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Model (3)

$$RET_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Model (4)

$$PM_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Model (5)

$$ROA_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Model (6)

$$RET_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t} + \varepsilon_{i,t}$$

Note that in models (1), (2), (4) and (5) r accept values of 1 and 2 to express operating profit margin and return on assets of a year later and two years later. Also in models (3) and (6) r accept values of 0, 1 and 2 to express stock return of the current year, a year later and two years later. Table 1 display the list of variables and their description.

Table 1 Variable description

Variable	Specification
Independent variables	
$\mathbf{SG\&A - STICKY_{i,t}}$	Stickiness of sales, general and administrative costs (Weiss, 2010).
$\mathbf{COGS - STICKY_{i,t}}$	Stickiness of cost of goods sold (Weiss, 2010)
Dependent variables	
$\mathbf{PM_{i,t+r}}$	operating profit margins defined as operating profits over revenue (Park, 2017)
$\mathbf{ROA_{i,t+r}}$	Return on assets defined as operating profit over total assets (Park,2017)
$\mathbf{RET_{i,t+r}}$	Stock return (Anderson et al., 2007; Park, 2017)
Control variables	
$\mathbf{SIZE_{i,t}}$	Firm size, measured by the logarithm of the firm's book value of total assets (Anderson et al., 2007)
$\mathbf{LEV_{i,t}}$	Leverage, measured by the ratio of the book value of long-term debt to the book value of equity (Anderson et al., 2007)
$\mathbf{AS_{i,t}}$	Size of audit firm if the auditor is the Iran Audit Organization (IAO), the state audit firm, and □ if otherwise; if the auditor is the Iran Audit Organization (IAO), the state audit firm, and □ if otherwise; Size of audit firm; 1 if the auditor is the Iran Audit Organization (IAO), the state audit firm, and 0 if otherwise (MohammadRezaei et al.,2016)
$\mathbf{AR_{i,t}}$	Measured by the ratio of accounts receivable to sales (Anderson et al., 2007)
$\mathbf{INV_{i,t}}$	Measured by the ratio of inventory to sales (Anderson et al., 2007)
$\mathbf{CAPX_{i,t}}$	Measured by the ratio of capital expenditure to total asset (kim and Jang, 2018; Canace et al, 2017)

Variable	Specification
$\mathbf{SALESGROWTH_{i,t}}$	Rate of sales growth (Anderson et al., 2007)
$\mathbf{GOVINF_{i,t}}$	1 If government owns 20% or more of the issued shares and 0 otherwise. We use 20% to be consistent with the threshold used in equity accounting standards to determine significant influence (Bagherpour et al., 2014)
$\mathbf{GDPGROWTH_{t}}$	Rate of gross domestic product growth (li and zheng, 2016; Banker et al., 2014)
$\mathbf{COMP_{i,t}}$	The Herfindahl-Hirschman Index (HHI) as an indicator of the amount of competition. We multiply the HHI variable by -1 so that a larger THHI value indicates higher competition (li and zheng, 2016; Banker et al., 2014).

3.3. Sample selection and descriptive statistics

Financial data were extracted from financial statements of the firms listed in Tehran stock exchange from 2002 to 2018. We retrieve financial data from CODAL[i], RDIS[ii] and Rahavard Nowin database. We also collect stock price data from Tehran Stock Exchange (TSE) and Rahavard Nowin database.

According to Weiss model (2010), the base sample comprises all firm-years in this period which satisfy the following condition:

- Values for *sales*, *SG&A* cost and COGS are available for both the current and preceding year.
- Include both sales decrease and sales increase
- $\left(\frac{\Delta COST}{\Delta SALE}\right) i, \underline{\tau}$ and $\left(\frac{\Delta COST}{\Delta SALE}\right) i, \overline{\tau}$ are positive (required for log transformation)

The final sample comprises 124 firms from 2002 to 2018 after deleting observation with missing data for other variables in the models which describe in next section. Table 2 presents summary statistics for the relevant variables. The mean value of SG&A-STICKY and COGS-STICKY is 0.678 and 0.34. The median is also 0.526 and 0.225 respectively. As already mentioned in section 4.2, we multiplied the SG&A_STICKY and COGS_STICKY variables by -1, so that a large value of these variables indicates higher cost stickiness. Also, as shown in table 2, the number of observations for SG&A_STICKY and COGS_STICKY variables is different from other variables due to the cost stickiness measurement method which is discussed earlier in section 4.2.

Table 2 Descriptive Statistics

Variables	n	Mean	Median	Maximum	Minimum	Std. Dev
PM	1612	0.184946	0.153715	0.556052	-0.112716	0.168994
ROA	1612	0.143178	0.123024	0.406855	-0.052285	0.120466
RET	1612	0.317029	0.125122	2.133250	-0.39.9940	0.63.8837
SGA_STICKY	522	0.677699	0.526080	0.043221	1.958283	0.548714
COGS_STICKY	995	0.340068	0.221419	0.014815	1.197413	0.329916
SIZE	1612	6.003769	5.909166	7.368244	5.035521	0.622529
LEV	1612	0.219763	0.119450	1.035629	0.000000	0.267683
AS	1612	0.211538	0.000000	1.000000	0.000000	0.408526
AR	1612	0.471992	0.365381	1.529197	0.031854	0.390889
INV	1612	0.324630	0.279084	0.864433	0.051115	0.204532
CAPX	1612	0.038491	0.025045	0.145047	0.001221	0.039522
SALESGROWTH	1612	0.162487	0.133376	0.802172	-0.322328	0.281029
GOVINF	1612	0.351737	0.000000	1.000000	0.000000	0.477661
GDPGROWTH	1612	0.027846	0.032000	0.125000	-0.077000	0.047018
COMP	1612	-0.375960	-0.335383	-0.086613	-1.000000	0.245943

4. Results

4.1. SG&A cost stickiness and operating profit margin

Table 3 provides the results from regressing SG&A cost stickiness on the operating profit margin variable and the different groups of control variables. The adjusted R2 of 0.705 and 0.7037 and F-statistic of 7.424 and 8.003 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 2.453 and 2.329 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $SG\&A - STICKY$ ($\beta 1$), which indicates the impact of SG&A cost stickiness on operating profit margin, is negative and significant ($\beta 1 = -0.026$ and -0.022 , $p < 0.05$). This provides evidence for our hypothesis and the negative sign of the coefficient proves the view based on agency theory.

Table 3 SG&A Cost stickiness and operating profit margin

$$PM_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$$

Variable	PM_{t+1}		PM_{t+2}	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
SGA_STICKY	0.026252-	2.935758-	0.022002-	2.871443-
SIZE	0.149859	3.876338	-0.072145	-1.270281
LEV	0.034416	1.181051	-0.030390	-2.211843
AS	0.084653	1.555688	0.012860	0.550552
ACR	-0.060295	-2.359542	0.046799	1.421623
INV	-0.072446	-1.341661	-0.200267	-3.427800
CAPX	-0.522538	-2.355455	-0.046766	-0.183534
SALESGROWTH	-0.102753	-4.862622	-0.063622	-2.166287
GOVINF	0.017120	0.148850	0.000349	0.012982
GDPGROWTH	-0.068121	-0.696645	-0.169342	-2.076020
COMP	0.053380	0.341535	-0.261206	-2.494387
C	-0.695670	-2.704245	0.569620	1.638361
F-statistic	7.424424		8.002826	
Prob(F-statistic)	0.000000		0.000000	
DURBIN-WATSON STAT	2.453309		2.329484	
R-squared	0.815097		0.841676	
Adjusted R-squared	0.705311		0.736504	

4.2. SG&A cost stickiness and return on asset

Table 4 provides the results from regressing SG&A cost stickiness on the return on asset variable (as another operating indicator) and the different groups of control variables. The adjusted R2 of 0.667 and 0.610 and F-statistic of 8.267 and 4.925 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 2.489 and 1.726 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $SG\&A - STICKY$ ($\beta 1$), which indicates the impact of SG&A cost stickiness on return on asset, is negative and significant ($\beta 1 = -0.008$ and -0.015 , $p < 0.05$). This provides more evidence for our hypothesis and the negative sign of the coefficient proves the view based on agency theory as well.

Table 4 SG&A Cost stickiness and return on asset

$$ROA_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$$

Variable	ROA_{t+1}		ROA_{t+2}	
	Coefficient	t-statistic	Coefficient	t-statistic
SGA_STICKY	0.007739-	3.454329-	0.014939-	2.099038-
SIZE	0.014588	0.631044	-0.068059	-2.348777
LEV	-0.021504	-2.032028	-0.030543	-1.236661
AS	0.023456	1.502437	0.028561	0.719217
ACR	-0.044250	-2.518260	0.033987	1.719224
INV	-0.043934	-1.133146	-0.100421	-2.468354
CAPX	-0.402661	-3.839103	-0.199953	-1.063339
SALESGROWTH	-0.061907	-4.213961	-0.037862	-2.365385
GOVINF	0.046916	2.578752	-0.005681	-0.063606
GDPGROWTH	-0.086445	-0.691540	-0.191365	-2.394442
COMP	0.123423	2.039970	-0.128619	-0.994682
C	0.064920	0.425883	0.519504	2.716039
F-statistic	8.266621		4.925010	
Prob (F-statistic)	0.000000		0.000000	
DURBIN-WATSON STAT	2.488800		1.725708	
R-squared	0.758352		0.765896	
Adjusted R-squared	0.666616		0.610385	

4.3. COGS stickiness and operating profit margin

Table 5 provides the results from regressing COGS stickiness on the operating profit margin variable and the different groups of control variables. The adjusted R2 of 0.733 and 0.759 and F-statistic of 15.632 and 19.699 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 2.101 and 1.897 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $COGS - STICKY$ ($\beta 1$), which indicates the impact of COGS stickiness on operating profit margin, is positive and significant ($\beta 1$ = 0.034 and 0.027 , p < 0.05). This provides evidence for our hypothesis and the positive sign of the coefficient rejects the view based on agency theory. In the other words, this result indicate that some of the cost stickiness observed (COGS stickiness) might actually be "good" and based on optimal resource adjustment view.

Table 5 COGS stickiness and operating profit margin

$$PM_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$$

Variable	PM_{t+1}		PM_{t+2}	
	Coefficient	t-statistic	Coefficient	t-statistic
COGS_STICKY	0.034193	3.944706	0.026729	3.681491
SIZE	-0.016262	-1.020569	-0.006332	-0.440662
LEV	-0.040230	-2.512922	-0.032219	-2.506277
AS	-0.008338	-0.459143	0.005153	0.331450
ACR	-0.006744	-0.422304	0.012429	0.981978
INV	-0.006186	-0.215953	-0.054324	-2.281948
CAPX	-0.265244	-2.332370	-0.255053	-2.403158
SALESGROWTH	-0.058529	-5.208474	-0.038466	-3.946948
GOVINF	-0.016332	-0.957450	0.001919	0.120721
GDPGROWTH	0.041496	0.688958	-0.190036	-3.668739

$PM_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$				
Variable	**PM_{t+1}**		**PM_{t+2}**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
COMP	0.128681	1.760140	0.022244	0.356147
C	0.333911	3.374902	0.157099	1.744937
F-statistic	15.63195		19.69925	
Prob (F-statistic)	0.000000		0.000000	
DURBIN-WATSON STAT	2.100752		1.896833	
R-squared	0.782857		0.799281	
Adjusted R-squared	0.732776		0.758707	

4.4. COGS stickiness and return on asset

Table 6 provides the results from regressing COGS stickiness on the return on assets variable (as another operating indicator) and the different groups of control variables. The adjusted R2 of 0.696 and 0.713 and F-statistic of 13.190 and 15.761 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 1.863 and 2.069 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $COGS - STICKY$ ($\beta 1$), which indicates the impact of COGS stickiness on return on assets, is positive and significant ($\beta 1$ = 0.023 and 0.027, p < 0.05). This results provides evidence for our hypothesis and the positive sign of the coefficient rejects the view based on agency theory. In the other words, the result of this operating indicator (in addition to profit margin) provide more evidence that the COGS stickiness observed might actually be "good" and based on optimal resource adjustment view.

Table 6 COGS stickiness and return on asset

$ROA_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$				
Variable	**ROA_{t+1}**		**ROA_{t+2}**	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**
COGS_STICKY	0.023181	3.402167	0.026819	4.522326
SIZE	0.003922	0.292955	-0.014131	-1.194220
LEV	-0.044437	-3.770830	-0.026490	-2.530930
AS	0.026429	1.594083	0.026097	2.027978
ACR	-0.061743	-4.492535	-0.006510	-0.620089
INV	-0.055911	-2.293436	-0.064570	-3.280365
CAPX	-0.277195	-2.723951	-0.169725	-1.923842
SALESGROWTH	-0.106218	-10.33530	-0.048316	-5.983669
GOVINF	-0.008390	-0.571666	0.007812	0.602512
GDPGROWTH	0.026155	0.530659	-0.164201	-3.772426
COMP	0.110586	1.771352	-0.029676	-0.573511
C	0.217200	2.553473	0.180178	2.419394
F-statistic	13.18984		15.76136	
Prob (F-statistic)	0.000000		0.000000	
DURBIN-WATSON STAT	1.862530		2.068953	
R-squared	0.752599		0.761112	
Adjusted R-squared	0.695540		0.712822	

4.5. SG&A cost stickiness and stock return

Table 7 provides the results from regressing SG&A cost stickiness on the stock return variable and the different groups of control variables. The adjusted R2 of 0.511, 0.380, 0.440 and F-statistic of 24.79, 4.84, 32.89 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 2.085, 2.194, 2.216 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $SG\&A - STICKY$ ($\beta 1$), which indicates the impact of SG&A cost stickiness on stock return, is negative and significant ($\beta 1$ = 0.095, 0.051, 0.069 , p < 0.05). This provides evidence for our hypothesis and the negative sign of the coefficient indicate that investors perceives cost stickiness as value-destroying which can be the result of opportunistic incentives of manager to increase personal benefits according to the view based on agency theory.

Table 7 SG&A cost stickiness and stock return

$$RET_{i,t+r} = \beta_0 + \beta_1 SG\&A - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$$

Variable	RET_t		RET_{t+1}		RET_{t+2}	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
SGA_STICKY	-0.095519	-6.209177	-0.051018	-3.387695	-0.069329	-3.764312
SIZE	-0.109124	-3.578574	0.040040	1.284805	0.024256	1.334691
LEV	0.139237	1.712151	0.000431	0.006729	-0.155910	-2.435079
AS	0.004824	0.133850	-0.088066	-2.481691	0.015781	0.593037
ACR	-0.046782	-1.236781	0.019764	0.393728	0.084992	1.288364
INV	-0.105836	-1.073335	-0.032388	-0.378419	-0.314735	-6.118023
CAPX	0.078255	0.187772	-1.654138	-3.227049	-0.096466	-0.142817
SALESGROWTH	0.754752	9.252020	0.196709	3.486481	-0.327159	-7.363990
GOVINF	-0.111297	-3.177690	-0.085100	-2.185801	-0.156622	-4.040274
GDPGROWTH	-0.970809	-3.201798	1.321834	4.256081	-4.018160	-14.75946
COMP	-0.160639	-3.818116	-0.045475	-0.685454	-0.096966	-1.853453
C	0.821461	4.230033	-0.093171	-0.546267	0.403434	3.086047
F-statistic	24.79096		4.839881		32.88941	
Prob(F-statistic)	0.000000		0.000000		0.000000	
DURBIN-WATSON STAT	2.085373		2.193545		2.216330	
R-squared	0.532670		0.400976		0.453486	
Adjusted R-squared	0.511183		0.380113		0.439698	

4.6. COGS stickiness and stock return

Table 8 provides the results from regressing COGS stickiness on the stock return variable and the different groups of control variables. The adjusted R2 of 0.135, 0.123, 0.205 and F-statistic of 15.07, 2.99, 1.77 (p value < 0.01) indicate a satisfactory fit of the model. The Durbin–Watson statistic of 2.097, 2.097, 2047 shows that autocorrelation is not limiting the model.

The estimator of the interaction term of $COGS - STICKY$ ($\beta 1$), which indicates the impact of COGS stickiness on stock return, is negative and significant ($\beta 1$ = 0.106 and 0.075, p < 0.05). This provides evidence for our hypothesis and the negative sign of the coefficient provide more evidence that investors perceives cost stickiness as value-destroying.

Table 8 COGS stickiness and stock return

$$RET_{i,t+r} = \beta_0 + \beta_1 COGS - STICKY_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 AS_{i,t} + \beta_5 AR_{i,t} + \beta_6 INV_{i,t} + \beta_7 CAPX_{i,t} + \beta_8 SALESGROWTH_{i,t} + \beta_9 GOVINF_{i,t} + \beta_{10} GDPGROWTH_t + \beta_{11} COMP_{i,t}$$

Variable	RET_t		RET_{t+1}		RET_{t+1}	
	Coefficient	**t-statistic**	**Coefficient**	**t-statistic**	**Coefficient**	**t-statistic**
COGS_STICKY	-0.105877	3.536244-	-0.075398	1.983996-	0.105526	1.989047
SIZE	-0.001805	-0.101953	0.022318	0.836477	0.535070	1.635851
LEV	-0.105397	-1.803068	-0.107498	-1.739979	0.020529	0.218139
AS	0.048073	1.912231	0.031981	0.851890	0.120833	1.649469
ACR	0.013269	0.358731	-0.073356	-1.668406	0.107198	0.622053
INV	-0.020915	-0.341051	-0.112239	-1.393166	-0.570390	-3.089206
CAPX	0.094060	0.301701	-0.726696	-1.659227	-0.332673	-0.493722
SALESGROWTH	0.525305	7.731472	-0.013112	-0.239452	-0.470740	-2.471490
GOVINF	-0.022664	-1.018549	-0.006789	-0.216380	-0.172102	-2.822343
GDPGROWTH	-1.593961	-4.924674	1.056436	3.656030	-4.532891	-2.948382
COMP	-0.105909	-3.086256	-0.008577	-0.138350	-0.897706	-1.465020
C	0.243754	2.111790	0.202932	1.226948	-2.885502	-1.650805
F-statistic	15.07238		2.988310		1.770105	
Prob(F-statistic)	0.000000		0.000644		0.000002	
DURBIN-WATSON STAT	2.097040		2.096922		2.473305	
R-squared	0.144322		0.134461		0.241964	
Adjusted R-squared	0.134746		0.122929		0.205269	

5. Discussions and Conclusions

In this paper we test whether the conjecture of Anderson et al. (2003), Bruggen and Zender (2014) and Park (2017) holds that cost stickiness is generally "good", i.e. whether managers use the information available to them to make a decision concerning resource adjustment in the interest of the firm. This assumption is opposed by Chen et al. (2012), who argue that cost asymmetry is to some extent actually "bad" in that the manager makes costs exceed the optimal level of stickiness to extract private benefits from empire building. We test these two contrary notions in the context of Iran as a developing country with own special characteristics including government's strong influence on economy, hyperinflation, monopolistic market etc. Considering these characteristics, we expect to find results to support chen et al (2012) assumption of "bad" cost stickiness which is consistent with the view based on agency theory and reject the "good" cost stickiness which imply on optimal resource adjustment view. We test these two conflicting views by examining the impact of cost stickiness on operating indicators such as operating profit margin and return on asset.

On the other hand, a large increase in profits despite sales decline may imply efficient resource allocation which is consistent with optimal resource adjustment view, or it may suggest unsustainable, excessive cost-cutting which imply on the view based on agency theory. The firms' prospects are dim when underlying motivations of resource adjustment are either wasteful spending or unsustainable cost-cutting. As a result, investors face greater uncertainty in assessing future profitability of firms that undergo sales decreases and following resource adjustments. Thus, this paper also tests whether the stock market perceives managers' resource adjustments during a sales decline as value-creating or value-destroying.

This paper finds that SG&A cost stickiness is entirely "bad" and imply on the view based on agency theory in which managers makes costs exceed the optimal level of stickiness to extract private benefits arising from empire building. The results support Chen et al. (2012) assumption of "bad" cost stickiness and reject the opposed optimal resource adjustment view. Furthermore this finding confirms the assumption that SG&A cost stickiness is generally a signal of self-interested managers who may grow a firm beyond its optimal size opportunistically or maintain unutilized

resources to increase personal benefits at the expense of shareholders.

On the contrary, the results show that COGS stickiness is to some extent "good" that is consistent with optimal resource adjustment view in which the resource adjustment decisions are optimal and value-creating. The results support Anderson et al. (2003) assumption of "good" cost stickiness and reject the opposed view based on agency theory. The results provide support for Anderson et al. (2003) alternative model of cost behavior, which contradicts the traditional model of fixed and variable costs, and which considers deliberate decisions of the manager as an intervening variable. If costs do not move mechanistically but are a result of adjustment processes of the manager, they can be expected to be to some extent a function of the incentives of the executive. Furthermore the results indicate that COGS stickiness is generally a signal of far-sighted management in the interest of the firm and rejects conjectures that managerial empire building is responsible for COGS asymmetry.

Additionally, the results also indicate that investors perceives SG&A cost stickiness and COGS stickiness (despite the fact that COGS stickiness is consistent with optimal resource adjustment view) as a signal of self-interested managers who decide to maximize their personal utility rather than the interests of the firm's shareholders. This finding turns out that analysts and investors have difficulties understanding resource adjustment decisions in response to sales declines and suggest that investors do not fully recognize the managerial expectations underlying the resource adjustment decisions.

Our findings have important implications for several groups of practitioners. First, the support for Anderson et al. (2003) alternative model of cost behavior leads us to second the authors' claim that when applying textbook methods that are based on the traditional model of cost behavior, e.g. flexible budgeting or cost-plus pricing, it is necessary to consider that costs do not necessarily behave mechanistically, but might be sticky. The results also have important implication for directors on the board of a company and specifically members of the compensation committee. When monitoring the CEO, an increasing SG&A to sales ratio in periods of declining sales does not necessarily provide evidence of inefficient management or empire building. The executive might act in the best interest of the firm and save costs in the long term. As evidenced by the analysis in this study, cost behavior is sensitive to incentives provided to the manager. Hence, in periods where short term performance is crucial, the board can control costs by providing managers corresponding incentives, such as bonuses on ROI or earnings.

Furthermore, the support for Chen et al. (2012) assumption of "bad" cost stickiness in regard to SG&A cost stickiness, provides important implications for predicting future firm performance, which should be of interest to financial analysts, auditors, creditors and standard setters in Iran. For example, financial statement users should take into account SG&A cost stickiness as a likely signal of opportunistic behavior of managers and considerate it in developing their prediction models of future firm performance. Similarly, auditors may be able to improve their auditing analytical procedures based on a better understanding of cost behavior that is sensitive to incentives provided to the manager.

Additionally the finding of this paper have important suggestion for future researches. Although there have been several publications since Anderson et al. (2003) which have documented drivers and characteristics of cost stickiness, the phenomenon and its consequences is not fully understood yet and further research is desirable.

Atasoy and Banker (2014) show that cost management decisions confound firm efficiency scores derived from data envelopment analysis. Therefore, the confounding effect of cost management decisions on the DEA efficiency scores could have implications for research areas far beyond cost management research in accounting.

The availability of data has led to this research that investigate the consequences of stickiness using either SG&A costs or COGS. Considering the findings about COGS stickiness, further research is required by using finer data that could provide more information about the stickiness of specific costs and corresponding activity levels. Some studies focus on labor costs but fail to provide conclusive findings. Labor cost is always an important factor for cost accounting decision making system and it is very difficult to make adjustments of employees or labor resources quickly and frequently as a result of change in activity level or demand of production. Adjustment cost of labor resources (costs incurred by firing, recruiting, training

etc.) is very high. So there are ample opportunities to investigate the determinants and consequences of the stickiness of labor costs and this could be a fertile area for future inquiry.

Rouxelin, Wongsuwai, and Yehuda (2016) show that because firm-level cost stickiness reflects managers' expectations of future demand, aggregate cost stickiness (i.e., average cost stickiness across all firms in a given year) helps predict future macroeconomic outcomes such as the unemployment rate, providing relevant information for macroeconomic policy. Thus, because cost behavior reflects managerial actions, we can use the observed cost behavior to extract useful information for various other areas that rely on managerial decisions and expectations.

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Note

[i] www.codal.ir
[ii] www.rdis.ir