IRANIAN JOURNAL OF ACCOUNTING, AUDITING & FINANCE

Journal homepage: https://ijaaf.um.ac.ir
DOI: 10.22067/ijaaf.2020.39359
Research Article

The Effect of Cost Categories and the Origin of their Stickiness on Earnings Forecast: A Comparative Study

Ali Shirzad, Mohammad Javad Saei*, Farzaneh Nasirzadeh

Faculty of Economics and Administrative Sciences, Ferdowsi University of Mashhad, Mashhad, Iran

Hassan Yazdifar

Department of Accounting, Finance and Economics Department, Bournemouth University, England

Abstract

The main aim of this study is to separate the origins of "selling, general, and administrative costs (SG&A)" and "cost of goods sold (COGS)" stickiness and investigate their sources effects on earnings forecast accuracy (EFA). In previous research, various micro and macro factors have been shown to affect asymmetric cost behavior. These factors are rooted in the industry and firm-specific characteristics or specific events, which may occur each year at national or international scales. In this study, a new methodology is presented to separate the cost stickiness sources in the first step, including a novel method for calculating cost stickiness for each firm-year. In the second step, we investigated each firm-year stickiness effect and each stickiness source on the EFA. The study's statistical population consisted of all companies listed on the Tehran Stock Exchange, from which 1080 observations in the 2014-2018 period were selected and reviewed. Our results indicated that EFA has a negative and significant relationship with SG&A and COGS stickiness, each year's stickiness, and each company. Still, no significant relationship was found with the stickiness of each industry. Our results demonstrated that the stickiness of SG&A to COGS has a greater effect on the EFA. The findings suggest that each year's events and the intra-organizational events of each company have a greater impact on cost behavior. Hence, managers and financial analysts must consider each source of cost stickiness, especially year-specific events and firm-specific characteristics, and consider their earnings forecast effects to improve their EFA.

Keywords: Cost stickiness, Cost categories, Earnings forecast, Origin of cost stickiness.

*_**Corresponding Author**_: Assistant Professor of Accounting, Email: mj-saei@um.ac.ir

1. Introduction

Over the past two decades, a growing body of accounting research has looked into the asymmetric response of costs to changes in activity levels. The results of these studies suggest that costs fall (rise) when the level of activities fall (rise), but the rate of costs reduction is less than the reduction in activities. In contrast, the rate of increase in costs is almost proportional to the improvement in the level of activities. This type of cost behavior is called cost stickiness. Anderson et al. (2003) were the first to focus on asymmetric SG&A to illustrate that cost stickiness has a negative effect on the firm's current earnings. It is because a reduction in costs does not offset sales shrinkage. In their view, senior managers have authority over SG&A costs. By reviewing and criticizing traditional models of cost behavior, they presented a new model in which costs do not change relative to changes in the level of activities. Rather, changes are based on decisions made by managers. They declare that two main causes of cost stickiness are "the theory of manager's personal considerations" that serve the personal interest and "the theory of adjusted costs ". According to the former theory, managers do not always make decisions that provide the best outcomes for shareholders. Managers tend to maximize their own interests and may therefore be reluctant to cut back on resources in order to prevent a power reduction. One of the consequences of opportunistic contracts is a managerial empire, meaning that management tends to overgrow the company and maintain untapped resources in order to preserve and increase personal interests, including prestige, position, power, reward, and credibility.

According to "the theory of adjusted costs" or "cost adjustments", managers can eliminate redundant resources and adjust the associated costs when demand for an organization's products and services falls. If the decreased activity level is temporary, the cost adjustment and the subsequent increase (due to the raised activity level) will likely exceed the cost of retaining redundant resources that have been temporarily conserved. The resource adjustment costs may include severance payments to dismissed employees, assets disposal costs, and penalties for terminating contracts. In addition, if the demand for products keeps rising after the cost adjustment, the firm will incur costs such as acquiring new assets based on the company's conditions, recruiting and training new employees, and negotiating costs for signing new contracts. Therefore, costs are proportionate to the current sales level and may rely on managers' expectations for future sales.

However, sometimes there are reasons other than the company level that complicates the adjustment of resources despite managers' pessimism about the company's future. In this study, these factors are divided into a macro to micro levels. At the first level, macroeconomic factors stem from global and national developments, contributing to cost stickiness. For example, events such as war, tariff warfare, sanctions, or global political crises at the international arena and changes in domestic policies (including amendments of laws or changes in political drivers that are expected to alter corporate support) affect management behavior in handling cost and therefore stickiness at the macro level. Given that these factors may vary at different times, the time factor (year) has been used to differentiate their effects. At the second level of stickiness, we look into industry-level factors. The industry-specific characteristics such as operational and production environment, the intensity of competition, and cost structure in different industries are other variables that influence the degree of cost stickiness. At the third level, there are factors related to the company, including managers' ability to forecast future conditions and varying risk aversion levels.

Identifying the source of these factors enables managers to make appropriate decisions regarding resource adjustment. By identifying and measuring the sources of cost stickiness, managers can clarify and evaluate their reasons for cost stickiness and

non-adjustment of costs, improving the company's flexibility in the face of diminishing demand for its goods or services. This helps improve the company's accountability process. By knowing the cost behavior, company owners can also determine whether management is imposing unnecessary costs on the firm. It is also useful to ascertain external users' cost behavior (such as analysts) who intend to evaluate the company's performance. Therefore, identifying the origin can effectively measure and control the degree of cost stickiness and its consequences.

Based on the theoretical framework of financial reporting, cost segregation provides more comprehensive information on the behavior of different types of costs. When costs are considered total costs, we can only judge the behavior of total costs at the time of the sales change, while each type of cost may have different behaviors. Therefore, in this study, to further investigate the behavior of costs, costs are categorized based on function and examined. For this purpose, in this research, costs are divided into two groups: Selling, general, and administrative (SG&A) and cost of goods sold (COGS).

As noted in a few previous research, one of the significant cost consequences of stickiness is its effect on the EFA. Most financial managers and analysts project earnings irrespective of cost stickiness on future expenses, underline the EFA. However, they can forecast earnings more accurately by assessing the cost stickiness and the impact of its sources on future earnings. Therefore, as the second goal of this study, we consider the importance of accurate earnings forecast and its impact on users' decisions and investigate the effect of the degree of cost stickiness on EFA and measure each stickiness source's relative share EFA.

Therefore, the main contributions of this research to the literature on cost stickiness are:

1) Identifying, separating, and measuring stickiness sources,

2) Examining the separate consequences and impacts of each cost stickiness source on EFA.

The theoretical foundations and research background are first discussed, and the hypotheses are proposed. Then the data are described, and descriptive statistics are presented. In the next section, following the separation of cost stickiness sources, each source's impact on the EFA is evaluated. Finally, the study results concluded, and suggestions presented.

2. Literature Review and Hypothesis Development

According to previous research, multiple factors influence cost stickiness. Each of these factors is related to specific characteristics of each year [Lee et al. (2020), Awad and Awad (2015)], country [(Calleja et al. (2006), Byzalov & Chen (2013), Banker & Byzalov (2014), Kama & Weiss (2013),], industry [Banker, Flasher & Zhang (2014), Subramaniam et al. (2016)] and firm [Banker et al. (2014), Subramaniam et al. (2016), Dierynck & Renders (2009), Kama and Weiss (2013), Hay et al. (2010), Banker et al. (2011) and Chen et al. (2011)]. For example, setting varying tariffs by the United States on European and Chinese goods in 2018 is one of the events that can affect the parties' economies, production level, and even the degree of cost stickiness in continental Europe, China the United States. Moreover, the imposition of various economic sanctions against Iran affects GDP, sales, and the degree of cost stickiness based on managers' optimism or pessimism about the country's economic future. Besides, a number of factors such as technology level, which is rooted in the development of a country, and industry membership, can affect the degree of cost stickiness. Besides, each country's laws and regulations, corporate governance, and a host of other factors can influence the degree of cost stickiness. Each of these sources can trigger cost stickiness, but as noted by researchers [(Calleja et al. (2006), Banker, Byzalov & Chen

(2013), Banker & Byzalov (2014), Lee et al. (2020), Awad and Awad (2015)] identifying some of these factors could be ambiguous and increase the probability of errors in decisions. As mentioned earlier, in this study, the sources of stickiness are divided into three levels: year, industry, and firm. Each of these three levels is discussed in detail below.

Certain global and local events alter the degree of cost stickiness. These factors can be provoked by special political or economic events such as sanctions, war, tariff warfare, elections, and political instability. According to Anderson et al. (2003), management considers a company's specific characteristics in declining demand. It analyzes the economic development in the product market and economic conditions on a global scale. Managers tend to see demand reduction as temporary whenever they expect significant economic growth. War and sanctions can make managers pessimistic about the future and influence their decisions about resource adjustment. Lee et al. (2020) suggested that even by controlling company-level and country-level factors, the cost behavior asymmetry (cost stickiness) in election years will be greater than in non-election years. Economic sanctions are also one of the major tools for achieving political goals, which prompt economical and political instability, especially in sanctioned years. In recent years, multiple sanctions imposed on Iran have engendered serious economic problems, so that the production and sale of almost all industries have been adversely affected. Sanctions have always been a major hurdle to Iran's progress and development, which, while hampering modern technologies' introduction to Iran and reducing oil and non-oil exports, have rendered investors pessimistic about the country's economic future and managers disappointed with corporate futures. Economic sanctions, as economic and political destabilizers, will modify the asymmetric behavior of costs. The asymmetric cost behavior and managers' pessimism about the company's future will negatively affect the degree of cost stickiness. In addition, Yazdifar and Haghigh (2020) indicated managers' optimism effects on cost models.

The industry-specific characteristics affect cost adjustment when the scale of the company’s activity is modified. These features can be split into two groups. The first group consists of the intensity of assets and employees. The second group embraces other industry-specific characteristics such as operating and production environment, competition intensity, fixed and variable cost ratios, and supply chain. Anderson et al. (2003) contend that assets and employee intensity are two main characteristics of the company that affects cost adjustment. It is assumed that assets' intensity alters resources' adjustment because a decrease in assets is not commensurate with the decline in the company's activities. In firms with higher asset intensity, the costs associated with their resources, such as depreciation, repairs, and maintenance costs will be higher, and failure to reduce costs relative to the activity level will lead to cost stickiness. Therefore, assets have a huge bearing on cost stickiness because small companies usually hold less fixed assets. This indicates low costs associated with assets, and when the level of activity shrinks, the stickiness in these companies will be lower. Employee intensity affects cost adjustment for three reasons. First, the redundant workforce's layoffs will impose additional costs on the firm, and managers will be worried about losing skilled, experienced, and loyal employees. Second, if the demand for products rises, the firm will be forced to hire new employees, which will incur recruitment and training costs. Third, layoffs will dampen the morale of other employees and diminish productivity. A mixture of these factors leads to employees' non-dismissal, consequently, the lack of resources and cost adjustment. Therefore, with a higher number of employees, the costs of de-escalating the level of activity stickiness will be higher. Their research looked into the effect of these two factors on cost stickiness, concluding that these factors positively affect the level of adjusted costs at the firm level.

Cost structure varies significantly in diverse industries. For example, according to Elie (1991), the ratio of cost to sales is 5% in the coal industry and 66% in the pharmaceutical production industry. Subramaniam et al. (2003) concluded that the highest cost stickiness rate belonged to manufacturing companies, followed by service and commercial companies. In contrast, they did not observe any sign of asymmetric cost behavior in financial companies. Anderson et al. (2004) investigated cost behavior in service companies, reporting the absence of sticky costs in the retail sector, while the entertainment sector had the highest cost stickiness. According to their research, the degree of cost stickiness varies in different industries. The factors that provoke cost sticky behavior may exert divergent effects in each industry. They reported that assets, staff, and the prospect of improved sales had no effect on the degree of cost stickiness in the entertainment sector. In contrast, these factors had an undeniable impact on the hotel and restaurant industry's degree of service costs.

Firm characteristics that could affect cost stickiness are asset intensity, employee intensity, redundant operational capacity, and management optimism. The intensity of asset and employee, as discussed above, not only affected by industry type but also the firm-specific features have a significant effect on them.

Banker et al. (2006a) verified the relationship between utilized capacity and sticky cost behavior, attempting to expand this concept. According to Anderson et al. (2003), managers' expectations of the company's future performance play a pivotal role in the adjustment/ non- adjustment of the company's resources.

In another study, Banker et al. (2011d) used indices of managerial optimism and pessimism to offer more empirical evidence for their argument, contending that managers' expectations are a determinant of cost behavior. Banker et al. (2011d) found that if these indicators transmit clear and continuous positive signals about the company's future, the degree of cost stickiness will increase. Still, if conflicting or negative signals are sent, cost stickiness will plunge. In another study, Banker et al. (2011c) tested the model of Banker et al. (2011d) on an international sample, and their findings ratified the above outcomes for most countries.

Overall, the existing literature and theoretical foundations present strong evidence for stickiness in diverse types of costs in different years, industries, and companies. The research literature offers various reasons for cost stickiness, including managers' optimism and pessimism about sales prospects, earnings management, the nature of costs (in terms of controllability and uncontrollability), government regulations, technology level, employment protection laws and systems, which can affect the degree of cost stickiness.

2.1. Hypothesis development

A variety of factors can influence the EFA. According to previous research [Weiss (2010), Cifitci and Salama (2018)], asymmetric cost behavior is one of the main factors affecting the EFA. Weiss (2010) contends that there is a negative relationship between cost stickiness and EFA. He states that sticky companies tend to forecast low future earnings, explaining the higher errors in future earnings projection. Cifitci et al. (2016) argue that no systematic relationship will be observed between cost behavior and EFE if analysts can fully understand cost behavior. On the other hand, if analysts fail to take cost stickiness into account in their forecasts, the degree of EFE will be significantly different at the time of declining and rising demand. Cifitci and Salama (2018) revealed a positive relationship between cost stickiness and EFE because managers and analysts do not consider the adverse consequences of cost stickiness in an earnings forecast. If financial analysts estimate variable costs or cost stickiness accurately, the EFE should be symmetrical with abnormal sales (desirable or undesirable). They stated that an

accurate cost forecast has a significant impact on the EFA. Therefore, according to the above, it can be stated that the degree of cost stickiness is one of the major factors that can influence the EFA. If financial analysts and managers fail to account for the degree of cost stickiness in their forecasts, they may have more earnings prediction mistakes. Based on the above, we can have a comprehensive analysis by separating the costs and analyzing each behavior. Based on previous research, it is expected that the stickiness intensity of different types of costs will be different and have a variety of effects on the EFA. Therefore, the first research hypothesis is developed as follows:

H1: SG&A and COGS stickiness have a different impact on EFA.

However, since the sources of cost stickiness are different and triggered by year, industry, and firm-specific events and circumstances, we expect that the impact of each of these sources on the EFA is different. Forecasting and controlling each year's events and identifying the firm-specific features is more complicated than other stickiness sources.

Therefore, the greater the impact of each source on *SG&A* and *COGS* stickiness, the lower the EFA. Hence, the second hypothesis is expressed as follows:

H2: Each source of SG&A and COGS stickiness has a different effect on EFA.

3. Research Design

3.1. Separation of cost stickiness sources

The degree of cost stickiness will be measured using the model of Anderson et al. (2003), according to model (1).

Model (1):

$$\mathrm{Log}\left(\frac{\mathrm{Cost_{f,t}}}{\mathrm{Cost_{f,t-1}}}\right) = \mathrm{B_0} + \mathrm{B_1}.\,\mathrm{Log}\left(\frac{\mathrm{Sales_{f,t}}}{\mathrm{Sales_{f,t-1}}}\right) + \mathrm{B_2}.\,\mathrm{DD}.\,\mathrm{Log}\left(\frac{\mathrm{Sales_{f,t}}}{\mathrm{Sales_{f,t-1}}}\right) + \mathrm{e_{f,t}}$$

As noted by Anderson et al. (2003), "If sales revenue rises, the dummy variable of sales decrease (*DD*) will be zero. Thus, coefficient B_1 shows an increase in costs due to a 1% rise in sales revenue. Moreover, since the coefficient of the dummy variable of sales is equal to 1 when revenue decreases, the sum of coefficients B1 + B2 denotes the percentage reduction in costs resulting from a 1% reduction in sales revenue.

In sticky cases, the percentage of increase in costs during the revenue growth period will be greater than the percentage of decrease in costs during revenue decrement. In other words, we will have $B_1 > 0$, $B_2 < 0$ $(B_1 + B_2 < B_1)$. If costs are anti-sticky, $B_1 > 0$ and $B_2 > 0$, in which case $B_1 + B_2 > B_1$. It indicates that for a 1% change in sales, the costs reduction will be greater than the rising costs.

We use three steps to separate the stickiness sources as follows. First, model (1) is run by all observations, and the B2 coefficient calculates overall stickiness. The calculated coefficient (B_2) is affected by year, industry, and firm. Then to control the effects of the year, model (1) is tested for each year, and the coefficient B_2 is calculated for each year ($B_{2,y}$) that is influenced by industry and company effects. Therefore, by comparing $B_{2,y,}$ and B_2, the degree of relative stickiness of each year (CS_y) can be calculated

Second, we use the previous calculated $B_{2,y,}$ and then, to control the industry's effects, model (1) will be run for each industry each year. When naming the coefficient $B_{2,y,\,i,}$ which is influenced by the company's effects. Therefore, by comparing $B_{2,y,\,i}$ and, the degree of relative stickiness of each industry in each year ($CS_{y,i}$) is obtained.

Third, since the number of observations is limited to one to determine the relative stickiness of each firm; hence, it is impossible to test regression for single data. However, for the homogeneity of calculations with previous steps, each company's relative stickiness can be obtained. Supposed line $CS_{y,i}$ indicates the regression

relationship of these points for a specific company in a given industry and year according to model 1 that ran in industry-year level with the slope of $B_{2,y,\,i}$. We assume that the intercept illustrates factors, which are the same in all observations of that industry-year. The difference of each observation is related to the specific cost stickiness of that point. The slope of each point (such as F1) with a line ($LF_{(y,i,f)}$) that originating from the intercept shows the total stickiness of that observation ($B_{y,i,f}$). In a similar way to other sources of cost stickiness, the relative cost stickiness of each firm-year is divided by the total cost stickiness of each observation ($B_{y,i,f}$) to $B_{2,y,i}$ calculated. A summary of the points discussed in this section and the conceptual model of separation of cost stickiness sources are presented in Figure 1.

Step	Sticky source	observations	Coefficient		Relative stickiness index
---	---	(1) Overall	B_2		---
1	Year	(1) Annual	$B_{2,y}$		$\frac{B_{2,y}}{B_2} = CS_y$ (2)
2	Industry	(1) Industry-year	$B_{2,y,i}$		$\frac{B_{2,y,i}}{B_{2.y}} = CS_{y,i}$ (3)
3	Company	(4)single observation	$B_{2,y,i,f}$		$\frac{B_{y,i,f}}{B_{2,y,i}} = CS_{y,i,f}$ (4)

3.2. Testing research hypotheses

According to previous research, multiple factors influence the EFA. To test the research hypotheses and explain how cost stickiness and its sources can reduce EFA, it is necessary to control other variables affecting EFA. Therefore, to test the research hypotheses, we used the models proposed by Weiss (2010), Cifitci and Salama (2018), and Anderson et al. (2007). In this research, we used model 5 to test the first hypothesis (*SG&A* and *COGS* stickiness); and model 8 for the second hypothesis (*SG&A* and *COGS* stickiness sources).

Model (5):

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{SGAS_{f,t}} + \beta_2 MV_{f,t} + \beta_3 LOSS_{f,t} + \beta_4 VSALE_{f,t} + \beta_5 OPLEV_{f,t} + \beta_6 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{COGSS_{f,t}} + \beta_2 MV_{f,t} + \beta_3 LOSS_{f,t} + \beta_4 VSALE_{f,t} + \beta_5 OPLEV_{f,t} + \beta_6 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

Model (6):

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{SGAS_y} + \beta_2 \boldsymbol{SGAS_{y,i}} + \beta_4 \boldsymbol{SGAS_{y,i,f}} + \beta_5 MV_{f,t} + \beta_6 LOSS_{f,t} + \beta_7 VSALE_{f,t} + \beta_8 OPLEV_{f,t} + \beta_9 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{COGSS_y} + \beta_2 \boldsymbol{SGAS_{y,i}} + \beta_4 \boldsymbol{SGAS_{y,i,f}} + \beta_5 MV_{f,t} + \beta_6 LOSS_{f,t} + \beta_7 VSALE_{f,t} + \beta_8 OPLEV_{f,t} + \beta_9 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

To verify the results' validity, we calculated the cost stickiness by Anderson et al.'s model (2007) and confirming our first hypothesis results with them. The main reason

for choosing this model is the ability to measure cost stickiness for each firm-year. We used their cost behavior proxies ($SGA\ Signal^{-}_{f,t}$; $SGA\ Signal^{+}_{f,t}$, $COGS\ Signal^{-}_{f,t}$, $COGS\ Signal^{+}_{f,t}$) and substituted them in model 5 with our proxy ($SGA_{f,t}$ & $COGS_{f,t}$) and obtained model 7. The results of this model

Table 1. Descriptions of variables (alphabetic)

Variable	Description
AP	*Actual earnings per share (EPS)*
COGS	*Total stickiness of cost of goods sold*
$COGSS_y$	*Relative COGS stickiness for each year when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
$COGSS_{,i}$	*Relative industry-year COGS stickiness when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
$COGSS_{,i,t}$	*Relative firm-industry-year COGS stickiness when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
Decrease _Dummy	*The dummy variable takes the value of 1 when sales revenue decreases between period t −1 and t, and 0 otherwise.*
FP	*Management earnings per share (EPS) forecasts*
FE	*The absolute forecast errors.* $FE_{f,t} = \left\lvert \frac{(AP_{f,t} - FP_{f,t})}{FP_{f,t}} \right\rvert$
LOSS	*Dummy variable that equals 1 if the reported earnings are negative and 0 otherwise.*
MV	*The logarithm of the market value of equity + Liabilities*
ΔNINCOME	*Indicator variable that equals 1 if the change in earnings from the prior year is positive, and 0 otherwise*
OPLEV	*The ratio of gross income (sales, minus COGS) and sales*
Sale	*Total revenue*
SGAS	*Total stickiness selling, general, and administrative costs*
$SGAS_y$	*Relative SG&A of cost stickiness for each year when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
$SGAS_{y,\,i}$	*Relative industry-year SG&A cost stickiness when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
$SGAS_{y,i,t}$	*Relative firm-industry-year SG&A cost stickiness when sales decrease and 0 otherwise, similar to Anderson et al. (2007).*
$SGA\ Signal^{-}$	*The SGA cost signal- (cost stickiness) of each firm-year when sales decrease and 0 otherwise.* The negative SGA cost signal based on Anderson et al.'s model (2007) is calculated as follows: $SGA\ Signal^{-} = \frac{COST_{i,t}}{SALES_{i,t}} - \frac{COST_{i,t-1}}{SALES_{i,t-1}}$
$SGA\ Signal^{+}$	*The SGA cost signal+ of each firm-year when sales increase and 0 otherwise.* The positive SGA cost signal based on Anderson et al.'s model (2007) is calculated as follows:: $SGA\ Signal^{+} = \frac{COST_{i,t}}{SALES_{i,t}} - \frac{COST_{i,t-1}}{SALES_{i,t-1}}$

$COGS\ Signal^{-}$	*The COGS signal- (cost stickiness) of each firm-year when sales decrease and 0 otherwise.* The negative COGS signal based on Anderson et al.'s model (2007) is calculated as follows: $COGS\ Signal^{-} = \frac{COST_{i,t}}{SALES_{i,t}} - \frac{COST_{i,t-1}}{SALES_{i,t-1}}$
$COGS\ Signal^{+}$	*The COGS signal+ of each firm-year when sales increase and 0 otherwise.* The positive COGS signal based on Anderson et al.'s model (2007) is calculated as follows:: $COGS\ Signal^{+} = \frac{COST_{i,t}}{SALES_{i,t}} - \frac{COST_{i,t-1}}{SALES_{i,t-1}}$
VSALE	*The percentage change in sales to the previous year.*
This table defines the main variables.	

are compared with model 5 for verifying our proposed measurement.

Model (7):

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{SGA\ Signal^{-}}_{f,t} + \beta_2 \boldsymbol{SGA\ Signal^{+}}_{f,t} + \beta_3 MV_{f,t} + \beta_4 LOSS_{f,t} + \beta_5 VSALE_{f,t} + \beta_6 OPLEV_{f,t} + \beta_7 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

$$FE_{f,t} = \beta_0 + \beta_1 \boldsymbol{COGS\ Signal^{-}}_{f,t} + \boldsymbol{\beta_2\ COGS\ Signal^{+}}_{f,t} + \beta_3 MV_{f,t} + \beta_4 LOSS_{f,t} + \beta_5 VSALE_{f,t} + \beta_6 OPLEV_{f,t} + \beta_7 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

Table 1 provides descriptions of all variables.

3.3. Description of Data

Our sample includes all industrial firms from 2013 to 2018. Table 2 describes the industry information. According to the first two-digit SIC-Codeindustry, the sample was chosen, which displays the code of identifying the major industry group. Since the regression model must be fitted in each industry-year to compute the cost stickiness in each industry-year. We also exclude firm-year observations in the financial services industry due to the disparity of financial report interpretations between these industries and other industries (Subramanyam, 1996).

Table 2. Industry Information

	Observation
Motor Vehicles	152
Mineral Mining	143
Chemical	193
Food	138
Base Metals	148
Building	160
Pharmaceuticals	146
Total	1080

Table 3 describes our sample selection procedure. Our sample consists of all companies listed on the Tehran Stock Exchange (TSE)[1] from 2013-2018. We trimmed the data to eliminate extreme observations by removing observations where any variable's value was in the top or bottom 0.5 percent of its distribution (Chen & Dixon, 1972). The final sample contains 1080 firm-year observations from 2014 to 2018.

1- The TSE is Iran's largest capital market. For detailed information about the TSE, refer to http://www.TSE.ir/.

Table 3. Sample selection procedures

	Observation
All companies listed on the TSE from 2013 to 2018	2219
Financial industry companies	966
Firms with insufficient information	173
Final sample	1080

Table (4) demonstrates descriptive statistics in three columns (low EFE, High EFE, and all sample data). The low and high EFE distinguished by the median static. By comparing the average *SGAS*, *COGSS*, and their resources in the two groups, it can be stated that *SGAS* and *COGS*, year origin of stickiness, industry, and firm source are higher in high EFE conditions.

4. Estimation Results

4.1. Separation of Cost stickiness sources

To separating the cost stickiness sources, we apply the model (1) three times, first with all observations that results showed in table 5, second for each year, and third for each industry-year (table 6), and then calculated relative stickiness of years and industries (table 6).

Table 4. Descriptive statistics of the full sample

Variables	low EFE		High EFE		All Sample Data	
	N	Mean	N	Mean	N	Mean
FE	540	0.356	540	2.005	1080	0.873
SGAS	540	0.010	540	0.233	1080	0.110
$SGAS_y$	540	0.240	540	0.354	1080	0.298
$SGAS_{y,i}$	540	0.112	540	0.157	1080	0.121
$SGAS_{y,i,f}$	540	0.295	540	0.340	1080	0.314
$COGSS$	540	0.187	540	0.430	1080	0.199
$COGSS_y$	540	0.314	540	0.528	1080	0.403
$COGSS_{y,i}$	540	0.160	540	0.232	1080	0.199
$COGSS_{y,i,f}$	540	0.361	540	0.775	1080	0.521
$SGA\ Signal^-$	540	0.004	540	0.009	1080	0.021
$SGA\ Signal^+$	540	-0.003	540	-0.0001	1080	-0.002
$SGA\ Signal^-$	540	0.009	540	0.011	1080	0.034
$SGA\ Signal^+$	540	0.0002	540	-0.024	1080	-0.005
MV	540	8.044	540	7.819	1080	7.935
VSALE	540	0.084	540	0.082	1080	0.081
OPLEV	540	0.284	540	0.221	1080	0.253
ΔNINCOME	540	-0.132	540	-0.441	1080	-0.257

The coefficient β_2 is a negative estimate that indicates the degree of stickiness in all observations, equal to -0.361 in *SG&A* and equal to -0.743 in *COGS*.

In table 6, Cost Stickiness ($B_{2,y}$) showed the stickiness of each year and could be influenced by industry and company effects. By comparing B_2 and $B_{2,y}$, the degree of relative stickiness related to each year was calculated, the results of which are presented in table 6.

Table 5. Results of Regressing Changes in Costs on Changes in Sales Revenue for the 5 years 2014–2018

Panel A: SG&A Model (1): $Log\left(\frac{SGA_{f,t}}{SGA_{f,t-1}}\right) = B_0 + B_1.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right) + B_2.DD.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right) + e_{f,t}$			
Independent variable	**Exp. sign**	**Coef**	**p-value**
$Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right)$	+	1.088 (21.49)	0.000
$DD.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right)$	-	-0.361 (-6.44)	0.000
Constant		0.003 (0.47)	0.637
Adjusted R Square	76.40%		
Observation	1080		
Panel B: COGS Model (1): $Log\left(\frac{COGS_{f,t}}{COGS_{f,t-1}}\right) = B_0 + B_1.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right) + B_2.DD.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right) + e_{f,t}$			
Independent variable	**Exp. sign**	**Coef**	**p-value**
$Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right)$	+	1.160 (3.79)	0.000
$DD.Log\left(\frac{Sales_{f,t}}{Sales_{f,t-1}}\right)$	-	-0.743 (-2.36)	0.021
Constant		- 0.007 (-0.54)	1.032
Adjusted R Square	67.15%		
Observation	1080		

As depicted in Table (6), the relative stickiness in *SG&A* was the highest in 2017 and 2018, which indicates the strong effects of the events in 2017 and 2018 on the degree of stickiness. The most important event of 2018 was the withdrawal of the United States from JCPOA[۲] and the imposition of new sanctions against Iran, which was a major hurdle to the production and export of many industries in Iran and cut its production capacity so that companies faced significant unutilized resources.

Table 6. Cost Stickiness and Relative Cost Stickiness for Each Year each Industry-Year Over 2014–2018

Panel A: SG&A										
Origin	**2014**		**2015**		**2016**		**2017**		**2018**	
	Cost Stickiness	**Relative cost stickiness**	**Cost stickiness**	**Relative Cost Stickiness**	**Cost Stickiness**	**Relative Cost Stickiness**	**Cost Stickiness**	**Relative Cost Stickiness**	**Cost Stickiness**	**Relative Cost Stickiness**
Year	-0.033	0.091	0.082	-0.227	-0.278	0.770	-0.691	1.914	-0.852	2.360
Building	-0.121	3.666	-0.087	-1.060	0.345	1.241	-1.142	0.001	-0.125	0.146
Food	-0.057	1.727	-0.452	5.512	-0.214	0.769	-1.142	0.147	-0.078	0.091
Mineral Mining	0.145	-4.393	-0.254	-3.097	-0.254	0.769	-0.378	0.547	-0.275	0.322
Base Metals	-0.402	0.322	-0.075	0.102	-0.025	0.730	0.02	0.565	0.035	-0.041
Chemical	-0.111	3.636	0.001	0.012	-0.021	0.075	-0.052	0.075	0.214	-0.251
Pharmaceuticals	-0.055	1.666	-0.061	-0.743	-0.214	0.769	-0.124	0.200	-0.251	0.294
Motor Vehicles	0.004	-0.121	-0.010	-0.121	-0.241	0.866	-0.214	0.309	0.125	-0.146

2 *Joint Comprehensive Plan of Action*

Panel B: COGS										
Origin	2014		2015		2016		2017		2018	
	Cost Stickiness	Relative cost stickiness	Cost stickiness	Relative Cost Stickiness	Cost Stickiness	Relative Cost Stickiness	Cost Stickiness	Relative Cost Stickiness	Cost Stickiness	Relative Cost Stickiness
Year	0.253	-0.340	-0.619	0.833	1.432	-1.927	-0.127	0.170	-0.097	0.130
Building	-0.478	0.138	-0.103	0.257	-0.147	2.672	-1.445	11.829	-0.458	2.053
Food	-0.023	0.138	-0.365	0.912	-0.458	8.327	-0.555	4.512	-0.112	5.090
Mineral Mining	0.036	-0.216	1.512	-3.780	-0.585	10.636	-0.558	4.536	-0.745	3.340
Base Metals	-0.254	1.530	-0.221	0.552	-0.254	4.618	0.447	-3.634	0.025	-0.112
Chemical	0.444	-2.674	0.551	1.377	-0.112	2.036	-0.254	2.065	0.458	2.053
Pharmaceuticals	-0.551	-4.548	-0.122	-1.675	-0.222	-5.090	0.452	-1.772	-0.125	2.829
Motor Vehicles	0.551	-3.319	-0.254	0.635	-0.452	8.218	0.225	-1.829	-0.478	2.143

Table 6 also represents the results of executing cost stickiness regression at the industry-year level. By comparing this model's cost stickiness coefficient with the results of cost stickiness, the industry's relative effects on cost stickiness can be determined.

4.2. Testing Hypothesis

4.2.1. SG&A and COGS stickiness and EFA (H1)

The test results of the first hypothesis are presented in table 7 and 8. The hypothesis test results are reported in two columns of these tables; the first column is based on our model (model 5), and the second column is based on Anderson et al. (2007) model (model 6). As shown by the results in table 7, the *SG&A* stickiness of each company is positively and significantly correlated with the EFE, and the hypothesis is confirmed with both models. The results calculated by our model illustrates a stronger relationship between cost stickiness and EFE. and significant (t-statistic = 2.09), suggesting that the stickiness of *SG&A* is directly and significantly related to the EFE. As shown by the results in table 12, each company's COGS stickiness is positively and significantly correlated with the EFE, and the hypothesis is confirmed with both models. The results calculated by our model illustrates a stronger relationship between cost stickiness and EFE.

The *SG&A* stickiness coefficient estimated by our model was significantly positive (β_1 = 4.152, t-statistics= 4.20), which shows that the stickiness of *SG&A* is directly and significantly related to EFE, so that with a one-unit increase in the *SG&A* stickiness, the EFE rises by 4.152. The coefficient of *SG&A* estimated by Anderson et al. (2007) model was positive (β_1 = 19.03).

The *COGS* stickiness coefficient estimated by our model was significantly positive (β_1 = 6.165, t-statistics= 2.45), which shows that the stickiness of *COGS* is directly and significantly related to EFE, so that with a one-unit increase in the *COGS* stickiness, the EFE rises by 6.165.

Table 7. Regression Coefficient of Management Forecast Error on SG&A Stickines

Regression Model (7):

$$FE_{f,t} = \beta_0 + \beta_1 SGAS_{f,t} + \beta_2 MV_{f,t} + \beta_3 LOSS_{f,t} + \beta_4 VSALE_{f,t} + \beta_5 OPLEV_{f,t} + \beta_6 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

Regression Model (10):

$$FE_{f,t} = \beta_0 + \beta_1 SGAS\ Signal^{-}_{f,t} + \beta_2 SGA\ Signal^{+}_{f,t} + \beta_3 MV_{f,t} + \beta_4 LOSS_{f,t} + + \beta_5 VSALE_{f,t} + \beta_6 OPLEV_{f,t} + \beta_7 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

	Coefficient Estimates (*t*-statistics)	
Independent variable	**Model (5)**	**Model (6)**
SGAS	4.152*** (4.20)	
SGA Signal^{-}		19.03** (2.09)
SGA Signal^{+}		-1.932 (-019)
MV	-0.125** (-2.04)	-1.587** (-2.08)
LOSS	0.115* (2.31)	9.976** (2.92)
VSALE	-0.181* (-1.96)	-0.113 (-1.38)
OPLEV	0.251* (1.88)	0.958 (0.41)
Δ*NINCOME*	0.152 (0.44)	0.059** (-2.099)
Constant	7.251 (10.03)	-9.941 (-2.00)
Adjusted R-Square	27.25%	25.72%
Number of observations	1080	1080
*Significant level: *** 1%, ** 5% ,* 10%*		

Table 8. Regression Coefficient of Management Forecast Error on COGS Stickiness.

Regression Model (5):

$$FE_{f,t} = \beta_0 + \beta_1 COGSS_{f,t} + \beta_2 MV_{f,t} + \beta_3 LOSS_{f,t} + \beta_4 VSALE_{f,t} + \beta_5 OPLEV_{f,t} + \beta_6 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

Regression Model (6):

$$FE_{f,t} = \beta_0 + \beta_1 COGA\ Signal^{-}_{f,t} + \beta_2 COGS\ Signal^{+}_{f,t} + \beta_3 MV_{f,t} + \beta_4 LOSS_{f,t} + + \beta_5 VSALE_{f,t} + \beta_6 OPLEV_{f,t} + \beta_7 \Delta NINCOME_{f,t} + \varepsilon_{f,t}$$

	Coefficient Estimates (*t*-statistics)	
Independent variable	**Model (5)**	**Model (6)**
COGSS	6.165** (2.45)	
COGS Signal^{-}		11.866** (2.24)
COGS Signal^{+}		-5.532** (-2.32)
MV	-0.254** (-2.11)	-1.212** (-2.28)
LOSS	2.031** (2.21)	7.976** (2.52)
VSALE	-1.112 (-1.08)	-0.545 (-1.45)
OPLEV	0.087 (0.88)	0.452 (0.021)
Δ*NINCOME*	0.221 (0.15)	0.121 (0.10)
Constant	8.11** (3.03)	-11.491** (-3.00)
Adjusted R-Square	20.96%	18.25%
Number of observations	1080	1080
*Significant level: *** 1%, ** 5% ,* 10%*		

The coefficient of *COGS* estimated by Anderson et al. (2007) model was positive (β_1 = 11.866) and significant (t-statistic = 2.24), suggesting that the stickiness of *COGS* is directly and significantly related to the EFE.

4.2.2. SG&A and COGS stickiness sources and EFE (H2)

The test results of the second hypothesis are presented in Tables 9 and 10. The results illustrate that each year's relative stickiness and each company in both *SG&A and COGS* is significantly related to the EFE. At the same time, there is no significant relationship between the stickiness of each industry and EFE. The estimated coefficient of *SG&A* relative stickiness in each year was positive (β_1 = 0.145) and significant (t-statistic = 3.21), indicating that the relative stickiness in each year is directly and significantly correlated with EFE. With a one-unit increase in the relative stickiness of each year, the EFE rises by 0.145 units. The estimated coefficient of relative stickiness in each industry-year is positive (β_2 = 0.050) and not significant (t-statistic = 0.02), demonstrating that each industry's average relative stickiness did not induce a significant forecast error. At the company level, the estimated coefficient of relative stickiness was positive (β_3 = 0.24) and significant (t-statistic = 2.00), suggesting that each company's relative stickiness has a direct and significant relationship with EFE.

Table 9. Regression Coefficient of Management Forecast Error on the Sources of SG&A Stickiness

Regression Model (7):

$$FE_{f,t} = \beta_0 + \beta_1 SGAS_y + \beta_2 SGASS_{y,i} + \beta_3 SGASS_{y,i,f} + \beta_4 MV_{f,t} + \beta_5 LOSS_{f,t} + \beta_6 VSALE_{f,t} + \beta_7 OPLEV_{f,t} + \beta_8 \Delta NINCOME_{f,t} \varepsilon_{f,t}$$

Independent variables	Coefficient Estimates (t-statistics)
	Model (7)
$SGASS_y$	0.145** (3.21)
$SGASS_{y,i}$	0.050 (0.02)
$SGASS_{y,i,f}$	0.024** (2.00)
MV	-0.124** (-2.40)
LOSS	0.142 (0.18)
VSALE	0.010 (0.12)
OPLEV	0.12 (1.12)
ΔNINCOME	- 0.121 (-5.42)
Constant	0.124*** (10.37)
Adjusted R-Square	8.31%
Observation	1080

Significant level: *** 1%, ** 5% ,* 10%

As shown by the results in table 10, the estimated coefficient of *COGS* relative stickiness in each year was positive (β_1 = 0.121) and significant (t-statistic = 2.09), indicating that the relative stickiness in each year is directly and significantly correlated with EFE. With a one-unit increase in the relative stickiness of each year, the EFE rises by 0.121 units. The estimated coefficient of relative stickiness in each industry-year is positive (β_2 = 0.003) and not significant (t-statistic = 0.19), demonstrating that each

industry's average relative stickiness did not induce a significant forecast error.

Table 10. Regression Coefficient of Management Forecast Error on the Sources of COGS Stickiness

Regression Model (7):

$$FE_{f,t} = \beta_0 + \beta_1 COGSS_y + \beta_2 COGSS_{y,i} + \beta_3 COGSS_{y,i,f} + \beta_4 MV_{f,t} + \beta_5 LOSS_{f,t} + \beta_6 VSALE_{f,t} + \beta_7 OPLEV_{f,t} + \beta_8 \Delta NINCOME_{f,t} \varepsilon_{f,t}$$

Independent variables	Coefficient Estimates (t-statistics)
	Model (7)
$COGSS_y$	0.121** (2.09)
$COGSS_{y,i}$	0.003 (0.19)
$COGSS_{y,i,f}$	0.125** (3.10)
MV	-0.52** (-2.05)
LOSS	0.254** (3.12)
VSALE	0.125** (2.45)
OPLEV	0.541 (0.44)
ΔNINCOME	- 0.412** (-2.41)
Constant	0.441*** (12.68)
Adjusted R-Square	10.12%
Observation	1080

Significant level: *** 1%, ** 5% ,* 10%

At the company level, the estimated coefficient of relative stickiness was positive (β_3 = 0.125) and significant (t-statistic = 3.10), suggesting that each company's relative stickiness has a direct and significant relationship with EFE.

The comparison results illustrate that the year and company sources, regardless of the cost category, affect the EFE. The results of this comparison are presented in Table 11.

Table 11. Comparison of cost stickiness source coefficients.

Cost category	Year-Specific Characteristics	Industry-Specific Characteristics	Firm-Specific Characteristics
SG&A	0.145** (3.21)	0.050 (0.02)	0.024** (2.00)
COGS	0.121** (2.09)	0.003 (0.19)	0.125** (3.10)

5. Summary and Conclusion

According to previous research, one of the major consequences of cost stickiness is its adverse impact on the EFA. In the present study, we further investigated this subject by examining the relationship between the stickiness of each source of cost stickiness and the EFA. This study presented a method that separated stickiness sources and calculated cost stickiness for each year-company. Then, the effect of *SG&A* and *COGS* stickiness, and all of their sources on the EFA was investigated. The results showed that the degree of *SG&A* and *COGS* stickiness has a negative and significant relationship with the EFA, so that a higher degree of stickiness decreased the EFA.

Accordingly, investors, analysts, managers, and other users need to consider the consequences of total cost stickiness in forecasting future earnings and assessing the

company's value to estimate the company's future performance with the least error.

In addition, to further investigate the proposed method, each year-company stickiness was tested with the model of Anderson et al. (2007), and its effect on the EFA was explored. The results were aligned with those obtained from our proposed method. Findings also suggest that each year's stickiness and each company negatively affect the EFA among cost stickiness sources. It indicates that each year events and intra-organizational events have a greater effect on EFA than other sources of cost stickiness. Therefore, it can be contended that by separating the sources of cost stickiness and including them in earnings forecast models, a more accurate estimate of future earnings can be made. It is worth noting that the findings of this study are consistent with those reported by Shirzad et al (2020), Weiss (2010), Cifitci et al. (2016), Cifitci and Salama (2018), and Banker and Chen (2006).

References

Anderson, M., Banker, R.D., Huang, R. and Janakiraman, S.N. (2007). Cost Behavior and Fundamental Analysis of SG&A Costs. *Journal of Accounting, Auditing & Finance*, 22 (1), 1-28. https://doi.org/10.1177/0148558X0702200103

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. https://doi.org/10.1111/1475-679X.00095

Anderson, M.C. Banker, R.D. Chen, L. and Janakiraman, S.N. (2004). Sticky Costs at Service Firms. *The University of Texas at Dallas.*

Awad, E. and Awad, I. (2015). Economic growth and cost stickiness: evidence from Egypt. *Journal of Financial Reporting and Accounting*, 13 (1), 119-140. https://doi.org/10.1108/JFRA-06-2014-0052

Banker, R.D. and Chen, L. (2006). Labor Market Characteristics and Cross-Country Differences in Cost Stickiness, *AAA 2007 Management Accounting Section (MAS) Meeting. Available at SSRN: https://ssrn.com/abstract=921419 or http://dx.doi.org/10.2139/ssrn.921419*

Banker, R.D. and Chen, L. (2006b). Predicting Earnings Using a Model-Based on Cost Variability and Cost Stickiness. *The Accounting Review*, 81(2), 285–307. https://doi.org/10.2308/accr.2006.81.2.285

Banker, R.D. Byzalov, D and Plehn-Dujowich, J.M. (2011). *Sticky Cost Behavior: Theory and Evidence*. *SSRN Electronic Journal*, DOI: 10.2139/ssrn.1659493

Banker, R.D. Byzalov, D. and Chen, L. (2011a). Impact of Labor Laws on Cost Behavior. *Temple University and Peking University.*

Banker, R.D. Byzalov, D. and Chen, L. (2013). Employment protection legislation, adjustment costs and cross-country differences in cost behavior, *Journal of Accounting and Economics*, 55(1), 111-127. https://doi.org/ 10.1016/j.jacceco.2012.08.003.

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. https://doi.org/10.2308/jmar-50726

Banker, R.D. Flasher, R. and Zhang, D. (2014). Strategic positioning and asymmetric cost behavior. . *SSRN Electronic Journal*, DOI: 10.2139/ssrn.2312852

Calleja, K. Steliaros, M. and Thomas, D.C. (2006). A Note on Cost Stickiness: Some International Comparisons, *Management Accounting Research*, 17 (2), 127-140. https://doi.org/10.1016/j.mar.2006.02.001

Chen, C.X. 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, 252-282. https://doi.org/10.1111/j.1911-3846.2011.01094.x

Cheng, T. and Firth, M. (2000). An Empirical Analysis of the Bias and Rationality of Profit Forecasts Published in New Issue Prospectuses. *Journal of Business Finance & Accounting*, 27, 423-446. https://doi.org/10.1111/1468-5957.00319

Ciftci, M and Salama, M. (2018). Stickiness in Costs and Voluntary Disclosures: Evidence from Management Earnings Forecasts. *Journal of Management Accounting Research*, 30 (3), 211-234. https://doi.org/10.2308/jmar-51966

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. https://doi.org/10.2308/jmar-51073

Dierynck, B. and Renders, A. (2009). Earnings Management Incentives and the Asymmetric Behavior of Labor Costs: Evidence from a Non-US Setting. *AAA 2010 Management Accounting Section (MAS) Meeting Paper*. Available at SSRN: https://ssrn.com/abstract=1441250 or http://dx.doi.org/10.2139/ssrn.1441250

Kama, I. and Weiss, D. (2013). Do Earnings Targets and Managerial Incentives Affect Sticky Costs?. *Journal of Accounting Research*, 51, 201-224. https://doi.org/10.1111/j.1475-679X.2012.00471.x

Lee, W.J., Pittman, J. and Saffar, W. (2020). Political Uncertainty and Cost Stickiness: Evidence from National Elections around the World. *Contemporary Accounting Research*, 17 (2), pp. 1107-1139. https://doi.org/10.1111/1911-3846.12547

Shirzad, A., Saei, M., Nasirzadeh, F. (2020). 'Fundamental Analysis of Cost Behavior by Function and Nature and Its Impacts on Earnings Forecast Accuracy', Financial Management Strategy, 8(4), pp. 83-110. doi: 10.22051/jfm.2020.29185.2262.

Subramaniam, C. and Watson, M.W. (2016).Additional Evidence on the Sticky Behavior of Costs. *Advances in Management Accounting*, 26, 275-305. https://doi.org/10.1108/S1474-787120150000026006.

Subramanyam, K. (1996). The Pricing of Discretionary Accruals. *Journal of Accounting and Economics*, 22 (1-3), 249–281. https://doi.org/10.1016/S0165-4101(96)00434-X

Weiss, D. (2010). Cost Behavior and Analysts' Earnings Forecasts. *The Accounting Review*, 85(4), 1441–1471. https://doi.org/10.2308/accr.2010.85.4.1441

Yazdifar, H. and Haghigh, F., 2020. The effect of managers' optimism on competitive strategy and final cost models. El efecto del optimismo de los gerentes sobre la estrategia competitiva y los modelos de costos finales. Religacion: Revista de Ciencias Sociales y Humanidades, 4 (20), 432-440.