



# “Cost stickiness and firm profitability: A study in Saudi Arabian industries”

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# COST STICKINESS AND FIRM PROFITABILITY: A STUDY IN SAUDI ARABIAN INDUSTRIES

## Abstract

This study examined the impact of cost stickiness on firm profitability in different industrial sectors in Saudi Arabia. The sample size for the study consists of 102 companies listed on Tadawul (Saudi Stock Exchange) from 2009 to 2018. The study estimated a panel regression using pooled OLS, fixed and random effects, and Generalized Method of Moments (GMM). The variable Return on Investment (ROI) is used as a proxy to measure a firm's profitability. The results of all the three models are similar to each other. The study found a negative and significant correlation between profitability and cost stickiness, indicating firms' inability to control the selling, general and administrative costs (SG&A), ultimately leading to lower profits. In addition, firm size is positively associated with profitability, indicating that larger firms are more profitable compared to smaller ones, while the leverage is negatively related to profitability, indicating that companies have higher debts.

## Keywords

cost behavior, sticky cost, firm growth, selling costs, administrative costs, leverage, size

## JEL Classification

L25, L61, L66, M41

## INTRODUCTION

Cost behavior affects firms' selling and administrative decisions, also termed as sticky cost decisions, which play an important role in the sales growth, which in turn increases firms' profits. Therefore, researchers found it important to study the behavior of these sticky costs. Financial managers devote large part of their time to estimate and control the cost of firms' growth and survival. Managers should possess knowledge of cost behavior to effectively implement cost control. It is assumed that proportional changes in costs to sales increase firm performance, and the degree of the change is used as a cost control indicator of firm performance and competitiveness (Lev & Thiagarajan, 1993). Traditional theories of costs report the cost behavior as a change in costs due to changes in sales revenues, and further this change differs between fixed costs, marginal costs, and mixed costs, and also the change depends on timing of costs, whether they are short-term or long-term (Abu-Serdaneh, 2014; Alenezi, 2020).

Two phenomena are changes in costs due to changes in sales revenue and timing of costs; the stickiness among these costs tend to decrease, which further helps to increase firm performance. Financial market investors always associate good firm performance with an increase in sales revenue to those firms that control sticky costs during an attrition period, and the increase in firm performance is linked to an increase in firms' operating leverage (Warganegara & Tamara, 2014). According to Banker and Bizalov (2014), cost control decisions depend on the past resources, future expected sales revenue, incentives of managers, magnitude of assets and liabilities, managers' optimism,

etc. Past researchers have examined the behavior of sticky costs and reported the influence of previously mentioned factors on cost control decisions (Chen et al., 2012; Kama & Weiss, 2012).

The Kingdom of Saudi Arabia (henceforth KSA) is in the stage of transformation, i.e. changing from oil nation to a non-oil dependence nation as per the Vision 2030. KSA's industrial sector consists of different industries, where selling and administration costs play an important role, and the growth in firms' profits is associated with the controlling of these costs.

## 1. LITERATURE REVIEW

Noreen (1991) studied conditions that Activity Based Costing (ABC) systems provide to certain types of relevant costs. The author reported that the main reason of switching to an ABC system is to estimate the profitability of products through pricing, drop decisions, and reduce manufacturing costs by applying design specifications. It was also suggested that relevant costs should be proportional to their respective cost drivers. Zanella et al. (2015) studied the degree of changes between costs and the sales revenue in the UAE companies. They use panel regression to estimate the degree of change. They reported no stickiness of costs in UAE firms and strongly associated this fact to employment protection legislation of the UAE in terms of expatriate labors as the cost is adjusted during the attrition period by firing employees. A similar study by Xu and Sim (2017) examined the reality of sticky costs in Chinese manufacturing firms. Their observation contradicts with the traditional assumption of changes in costs due to changes in companies' sales revenue. They reported an over-estimation of these sticky costs by Chinese manufacturing companies. Further, sticky costs differ in a large manner depending upon the type of an industry, and the increase of cost stickiness is associated to macroeconomic growth. Banker and Byzalov (2014) studied the asymmetric behavior of costs by providing a novelty in cost behavior that the asymmetric cost behavior is globally prevalent. They suggested a new area of research integrating financial and cost accounting, since a company's profits are determined by sales and costs. Therefore, their study brought new insights by integrating the cost and financial accounting. Weiss (2010) examined the association of cost stickiness with the forecast of earnings, specifically to the accuracy of analysts' forecasts. He found that the firms with higher sticky cost experience less accuracy in earnings'

forecasts, while the firms with lower sticky cost experience high accuracy in earnings' forecasts. Further, investors and analysts link their priorities to firms' sticky cost behavior. Moreover, Anderson et al. (2003) interpreted the increase in sales and administrative costs (SG&A) between two periods to decrease in a firm's profits. They said that this was opposite to traditional theories propounded. They observed that firms ignore some aspects of SG&A costs. They also reported that the fixation of costs and their stickiness may increase the cost ratio rather than decrease due to a decline in sales revenues. However, they associate an increase in the cost ratio with an increase in management earnings.

According to agency theory, firm performance is linked to the cost stickiness. The internal market hypothesis perfectly explains the association between cost stickiness and firm performance. Research findings may vary between developed and emerging countries (Kontesa & Brahmana, 2018). Similarly, Yao (2018) studied the influence of cost stickiness on company risk and found a positive association between the two. The increase in cost stickiness increases the company's risk and is associated with ownership concentration. The higher the ownership concentration, the larger the influence of cost stickiness on company risk. Further, does the management of earnings affect stickiness in firms' costs? The answer is yes, as the efficient earnings management have a significant influence on cost stickiness, because this perspective helps financial managers to estimate accurate costs in order to make efficient cost decisions, which ultimately leads to an increase in firm performance (Jin, 2017). A similar study by Silva et al. (2019) found the influence of sticky costs and earnings management on firms' profits. Moreover, there is an influence of economic growth on the stickiness of costs. Ibrahim (2015) used a multiple regression model to examine the behavior of sell-

ing and administrative costs, cost of goods sold and operating costs. He found the SG&A costs to be sticky during the period of growth and non-sticky during the period of recession, while the cost of goods sold was sticky in both the periods of growth and recession.

The behavior of sticky costs varies as per the industrial sector. Hosomi and Nagasawa (2018) found anti-sticky costs in public firms, and found that the sticky costs in these firms by removing water supply firms. They reported that the change in sticky costs depends not only on the type of industry, but also on the structure of costs, government regulations, pricing, etc. Similarly, the stickiness of cost in small and medium enterprises (SMEs) is found in labor costs and not in selling and administrative costs, cost of goods sold and operating costs (Via & Perego, 2014). In contrast, Pamplona et al. (2016) reported that the larger companies of Brazil, Chile and Mexico adhere with the sticky cost approach, that is, an increase in costs is linked to an increase in sales, and vice versa. Further, Huong (2018) examined the association of cost stickiness and profitability of each firm from the Vietnam listed companies. He found selling and administrative costs to be stickier compared to Brazil and US, and reported that these sticky costs influence companies' profits. A similar kind of study of Indonesian firms by Warganegara and Tamara (2014) found evidence of the sticky cost existence in firms, and these sticky costs affect firms' profitability. Moreover, the capital of an organization (including intellectual capital) influences cost stickiness. There is a significant association between the two, but there is no significant difference between high and low intensity of capital (Mohammadi & Taherkhani, 2017). Further, Argiles-Bosch et al. (2017) studied the impact of an increase in sales and profitability trade-off on cost stickiness. They found that firms' profitability and increased future sales significantly affect cost behavior during the periods of a decrease in sales. They found a significant impact of these two on cost stickiness. A similar study by (Alenezi, 2020) explored the impact of sales increase and profitability trade-off on cost stickiness of Jordanian listed firms. He found that sticky costs increased due to an increase in sales, while he found no impact of change in sticky

costs on a decrease in sales. Further, he found a positive association between sticky costs and profitability when sales decrease.

In light of the above past research, this study found that the behavior of sticky costs in different types of industries situated in different countries, and the relationship between firm performance and cost stickiness have been explored extensively. Moreover, no study was found examining the influence of sticky costs (SG&A costs) on firms' profitability in Saudi Arabian industries. Hence, the study intends to examine the impact of sticky costs on the profitability defined as a return on investment (ROI) in the industrial sectors of Saudi Arabia. The study establishes the following hypotheses:

$H_0$ : *There is no significant relationship between cost stickiness and firm profitability.*

$H_1$ : *There is a significant relationship between cost stickiness and firm profitability.*

## 2. METHODOLOGY

This study examines the influence of cost stickiness on firms' profitability in the context of Saudi Arabia. The sample size of this study consists of 102 companies listed on Tadawul (stock exchange of Saudi Arabia) from 2009 to 2018. The sample companies are chosen from different sectors, such as materials, capital goods, telecom, consumer durable, energy, health care, consumer services, food and beverages, materials, and retailing. The study estimates a pooled regression, panel regression and GMM and reports the results.

### 2.1. Study variables

This study employs Return on Investment (ROI) as a dependent variable, which is a profitability measurement variable. Further, the study follows the past studies by Anderson et al. (2003) and Salehi (2018) to measure cost stickiness. The independent variable (cost stickiness) is SC, which consists of administrative costs calculated as a difference between the current year and the previous year divided by the previous years' sales revenue; and the sales cost is calculated as difference be-

tween the current year and the previous year divided by the previous years' sales revenue. Further, the study includes control variables into the model, such as Size computed as a logarithm of total assets; Lev computed as total assets differentiated by debt and divided by total assets.

### 2.2. Empirical model

The study estimates panel regressions by adopting pooled regression, fixed effects model (FEM), and random effects model (REM). Further, the study employs the Hausman test and F-statistic to choose an appropriate model among the three. Moreover, if the problem of auto-correlation, multicollinearity, and heteroscedasticity exists, then the study shall employ the generalized method of moments (GMM). According to Driffill et al. (1998), the GMM has advantage over other models in financial analysis. The basic panel regression model is as follows:

$$ROI_{i,t} = \alpha + \beta_1 SC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \varepsilon_{i,t}, \tag{1}$$

where *ROI* – Return on Investment, *SC* – Sticky Cost measured in terms of Selling, General and Administrative Costs, *SIZE* – Log of Total Assets, *LEV* – Leverage.

**Table 1.** Variables and their expected sign

Variable	Expected sign
SC (Sticky Cost)	+/-
SIZE	+
LEVERAGE	-

## 3. RESULTS

The study examines the association of sticky costs and profitability. This section reports empirical results. Table 2 reports descriptive statistics in terms of mean and standard deviation. The reported result shows that the mean and SD of ROI (profitability measurement) is 0.024 and 0.042. Similarly, the mean and SD of sticky costs, which are an important explanatory variable, are 0.012 and 0.12, respectively, and that of size measured in terms of log of total assets are 6.14 and 1.32, and that of leverage are 1.94 and 1.45.

**Table 2.** Descriptive statistics

Variable	Mean	Standard deviation
ROI	0.024	0.042
SC (Sticky Cost)	0.012	0.12
SIZE	6.14	1.32
LEVERAGE	1.94	1.45

Table 3 presents the correlation analysis of dependent and independent variables. The result shows that the correlation between ROI and SC is negative, while the correlation with size is positive and negative with leverage.

**Table 3.** Correlation analysis

	ROI	SC	SIZE	LEV
ROI	1.000	-	-	-
SC	-0.1486	1.000	-	-
SIZE	0.1159	-0.0274	1.000	-
LEV	-0.1991	-0.0230	0.3502	1.000

### 3.1. Panel regression results

Panel regression results are reported in terms of pooled regression (pooled OLS), Fixed Effects Model (FE), Random Effects Model (RE), and Generalized Method of Moments (GMM).

Table 4 presents the results of pooled regression. The results show that a negative relationship is significant at the 1 percent level between the profitability and sticky costs. The relationship of firm size is positive and significant with firm profitability, while the leverage is negative and significant. The adjusted *R*-square is 10%, and *F*-statistic is significant at the 1 percent level of significance.

**Table 4.** Pooled regression results

Variable	Coefficients	t-statistics	p-value
C	-0.00028	-0.05	0.962
SC	-0.0527	-5.01	0.000
Size	0.0067	6.56	0.000
Lev	-0.0080	-8.67	0.000
Model Diagnostics			
F-statistic	38.12 (0.000)	-	-
Adj. R-square	0.10	-	-

Table 5 presents the results of panel fixed effects and random effects. The results of fixed and random effects models are similar to each other, where there is a negative and significant association at the 1 percent level between profitability and sticky costs. The relationship with size is positive

and negative with leverage, and it is significant at the 1 percent level. The result of the Hausman test suggests the fixed effects model compared to the random effects, because the p-value is less than 0.05, hence it rejects the null hypothesis of selecting random effects. The significant F-statistic shows the fitness of the model.

**Table 5.** Panel results with fixed and random effects

Variable	Coefficients	t-statistics	p-value
<b>Fixed Effects Model</b>			
C	-0.0044	-0.68	0.494
SC	-0.0372	-4.09	0.000
Size	0.0061	5.47	0.000
Lev	-0.0042	-3.95	0.000
<b>Model Diagnostics</b>			
F-statistic	16.66 (0.000)	-	-
Adj. R-square	0.16	-	-
<b>Random Effects Model</b>			
C	-0.0034	-0.52	0.600
SC	-0.0402	-4.45	0.000
Size	0.0063	6.00	0.000
Lev	-0.0052	-5.38	0.000
<b>Model Diagnostics</b>			
F-statistic	66.64 (0.000)	-	-
Adj. R-square	0.18	-	-
<b>Hausman Test – 16.06 (0.001)</b>			

Table 6 presents the result of Generalized Method of Moments (GMM). The results show a negative relationship between profitability and sticky costs significant at the 1 percent level. The size is insignificant having no impact on profitability, while the relationship with the leverage is negative and significant at the 5 percent level. The GMM estimation model is valid at the 1 percent level as the Wald Chi2 is significant at the 1 percent level of

significance.

**Table 6.** GMM estimation results

Variable	Coefficients	z-statistics	p-value
C	0.0324	2.56	0.011
SC	-0.0403	-3.15	0.002
Size	-0.0017	-0.78	0.436
Lev	-0.0033	-1.89	0.05
<b>Model Diagnostics</b>			
Wald Chi2	65.76	-	-
Prob >Chi2	0.000	-	-

## 4. DISCUSSION

The study found a significant association between cost stickiness and firm profitability measured in terms of Return on Investment (ROI) in all the three models of pooled OLS, fixed and random effects and panel GMM. This shows that companies in different sectors of Saudi Arabia failed to adjust the selling, general and administrative cost (SG&A) proportionately, which leads to an adverse effect on profitability. Further, the positive association between size and profitability shows that bigger firms have larger profits than smaller firms. Further, the relationship between profitability and leverage is negative, indicating a low profitability due to higher debts. This result confirms the previous research of Lev and Thiagarajan (1993), Weiss (2010), and Warganegara, and Tamara (2014). Further, the study contradicts those of Pamplona et al. (2016) and Yao (2018). The results of current study confirm the alternative hypothesis, that there exists a relationship between cost stickiness and firm profitability.

## CONCLUSION

This study examined the influence of cost stickiness on the firm profitability measured in terms of Return on Investment (ROI) for the companies listed on the Saudi Arabian Stock Exchange (Tadawul). To estimate the results, the study selected a sample size of 102 companies during the time period 2009–2018 and used pooled OLS, panel regression with fixed and random effects and panel GMM models. The results of the three estimated models are similar to each other, where the explanatory variable, the sticky cost measured in terms of selling, general and administrative (SG&A) costs, is negatively related to firm profitability measured in terms of Return on Investment (ROI). This might be due to failure to adjust SG&A costs by financial managers working in the industries of Saudi Arabia. Further, firm size positively affects firm profitability, while the effect of leverage is negative. Therefore, the results of this study confirm that there is a significant association between cost stickiness and firm profitability. The

results of the study are useful for financial managers in terms of controlling SG&A costs to enhance firm profitability, as well as for academicians and policy makers. This study can be further extended by including different profitability measurement parameters, gross domestic product, inflation, etc.

## AUTHOR CONTRIBUTIONS

Conceptualization: Abdulwahid Ahmed Hashed Abdullah.

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Formal analysis: Abdulwahid Ahmed Hashed Abdullah.

Investigation: Abdulwahid Ahmed Hashed Abdullah.

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Supervision: Abdulwahid Ahmed Hashed Abdullah.

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Visualization: Abdulwahid Ahmed Hashed Abdullah.

Writing – original draft: Abdulwahid Ahmed Hashed Abdullah.

Writing – review & editing: Abdulwahid Ahmed Hashed Abdullah.

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