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The Impact of Cost Stickiness on Saudi Firm's Profitability

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Abstract

This paper examines the impact of cost stickiness on firm performance for a sample composed of 110 listed companies in Saudi Arabia from 2017 to 2022. Data are estimated by the OLS regression analysis, and the Earnings per Share (EPS) ratio is used as a proxy to estimate firms' performance. The results show a negative correlation between cost stickiness and performance. Furthermore, the results indicate that for industrial firms, age and size are positively correlated with performance. On the other hand, for commercial and service companies, a high level of debt is related to low performance.

Keywords

Cost Stickiness, Earnings per Share (EPS), Saudi Companies

1. Introduction

In a world characterized by a high level of competition, companies are seeking to increase their performance to ensure their continuity. However, several companies suffer from cost stickiness, which can disrupt business activity and cause enormous costs. Therefore, the study of the connection between cost rigidity and performance remains very important.

The problem proposed in this study is to know if cost stickiness can influence the performance of companies. This study focuses on a sample composed of Saudi-listed companies. In fact, Saudi companies are characterized by their large size, high turnover, and economic power in the domestic and global economy.

This research was motivated by this idea, so we're trying to provide more answers about the impact of cost stickiness on the performance of Saudi companies and searching for reasons that can explain this correlation if exists.

The paper is organized as follows: Section 2 is a brief review of the literature

about analysis of the relationship between cost stickiness and performance; Section 3 describes the methodology; Section 4 provides results. Concluding comments are set out in Section 5.

2. Literature Review

The concept of cost stickiness was introduced by Anderson, Banker, and Janakiraman (2003) (henceforth ABJ). The authors showed that cost increases more when activity rises and decreases less when activity falls by an equivalent amount. Therefore, this type of cost behavior is called "cost stickiness". Based on Anderson et al.'s (2003) model, several studies examine different phenomena of "sticky costs" and develop the extant literature in this area.

Warganegara and Tamara (2014) investigated the existence of the effects of cost stickiness on the profitability of firms. The authors used a sample composed of 476 Indonesian-listed firms from 2007 to 2012 and confirmed the negative relationship between cost stickiness and firm profitability. The authors explained that the stickier the operating expenses the lesser the future profitability of the firms.

Using a sample of 315 listed firms in Malaysia over 2010-2014, Kontesa and Brahmana (2018), emphasized the significant role of cost stickiness on firm performance, the authors' findings confirm the alignment proposition of the agency theory.

In their study, Ana Belen et al. (2019) used non-financial firms listed on the Korea Composite Stock Price Index (KOSPI) during the period of 2010-2017, the authors found a significant negative relationship between the asymmetrical behavior of cost and capital structure in firms with high-level of cost stickiness.

Han et al. (2019) examined the association between a firm's degree of cost stickiness and its propensity to release management earnings forecasts. The authors found that the level of cost stickiness is associated with more favorable earnings news forecasted by management, this association is more evident when the resource adjustment cost is high and firm efficiency is high.

Recent research from Hong and Thao (2021) based on Vietnam firms indicated that Sales cost stickiness has a positive impact, while administrative cost stickiness has a negative impact on the earnings management level.

Tang et al. (2022) investigated the impact of cost stickiness on firms' stock price crash risk, they suggested a negative association that mainly exists in firms with younger CEO, high levels of product market competition, lower finance risk, poor performance, state-owned and concentrated ownership.

Costa and Habib (2023) found a negative relationship between cost stickiness and firm value using a large sample of U.S. data. The authors explain the detrimental impact of cost stickiness on firm value is mediated partially through the cost of equity and cash flow channels.

Studying firms from the Chinese capital market, Li and Sun (2023) assert that lower cost stickiness improves the ability of current returns to reflect future earn-

ings. Furthermore, the authors suggest that Cost stickiness significantly reduces the future earnings response coefficient of non-state-owned enterprises but does not reduce the future earnings response coefficient of state-owned enterprises.

3. Methodology

This section will present hypotheses to be tested, the model to be estimated, variables and data used.

3.1. Hypotheses

To respond to the objective proposed in this study, the first hypothesis (H1) will examine the impact of cost stickiness on the firm profitability. Weiss (2010) indicated that Cost stickiness increases earnings volatility. Other authors such as Costa and Habib (2023) emphasized the negative impact of cost stickiness on firm value. Li and Sun (2023) showed that Cost stickiness significantly affects the earnings response coefficient of stock prices.

Hypotheses H2, H3, and H4 will test the significance of the control variables. Hypothesis H2 will examine the impact of the age of the firm on its profitability. Loderer and Waelchli (2010) found as firms grow older, their profitability seems to decline. Otherwise, Kontesa and Brahmana (2018) found a positive relationship between age and firm performance. Then, Hypothesis H3 will study the impact of leverage on firm performance. Dawar (2014) showed that there is a significant negative relationship between total debts and firm performance. For a sample composed of firms from Gulf Cooperation Council (GCC) countries, Zeitun and Saleh (2015) showed that higher financial leverage will lead to a decrease in the firm performance. Finally, Hypothesis H4 will be devoted to the study of the relationship between the size and performance of the firm. Many authors such as Calleja, et al. (2006) have tested firm size (total assets) assuming that large firms may suffer from cost stickiness. Additionally, Ghafoorifard, et al. (2014) found a significant relationship between firm size and firm performance.

H1: When cost stickiness is higher the profitability of the firm is lower.

H2: The profitability of the firm is higher when his age is higher.

H3: The profitability of the firm is associated with a low level of debt.

H4: The profitability of the firm is associated with its size.

3.2. Model

The analysis of cost stickiness was based mainly on the study of Anderson et al., (2003). The authors developed a model that makes it possible to measure whether the cost of a company is sticky and to determine the factors that can influence cost stickiness. The ABJ model can be written as follows:

$$\log\left[\frac{\text{Costs}_{i,t}}{\text{Costs}_{i,t-1}}\right] = \beta_0 + \beta_1 \log\left[\frac{\text{Sales}_{i,t}}{\text{Sales}_{i,t-1}}\right] + \beta_2 \times d_{i,t} \log\left[\frac{\text{Sales}_{i,t}}{\text{Sales}_{i,t-1}}\right] + \varepsilon_{i,t} \quad (1)$$

The variable d is a dummy variable that takes the value of 1 when revenue decreases between two periods and is otherwise 0. Since the value of the dummy variable (d) is 0 when revenue increases, β_1 measures the increase in percentage terms in costs with a 1% increase in revenue. However, since the value of the dummy variable (d) is 1 when revenue decreases, the sum of β_1 and β_2 measures the decrease, in percentage terms, in costs following a 1% decrease in revenue. The traditional cost behavior model is valid when β_2 is equal to 0 since upward and downward changes in costs will be equal, and β_1 would be equal to 1, reflecting proportionality. Otherwise, companies present sticky cost behavior when β_2 is negative and statistically significant.

Weiss (2010) proposed a more recent measure of cost stickiness which can be measured by the following model:

$$\text{Sticky}_{i,t} = \log\left[\frac{\Delta\text{Cost}_{i,T}}{\Delta\text{Sales}_{i,T}}\right] - \log\left[\frac{\Delta\text{Cost}_{i,\check{T}}}{\Delta\text{Sales}_{i,\check{T}}}\right] \quad (2)$$

where $T, \check{T} \in \{t, \cdots, t-3\}$, T is the most recent period during which the activity level has decreased over the past four quarters, and $\check{T}$ is the most recent period in which the activity level has increased over the past four quarters. $\Delta\text{Sales}_{it} = \text{Sales}_{it} - \text{Sale}_{it-1}$ is the change in total sales. $\Delta\text{Cost}_{it} = \text{Cost}_{it} - \text{Cost}_{it-1}$ is the change in total costs.

The dependent variable $\text{Cost}_{i,t}$ will be replaced by Cost of Goods Sold (COGS) as Walid (2021) found the existence of cost stickiness in COGS more than Selling, General and Administrative costs SGA Expenses in a sample composed of Saudi companies. Model (2) will be written as follows:

$$\text{Sticky}_{i,t} = \log\left[\frac{\Delta\text{COGS}_{i,T}}{\Delta\text{Sales}_{i,T}}\right] - \log\left[\frac{\Delta\text{COGS}_{i,\check{T}}}{\Delta\text{Sales}_{i,\check{T}}}\right] \quad (2a)$$

In this paper, the objective is to determine the impact of cost stickiness on the financial performance of firms. A multivariate linear regression analysis is used to examine the relationship between cost stickiness of COGS and firm performance. The dependent variable of the model concerns the future evolution of the Earnings per Share (EPS) ratio. The independent variables are made up firstly of cost stickiness (Sticky) and secondly of a group of control variables made up of age, leverage and size. The model is expressed as follows:

$$\text{EPS}_i = C + \beta_1\text{Sticky}_i + \beta_2\text{Age}_i + \beta_3\text{Lev}_i + \beta_4\text{Size}_i + \varepsilon_i \quad (3)$$

where: EPS: Earnings per Share, Sticky: stickiness measurement, Age: the firm age, Lev: financial leverage, Size: firm size and ε_i: error term.

3.3. Variables

Table 1 shows the variables considered in this paper.

Data are collected from the annual reports of Saudi companies selected in this study. Table 2 presents a statistical description of all the variables used in the sample.

Table 1. Definition of variables.

Variable	Symbol	Definition
Profitability	EPS	The Earning per Share ratio divided by share price
Cost Stickiness	Sticky	Using Cost of Goods Sold (COGS) as indicated in Model (2a)
Firm Age	Age	Log of the number of years since the creation of the firm
Financial Leverage	Lev	Log(total long-term debts/total assets)
Firm Size	Size	Log of total assets

Table 2. Descriptive statistics of variables.

	MIN	MAX	Mean	SD
EPS	−0.002	0.266	0.0114	0.021
Sticky	0.003	0.454	0.0277	0.17
Age	0.397	3.553	1.667	0.298
Leverage	0.0186	0.278	0.081	0.0575
Size	3.8	7.9	5.4	0.851

3.4. Sample and Estimation

The sample used in this study is composed of 110 Saudi companies listed on the Saudi Stock Exchange during the period from 2017 to 2022. This period was considered for two reasons. First, this period covered recent data of Saudi firms. Second, this study examined six years in length to detect the maximum number of firms experiencing sales decrease and increase for the period between 2017 and 2022.

Two subgroups are formed: the first concerns industrial companies (72 companies), and the second concerns commercial and service companies (28 companies). Data are collected from annual accounting reports and stock price quotes from the Saudi Stock Exchange (Tadawul). Three types of regressions were tested: the first which included the total sample (composed of 110 companies), the second which included only industrial companies (composed of 72 companies), and the third which included only commercial and service companies (composed of 28 companies).

4. Results

Using the OLS regression analysis, the results of regression model are provided in Table 3.

The results show that Hypothesis H1 is accepted for the three regressions, indicating that cost stickiness affects negatively the performance of companies. The coefficient of Sticky is −0.32, −0.78 and −0.25 respectively for each regression and t-value is −1.76, −2.44 and −1.43, respectively. In other words, when companies suffer from cost stickiness, their performance will be reduced. This

Table 3. Results of regression model.

	(1)	(2)	(3)
Constant	0.57 (0.96)	0.122 (0.87)	0.32 (1.106*)
Sticky	−0.32* (−1.76*)	−0.78** (−2.24**)	−0.25* (−1.43*)
Age	0.58 (1.126)	1.44* (1.89*)	0.62 (1.06)
Leverage	−0.44** (−2.26**)	−1.94** (−2.3**)	−2.75*** (−3.11***)
Size	−0.76* (−1.376*)	−2.85*** (−3.42***)	−0.71 (−1.08)
Observations	660	432	228
R^2	0.27	0.29	0.16
Adj R^2	0.3	0.32	0.196
F	5.51***	6.62***	4.57***

Note: The values in parentheses are t-values. *, **, and *** indicate significance at 10%, 5%, and 1%, respectively.

relationship is more significant among industrial companies with a level of significance of 5% against 10% for commercial and service companies.

As for Hypothesis H2, it was rejected for Regression 1 (composed of the total sample) and Regression 3 (composed of commercial and service companies only), indicating that the Age of the firm has no influence on its performance. However, this hypothesis is accepted by the second regression, the coefficient of Age = 1.44 and (t-value is 1.89) is significant at 10% statistical level, indicating that for industrial companies age is positively correlated with performance.

Hypothesis H3 is accepted for the three sample types of our study, the coefficient of Leverage is −0.44, −1.94, and −2.75 respectively for each regression, and t-value is −2.26, −2.3 and −3.11, respectively. These results show that leverage is negatively correlated with performance, the more companies are in debt, the more their performance decreases. This result is more evident among commercial and service companies with a level of significance reaching 1%.

Finally, Hypothesis H4 was accepted for Regression 1 by indicating that size has a positive impact on company performance, the coefficient of size is −0.76 and t-value is −1.376, significance rate is around 10%. This result is more significant for Regression 2, where the coefficient of size is −2.85 and t-value is −3.42, significance level reached 1%, showing that the size of industrial companies is positively correlated with their performance. However, no significant relationship between size and performance was recorded for commercial and service firms.

Referring to the R-squared and the adjusted R-squared coefficient, we can notice that the three models have been designed properly. The adjusted R-squared

(30%, 32%, and 20% respectively for each regression) showed that the independent variables in the model have the power to explain more than 20% of the variations in the EPS, which means that the model is quite powerful. Furthermore, the F-statistic for the three models is above 4.5, which is statistically significant at less than the 1% level.

In summary, we can conclude for Saudi companies, cost stickiness is negatively associated with performance. In other words, companies suffering from cost stickiness are those who see their performance decline.

5. Conclusion

The objective of this paper was to study the impact of cost stickiness on the firm performance. The sample used is composed of 110 Saudi companies (72 manufacturing firms and 28 commercial and services firms), and the data covers the period from 2017 to 2022. The variable Earnings per Share (EPS) ratio is used as a proxy to measure a firm's profitability. The independent variables essentially concern the measurement of the cost stickiness, and then a group of control variables were tested: age, leverage, and size. The study confirmed the negative relationship between cost stickiness and performance, in other words, cost stickiness affect negatively the performance of firms. This result is more significant among industrial companies. Furthermore, the results indicated that the age and size of industrial companies are positively correlated with their performance. For commercial and services companies, a high level of debt is associated with low performance.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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