

The Effect of Economic Growth on Cost Stickiness in Tehran Stock Exchange

Seyed Mohammad Alavinasab*, Mohammad Reza Mehrabanpour, Abolfazl Ahmadi

Faculty of Management & Accounting, College of Farabi, University of Tehran, Iran

Abstract This study attempts to investigate the effect of economic growth on cost stickiness of companies in Tehran Stock Exchange during 2008-2013. In this context, the study examines whether costs behave asymmetrically to demand change and investigates the impact of economic prosperity as well as economic recession on cost stickiness. Statistical population includes all companies listed in Tehran Stock Exchange market for the study period and 100 firms have been selected as the sample group. In order to examine the hypothesis, regression analysis of the panel data has been carried out. The results show that all costs studied, namely selling, general and administrative cost (SG&A), cost of goods sold (COG) and operating costs (OC) behave asymmetrically to demand change where all three costs were sticky during 2008-2013. Also, results reveal that the behavior of all three costs were sticky during the prosperity period (2008-2010). In addition, results indicate that all three costs behave anti-sticky during the recession period (2010-2013). Thus, the regression analysis results confirm the three study hypothesis. Further, the results indicate that costs are more stickiness in prosperity period as compared to recession period.

Keywords Cost stickiness, Cost behavior, Economic growth

1. Introduction

The traditional model of cost behavior assumes that variable costs change proportionally and symmetrically with changes in the activity volume. The recent empirical research on asymmetric cost behavior give a new way of thinking about costs. Anderson et al. (2003) discovered that selling, general and administrative costs do not increase or decrease with the same volume of changes in sales revenue. They interpret this phenomenon as cost stickiness phenomenon. Cost stickiness phenomenon is defined as the degree of increase in costs with the volume of sales increase is larger than the degree of decrease in costs with the same volume or sales decrease. The phenomenon of cost stickiness occurs because managers tend to adjust deliberately their resources committed to activities (Anderson et al., 2003). Adjustment costs are costs to reduce or restore committed resources. Chen et al. (2012) discuss cost stickiness can also arise with managerial empire building incentive as a consequence of conflict of interest between managers and shareholders. In order to chase their personal benefits, managers have little incentives to optimize the operating efficiency of companies. Managers may retain unutilized costs which are beneficial for their compensation and

reputation. Thus, managers could make decisions to retain costs away from the optimal levels, which would give rise to cost stickiness phenomenon. Or of cost stickiness. For example, Anderson et al. (2003), Subramaniam & Weidenmier (2003), Balakrishnan et al. (2004) and Calleja et al. (2006) indicated that cost stickiness is determined by firm specific characteristics that capture organizational constraints on resource adjustment such as asset intensity and employee intensity. Anderson et al. (2003) argued that cost stickiness is affected by the timing of the activity decrease. Authors identified a successive decrease in revenues is a determinant of cost stickiness. Anderson et al. (2003) also discussed economic growth of a firm is a determinant of cost stickiness. Their findings show that managers are less willing to reduce committed resources in periods of macroeconomic growth than in other periods, resulting in more cost stickiness. The argument for this is that managers consider a revenue decline in a period of macroeconomic growth to be more transitory than a revenue decline in a period of macroeconomic contraction. Accordingly, this paper attempts to examine the effects of economic growth on cost stickiness of companies in Tehran Stock Exchange.

The remainder of this paper is organized into four sections. Section II outlines the prior research. Section III describes our empirical design for analysis. Section IV reports empirical results and conclusions are presented in the last section.

* Corresponding author:

Alavinsb@ut.ac.ir (Seyed Mohammad Alavinasab)

Published online at <http://journal.sapub.org/ijfa>

Copyright © 2017 Scientific & Academic Publishing. All Rights Reserved

2. Literature Review

Anderson et al. (2003) introduced the concept of a sticky cost behavior. They examined cost behavior by using selling, general, and administrative (SG&A) costs and sales revenue of 7,629 firms over 20 years period (during 1979–1998). The authors found that SG&A costs are sticky; SG&A costs increased 0.55% per 1% increase in sales revenue but decreased only 0.35% per 1% decrease in sales revenue. In the wake of Anderson et al.'s (2003) seminal work, a number of studies document factors determining the degree of asymmetry in cost stickiness.

Subramaniam and Weidenmier (2003) explore cost stickiness is related with different ranges of activity changes. The use of Anderson et al.'s model has resulted with finding that SG&A costs were stickier than COGS. Also, authors found that "sticky parameters" are not negative or significant for revenues change less than 10%, but beyond 10% change almost all parameters were negative and significant.

Medeiros and Souza Costa (2004) analysed costs stickiness for 198 Brazilian publicly listed companies in period 1986–2003. By replicating Anderson et al. methodology authors found that SA&G costs for sampled Brazilian companies were sticky. Surprising finding was the fact that cost stickiness increased when data was aggregated for two, three and four years, which means that cost stickiness gets worse in longer periods. Hypothesis on lagged adjustment of SG&A costs was rejected, while partial reversion hypothesis of stickiness was accepted.

Balakrishnan et al. (2004) in their research focus on capacity utilization and analyses the sample of 49 physical therapy clinics during the period 1994–1997. The authors proved that respond to decrease of activity should be higher than response to increase of activity if company is having excess capacity. Based on this finding, they concluded that Anderson et al.'s study on cost stickiness should be interpreted with caution since cost stickiness may be feature only for the firms with strained current capacities.

Yang, Lee, and Park (2005) inspected cost behavior of Korean general hospital, and found total costs, labor cost and administrative costs are sticky. The results provided strong support that the more hospitals have assets intensity or employees intensity, the more costs are sticky.

Calleja et al. (2006) used data for a sample of US, UK, French and German companies. The results found costs are stickier for French and German companies than for US and UK companies due to differences in the corporate governance regimes across these four countries.

Banker and Chen (2006) examining cross-country differences in the sticky behavior of operating expense; using a sample 12,666 firms from 19 countries that are members of the Organization for Economic Co-operation and Development (OECD) during the period 1996–2005. They document that the degree of stickiness in operating expense varies significantly across firms in different countries. The study provides strong empirical support that labor market characteristics are important determinants of a

cross-country variations in the degree of cost stickiness.

Anderson and Lanen (2007) found weak evidence of sticky costs. They revised the estimated models of previous research and considered the foundational model of economic production. Their paper suggested that the problem is in "ambiguity about what defines managerial discretion (cost management) and how managerial discretion about redeploying verves releasing resources interacts with recording costs in the accounting system...".

Kama and Weiss (2010) put focus on managers' intention to meet earnings target. Research was done on the sample of listed US companies for period 1979–2006 and the obtained results suggested that the incentives to meet earnings targets (to avoid losses and/or avoid earnings decreases) lead to deliberate resource adjustments that diminish cost stickiness.

Koo et al. (2011) showed that behaviors of total costs, total manufacturing costs, SG&A costs, and labor costs are different for firms with different earnings management incentives under different reported earnings levels.

Canon (2011) studied the determinant factors of the cost stickiness in American aviation companies. The results showed that if the final cost of increasing capacity when demand increases, are more than reducing capacity when demand is greater than the marginal benefit, stickiness costs were increased and since the price product reduction when reducing demand, are more than the increase in cost when demand increases, the price of costs stickiness reduces in reducing demand.

Cannon (2014) investigated the factors affecting costs stickiness in cost behavior in the aviation industry in the United States of America and concluded that at the time of increase in demand management to increase capacity and at a time when demand is reduced excess capacity to hold directors which lead to the cost stickiness.

Awad E. A. Ibrahim (2015) indicated that the costs including SG&A, COGS and OC, respond asymmetrically to demand change, where both the SG&A and COGS were sticky, but OCs were anti-sticky. The nature and magnitude of the asymmetric cost behavior also differed in contrasting economic conditions; in the prosperity period before the 2008 financial crisis, SG&As were sticky, but anti-sticky in the recession period after the 2008 financial crisis. In addition, for a 1 per cent demand increase, SG&As increased more in the prosperity period than in the recession period. In addition, for a 1 per cent decrease in demand, SG&As decreased by a larger extent in the recession period after the financial crisis than in the prosperity period before the financial crisis.

Namazi and Davanipour (2010) studied the real behavior of cost stickiness in the Tehran stock exchange. They found that the intensity of cost stickiness decreased as income decreased and that this intensity was higher in companies having more total assets against sales.

Poorzamani and Bakhtiary (2012) investigated the impact of the inflation rate, and short-term and long-term interest rates on operating cost stickiness (OCS) in the Tehran stock exchange. They found that there is a meaningful negative

relation between inflation rate and operating cost stickiness, a meaningful positive relation between short term interest rates and OCS, but no meaningful relation between long-term interest rates and OCS.

Kurdestani and Mortazavi (2013) in a study evaluated the effects of decisions made by managers on the costs stickiness in Tehran Stock Exchange. The results showed that the expected increase in future sales by management, cause to reduced cost stickiness of prime sales and how the optimism is greater; reduction of prime cost stickiness is greater. But management optimism was increased, sales, general and administrative cost stickiness and stickiness of these costs in management high optimism, are more than a little optimism that is strong evidence for confirmation of the hypothesis of wise decisions about selling, general and administrative cost.

3. Methodology

This study in terms of objective is an applied research and based on data collection method is a descriptive correlational study. It is a descriptive research because it is trying to describe a situation or considering phenomenon and to understand the present situation and the correlation between the variables.

3.1. Hypotheses

This paper aims to examine the effect of economic growth on cost stickiness of companies in Tehran Stock Exchange during 2008 - 2013. In this context, study investigate whether costs behave asymmetrically to demand change and examine the impact of economic prosperity on cost stickiness during 2008-2010 as well as influence of economic recession during 2011-2013. For this purpose, the following hypotheses have been presented: 1) The cost respond asymmetrically to an equivalent sales change. The increase in costs for a 1% sales increase is different from the decrease in costs for a 1% sales decrease. 2) During the economic prosperity period, the increase in costs is larger than their decrease for a 1% change in demand, that is they are sticky and 3) During the economic recession periods, the decrease in costs is larger than their increase for a 1% change in demand, that is they are anti-sticky.

3.2. Data and Sample Selection

Required data was collected from financial statements, explanatory notes, reports from Tehran Stock Exchange and by visiting the website of Informatics Bourse Company, site of Research Management, Development and Islamic Studies, and site of Tehran Stock Exchange. To analyze data of the research, descriptive and inferential statistics were adopted. For estimation of research models Panel Data method was used and E. views computer software, version 8 have been used for results derivation.

Statistical population includes all companies listed in Tehran stock exchange market during the years 2008 to 2013.

In order to select the sample following criteria have been considered:

- 1) Companies with the same financial period and leading up to the end of the year
- 2) Being active during the time domain between 2008-2013
- 3) Completeness and availability of their data bank from 2008 to 2013
- 4) Having the complete information for financial statements such as balance sheet of profit and loss and cash flow.
- 5) Not being among the intermediary institutions, investments, financial and insurance institutions

According to the above conditions, 100 companies were selected.

3.3. Model Specification

The paper utilizes econometric techniques to test research hypotheses based on Anderson et al.'s (2003) model as follows:

Model (1): SG&A

$$\begin{aligned} \text{Log}(\text{SG}\&A_{i,t}/\text{SG}\&A_{i,t-1}) &= B_0 + B_1 \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ B_2 \times \text{DecDummy} \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ \varepsilon_{i,t} \end{aligned}$$

Model (2): COGS

$$\begin{aligned} \text{Log}(\text{COGS}_{i,t}/\text{COGS}_{i,t-1}) &= B_0 + B_1 \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ B_2 \times \text{DecDummy} \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ \varepsilon_{i,t} \end{aligned}$$

Model (3): OC

$$\begin{aligned} \text{Log}(\text{OC}_{i,t}/\text{OC}_{i,t-1}) &= B_0 + B_1 \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ B_2 \times \text{DecDummy} \times \\ \text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1}) &+ \varepsilon_{i,t} \end{aligned}$$

Where

$\text{SG}\&A_{i,t}$ = selling, general and administrative costs for the firm_i at the time t.

$\text{COGS}_{i,t}$ = cost of goods sold for the firm_i at the time t.

$\text{OC}_{i,t}$ = operating costs for the firm_i at the time t.

$\text{Sales}_{i,t}$ = net sales for the firm_i at the time t.

$\text{Log}(\text{SG}\&A_{i,t}/\text{SG}\&A_{i,t-1})$ = natural logarithm (selling, general and administrative costs in current year divided by the selling, general and administrative costs in prior year).

$\text{Log}(\text{COGS}_{i,t}/\text{COGS}_{i,t-1})$ = natural logarithm (cost of goods sold in current year divided by the cost of goods sold in prior year).

$\text{Log}(\text{OC}_{i,t}/\text{OC}_{i,t-1})$ = natural logarithm (operating costs in current year divided by the operating costs in prior year).

$\text{Log}(\text{Sales}_{i,t}/\text{Sales}_{i,t-1})$ = natural logarithm (net sales in current year divided by net sales in prior year).

DecDummy = dummy variable that takes the value of 1, and if the current net sales are less than the prior year net sales, it takes the value 0 otherwise.

4. Empirical Results

4.1. Descriptive Results

Descriptive statistics of the variables are shown in Table 1. All variables for the homogenization divided by the asset of beginning of period. Following amounts only provide a general overview of the research data.

As shown in Table 1 the average sales of examined company during the study period is equals to 0.53. It means that sales of sample companies is 0.53 of their assets. The Median of sale is 0.49 which data shows that half of data is less than this amount and other half are greater than this. The standard deviation shows that data fluctuation is around the average of 0.123. Among the research variables, 0.865 shows greatest amount.

4.2. The Correlation Coefficient Test

As shown in table 2 there is no severe collinearity between research variables.

4.3. Unit Root Test

Dickey Fuller unit root test results in table 3 show that prob of variables are less than 5% percent and research variables are stationary at first difference.

4.4. Normality Test

The normality test adopted the Jarque-Bera (JB) Test of Normality. As shown in table 4 the residuals are also normally distributed as Jarque-Bera test of normality fails to reject the null of normally distributed residuals.

Table 1. Descriptive statistics

	Sales	COGS	SG&A	OC
Mean	0.532	0.301	0.110	0.133
Median	0.490	0.300	0.101	0.122
Maximum	0.865	0.654	0.331	0.552
Minimum	0.220	0.110	0.092	0.103
Std. Dev.	0.123	0.100	0.090	0.098
Observations	600	600	600	600

Source: author calculations

Table 2. Correlation coefficients

	LOGSales	LOGCOGS	LOGSG&A	LOGOC	DecDummy LOGSales
LOGSales	1.000	0.598	0.067	0.284	0.711
LOGCOGS	0.598	1.000	0.120	0.339	0.478
LOGSG&A	0.067	0.120	1.000	0.063	0.045
LOGOC	0.284	0.339	0.0630	1.000	0.290
DecDummy LOGSales	0.711	0.478	0.045	0.290	1.000

Table 3. Unit Root Test Result

Variables	ADF stats	Prob	Results
LOGSales	232	0.000	I(1)
LOGCOGS	320	0.000	I(1)
LOGSG&A	200	0.000	I(1)
LOGOC	286	0.000	I(1)

Table 4. Normality Test

Models	JB stats	Prob
Model 1 (2008-2013)	2.321	0.110
Model 2 (2008-2013)	1.865	0.321
Model 3 (2008-2013)	2.090	0.198
Model 1 (2008-2010)	1.991	0.201
Model 2 (2008-2010)	1.930	0.232
Model 3 (2008-2010)	2.000	0.200
Model 1 (2011-2013)	2.131	0.148
Mode 2 (2011-2013)	1.891	0.303
Model 3 (2011-2013)	2.100	0.195

5. Hypotheses Results

5.1. First Hypothesis

To confirm the suitability of panel data method, we have used Chow and Hausman tests. Table 5 shows the result of Hausman test. Results shows that significance level of F statistics is less than 5 percent. Hence, H0 hypothesis rejected and based on Chow and Hausman tests, Fixed Effects Model must be used for model estimation.

Table 6 briefing the results of three models regression analysis for the total study period of 2008-2013. According to analysis of the model (1), Adjusted R^2 is 0.20 which implies that about 20 percent of the total variations in SG&A costs are explained by the model while the remaining 80 percent is caused by other factors. Meanwhile, the Durbin Watson statistic suggests that there is no evidence of autocorrelation.

Table 6 reveals that the coefficients β_1 and β_2 are statistically significant at the 5% level. The coefficient of β_1 suggesting that 1 percent increase in sales leads to 0.32 percent increase in general, administrative and sales costs. The coefficients β_2 is negative and statistically significant at - 0.20 which indicates that if sales will be decreased by 1 percent general, administrative and sales costs will decrease by 0.20 percent. Also, the results show that $\beta_1 + \beta_2 < \beta_1$, it means that 1 percent decrease in sales leads to 0.12 percent decrease in general, administrative and selling costs. Therefore the result of model (1) is in accordance with the first study hypothesis.

The analysis of the model (2) reveals that the coefficients β_1 and β_2 are statistically significant at the 5% level. The coefficient of β_1 shows that 1 percent increase in sales leads to 0.63 percent increase in COGS. The coefficients β_2 is negative and statistically significant at - 0.15 which indicates that if sales will be decreased by 1 percent, cost of goods sold will decrease by 0.15 percent. In addition, results suggesting that the sum of both coefficient is 0.48 which indicates 1 percent decrease in sales leads to 0.48 percent decrease in cost of goods sold. Moreover, Adjusted R^2 is equal to 0.25 and Durbin Watson statistic shows that there is no evidence of autocorrelation. Thus the result of model (2) is in accordance with the first research hypothesis.

Based on analysis of the model (3), the coefficient of β_1 and β_2 are 0.25 and -0.17 respectively and both of them are statistically significant. $\beta_1 + \beta_2$ is less than β_1 which suggesting that 1 percent decrease in sales leads to 0.08 percent decrease in OC. Adjusted R^2 is 0.17 and Durbin Watson statistic indicate that there is no evidence of autocorrelation. Therefore, the result of model (3) is in accordance with the first study hypothesis. Briefly, the regression results of three models reveal that the behavior of all three costs, SG&A, COGS and OC were sticky. Thus, the regression results of three models confirm the first research hypothesis.

5.2. Second Hypothesis

We have used Chow and Hausman tests to confirm the

suitability of panel data method. The results of these tests are presented in Table 7 Results show that significance level of F statistics is less than 5 percent. Hence, H0 hypothesis rejected and based on Chow and Hausman tests, Fixed Effects Model must be used for model estimation.

Table 8 depicts a summary of the results of three models regression analysis during prosperity period (2008-2010). The evaluated regression model (1) shows that the adjusted coefficient of determination comes to 0.24 and there is no problem in autocorrelation of residuals, because of the calculated value of Durbin Watson is equal to 2.03. The coefficient β_1 has anticipated positive and statistically significant influence on dependent variable and the coefficient β_2 is also statistically significant and its negative sign is in accordance with sticky cost theory. The estimated value of β_1 of 0.25 indicates that 1% increase in sales leads to 0.25% increase in SG&A costs. The coefficient β_2 is negative and statistically significant at - 0.10 which indicates that if sales will be decreased by 1%, SG&A costs will decrease by 0.10%. The combined value of $\beta_1 + \beta_2 = 0.15$ suggests that 1% decrease in sales leads to 0.15% decrease in SG&A costs. Therefore, the result of model (1) is in accordance with the second study hypothesis during prosperity period.

The examination of model (2) reveals that the coefficient β_1 is positive and statistically significant and the coefficient β_2 is also statistically significant and negative sign. The estimated value of $\beta_1 = 0.38$ indicates that 1% increase in sales leads to 0.38% increase in COGS. The coefficient β_2 is negative and statistically significant at - 0.21 which indicates that if sales will be decreased by 1%, COGS will decrease by 0.21%. The combined value of $\beta_1 + \beta_2 = 0.17$ suggests that 1% decrease in sales leads to 0.17% decrease in COGS. Moreover, Adjusted $R^2 = 0.26$ and Durbin Watson statistic shows that there is no evidence of autocorrelation. Thus, the result of model (2) is in accordance with the second study hypothesis during prosperity period.

The analysis of the model (3) indicates that Adjusted R^2 is 0.18; it means that about 18% of the total variations in OC are explained by the model while the remaining 82 percent is caused by other factors. The Durbin Watson statistic also shows that there is no evidence of autocorrelation. In addition, the coefficients β_1 and β_2 are statistically significant at the 5% level. The coefficient of β_1 reveals that 1% increase in sales leads to 0.37% increase OC. The coefficients β_2 is negative and statistically significant at - 0.16 which indicates that if sales will be decreased by 1%, OC will decrease by 0.16% percent. Also, the results show that $\beta_1 + \beta_2 < \beta_1$, it implies that 1% decrease in sales leads to 0.21% decrease in OC. Thus, the result of model (3) is in accordance with the second study hypothesis. In summary, the regression results of three models during prosperity period reveal that the behavior of all three costs, SG&A, COGS and OC were sticky. Thus, the regression results of three models confirm the second study hypothesis.

5.3. Third Hypothesis

To confirm the suitability of panel data method we have used Chow and Hausman tests. The results of these tests are presented in Table 9. Results show that significance level of F statistics is less than 5 percent. Hence, H0 hypothesis rejected and based on Chow and Hausman tests, Fixed Effects Model must be used for model estimation.

Table 10 sum up the results of three models regression analysis during recession period (2011-2013). The evaluated regression model (1) shows that β_1 and β_2 are positive, statistically significant and sum of β_1 and β_2 is greater than β_1 which is in accordance with third study hypothesis. Further, results show that 1% increase in sales leads to 0.23% increase in SG&A costs but decrease by 0.33% respond to 1% decrease in sales which confirm anti-stickiness behavior of cost.

Table 10, regarding to model (2) shows that coefficients β_1 and β_2 are statistically significant and positive in

recession period. COGS behave anti-sticky with $\beta_1 + \beta_2 > \beta_1$ in economic recession. In addition, Adjusted $R^2 = 0.27$ which implies that about 27% of the total variations in COGS are explained by the model while the remaining 73% is caused by other factors. Meanwhile, the Durbin Watson statistic suggests that there is no evidence of autocorrelation. Thus, the result of model (2) is also in accordance with the third study hypothesis during recession period.

Table (10) also shows results of the model (3) analysis during recession period. The coefficients of β_1 and β_2 are positive and statistically significant. Moreover, $\beta_1 + \beta_2 > \beta_1$ which implies that OC decrease by 0.33% when sales decrease by 1% which indicates that OC behave anti-sticky in economic recession. Therefore, the result of model (3) is consistent with the third study hypothesis during recession period. As a result the regression results of three models confirm the third study hypothesis.

Table 5. Chow and Hausman Test

Models	Chow Test		Hausman Test	
	Statistics	Significance level	Statistics	Significance level
Model (1) SG&A	2.45	0.000	1.98	0.003
Model (2) COGS	2.32	0.004	2.55	0.002
Model (3) OC	1.98	0.002	2.43	0.000

Table 6. Results of panel data regression analysis

Model	B0	B1	B2	B1+B2	Adjusted R^2	F-statistic	Durbin-Watson
Model (1) SG&A	0.000*(0.34)	0.000*(0.32)	0.003*(-0.20)	0.12	0.20	32.55(0.000)	2.04
Model (2) COGS	0.000*(0.12)	0.000*(0.63)	0.000*(-0.15)	0.48	0.25	241.97(0.000)	2.06
Model (3) OC	0.034*(0.32)	0.000*(0.25)	0.000*(-0.17)	0.08	0.17	69.96(0.000)	2.08

Note:*Significant at 5%

Table 7. Chow and Hausman Test

Models	Chow Test		Hausman Test	
	Statistics	Significance level	Statistics	Significance level
Model (1) SG&A	2.17	0.002	2.65	0.000
Model (2) COGS	1.99	0.003	2.00	0.002
Model (3) OC	2.10	0.000	1.98	0.003

Table 8. The regression results of cost behavior during the prosperity period

Model	B0	B1	B2	B1+B2	Adjusted R^2	F-statistic	Durbin-Watson
Model (1)SG&A	0.008*(0.12)	0.000*(0.25)	0.002*(-0.10)	0.15	0.24	25.89(0.000)	2.03
Model (2) COGS	0.005*(0.13)	0.000*(0.38)	0.000*(-0.21)	0.17	0.26	43.97(0.000)	1.98
Model (3) OC	0.043*(0.13)	0.000*(0.37)	0.005*(-0.16)	0.21	0.18	6.872(0.000)	2.05

Note:*Significant at 5%

Table 9. Chow and Hausman Test

Models	Chow Test		Hausman Test	
	Statistics	Significance level	Statistics	Significance level
Model (1) SG&A	1.98	0.001	2.43	0.000
Model (2) COGS	1.95	0.002	2.32	0.000
Model (3) OC	1.93	0.001	2.56	0.000

Table 10. The regression results of cost behavior during the recession period

Model	B0	B1	B2	B1+B2	Adjusted R^2	F-statistic	Durbin-Watson
Model (1) SG&A	0.005*(0.15)	0.002*(0.23)	0.006*(0.10)	0.33	0.24	30.17(0.000)	1.87
Model (2) COGS	0.000*(0.23)	0.000*(0.21)	0.004*(0.10)	0.31	0.27	28.97(0.000)	1.89
Model (3) OC	0.003*(0.15)	0.001*(0.24)	0.032*(0.09)	0.33	0.20	25.00(0.000)	1.89

Note: *Significant at 5%

6. Conclusions

This study aims to examine the effects of economic growth on cost stickiness of companies in Tehran Stock Exchange. During 2008-2013, findings indicate that all costs studied, SG&A, COG and OC behave asymmetrically to demand change where all three costs were sticky. Thus, the regression results of three models confirm the first research hypothesis.

The results of the research hypotheses tests are in line with many recent studies on cost-stickiness. For example, Anderson et al., 2003, and Calleja et al., 2006, in recent years, have shown that the increase in costs during an increase in activity level is greater than the reduction in costs when the volume of activity is reduced. Also, Weiss (2010) showed that if sales revenue increased by 15%, costs would increase by 10%, but if the same sales revenue dropped by 15%, the costs would fall by less than 10%. In such a situation, the behavior of costs will be sticky. These results are consistent with our research findings. Our research shows that with the increase in sales, company costs have increased, but with such a decrease, such a decrease is not observed; in other words, cost behavior is not symmetric and has a stickiness. The results of our research are also consistent with the results of Namazi and Davanipour (2010), Namazie et al. (2012), Kordestani and Mortezaei (2012); they showed that administrative, general, and sales costs are sticking.

In this study, we examined the impact of economic conditions, that is, we examined whether the prosperity and economic recession could affect managers' decisions. Findings for the prosperity period (2008-2010) also reveal that the behavior of all three costs, SG&A, COGS and OC were sticky. Therefore, the regression results of three models affirm the second study hypothesis. In addition, findings for the recession period (2011-2013) show that all three costs, SG&A, COGS and OC behave anti-sticky. Thus, the result of three models is consistent with the third study hypothesis in economic recession. As a result, the regression analysis results confirm the three study hypothesis. Further, findings indicate that costs are more stickiness in prosperity period as compared to recession period. This may be caused from it during the economic prosperity managers believe that the decline in demand is temporary, but increasing demand growth is sustainable; thus costs may experience more stickiness.

The results of our study contradict the results of Kurdistan and Mortazavi (2012), which showed that economic growth has no effect on cost stickiness. But it is consistent with the

results of Ebrahim's research (2015), which examines the impact of economic growth on cost stickiness in Egypt. According to the results of the hypothesis testing, it is suggested to investors and shareholders that getting familiar with the concept of cost stickiness and pay attention to them in decision making. Because, according to the results, companies that have high cost stickiness, when their sales are reduced, their costs change less than time of increasing sales, which, from the point of view of investors and shareholders, will be considered as weaknesses in management, while one of the most important reasons for cost stickiness is to bear current costs in order to prevent further losses or to make more profit in the future. Managers are also advised when planning and budgeting company activities to anticipate future costs, considering cost stickiness and its severity to provide more comprehensive budgeting and more accurate predictions. Also, auditors and audit firms considering the cost stickiness and the process of changing costs with changes in sales and sales revenue to discover any errors or fraud in the presentation of financial statements. The most important limitations of this research are as follows: first, due to some selective criteria (such as the fiscal year ending in March, the unchanged fiscal year, etc.) in the selection of companies, as well as the incompleteness of the data of some companies, the number of companies surveyed decreased to 100; therefore, the generalization of the results of this research to other companies must be cautious. Second, among the other constraints of this research, the specific feature of semi-experimental research is the lack of control over some of the factors affecting the results of the research, including the effects of variables such as economic factors, the status of the global economy, etc. that are beyond the reach of the researcher and may be effective on results of the research.

REFERENCES

- [1] Anderson M., Banker R., Janakiraman S. (2003), "Are Selling, General, and Administrative Costs Sticky?", *Journal of Accounting Research* 41(1), pp. 47-63.
- [2] Anderson, S. W., and Lanen, W. N. (2007), "Understanding Cost Management: What Can We Learn from the Evidence on Sticky Costs?", Working Paper, Rice University.
- [3] Awad E. A. Ibrahim (2015), "Economic growth and cost stickiness: evidence from Egypt", *Journal of Financial Reporting and Accounting*, 13 (1), pp. 119-140.

- [4] Balakrishnan R. Petersen M. J. Soderstrom, N. S. (2004), "Does Capacity Utilization Affect the Stickiness of Cost?", *Journal of Accounting, Auditing and Finance*, 19(3), pp. 283-299.
- [5] Banker R. D., Chen L. (2006), "Predicting earnings using a model based on cost variability and cost stickiness", *The Accounting Review*, 81(2), pp.285-307.
- [6] Calleja K. Steliaros M. Thomas D. (2006), "A Note on Cost Stickiness: Some International Comparisons", *Management Accounting Research*, 17(2), pp. 127- 140.
- [7] Cannon, J. (2011), "Determinants of Sticky Costs: An analysis of cost behavior using United States air transportation industry data", Working Paper (Iowa State University, Ames, IA).
- [8] Cannon J.N. (2014), "Determinants of "Sticky Costs": An Analysis of Cost Behavior using United States Air Transportation Industry Data", *The Accounting Review*, 89 (5), pp. 1645-1672.
- [9] Chen C., Lu H., Sougiannis T. (2012), "The Agency Problem, Corporate Governance, and the Asymmetrical Behavior of Selling, General, and Administrative Costs", *Contemporary Accounting Research* 29(1), pp. 252—282.
- [10] Kama, I. Weiss D. (2010), "Do Managers' Deliberate Decisions Induce Sticky Costs?", Working Paper, Tel Aviv University.
- [11] Koo, J. (2011), "The effect of earnings management incentives on the asymmetric cost behavior: focusing on loss avoiding, income smoothing and big-bath", *Korean Accounting Review* 36(3), pp. 135-177 [Printed in Korean].
- [12] Kordestani Gh. and Mortezaei M. (2012) "The Impact of Managers' Deliberate Decisions on Costs Stickiness", *Accounting and Auditing Review*, 19 (67), pp.73-90.
- [13] Medeiros, O., R., and Souza Costa, P., "Cost stickiness in Brazilianfirms", http://papers.ssrn.com/sol3/papers.cfm?abstract_id=632365 2004.
- [14] Namazi M., Davanipour I. (2010), "Emperical Evaluation of the Sticky Behavior of Costs in the Tehran Stock Exchange Market", *Accounting and Auditing Review*, 17 (62), pp. 85-102.
- [15] Namazi, M. Ghaffari, M. J. and Fereiduni, M. (2012), "The fundamental analysis of the sticky behavior of costs and cost over the range of changes in the Tehran Stock Exchange", *Accounting Advances*, 2 (4), Autumn and Winter, pp. 151-171.
- [16] Poorzamani Z, Bakhtiary M. R. (2012), "Reviewing the impact of macroeconomic factors on operating cost stickiness in Tehran stock exchange", Islamic Azad University, Tehran Central Branch, Economic Faculty.
- [17] Suberamaniam C., Weidenmier M. (2003), "Additional evidence on the sticky behavior of costs", working paper, Texas Christian university.
- [18] Weiss, D. (2010), "Cost behavior and analysts' earnings forecasts", *The Accounting Review*, 85 (4), pp. 1441-1471.
- [19] Yang, D. H., Lee, Y. T., and Park, K. H. (2005), "Sticky Cost Behavior Analysis of General Hospitals in Korea", *Korean Journal of Health Policy and Administration*, 15(1), pp. 78-96.