
Evaluation of the Influential Factors of Cost Stickiness in Tehran Stock Exchange

Tayebeh Pakzad Mayvan¹, Gholamreza Shojatalab^{2*}, Reza Aghajan Nashtaei³

¹Department of management, Rasht Branch, Islamic Azad University, Rasht, Iran

^{2*}Department of management, Rasht Branch, Institute of Higher Education Kooshyar, Rasht, Iran

³Department of management, Rasht Branch, Islamic Azad University, Rasht, Iran

Received: 10th Jan 2017, Accepted: 23rd Jan 2017, Published: 15th March 2017

Abstract

This study on cost behavior reveals that cost stickiness is a behavioral characteristic of costs in relation with activity change. It indicates that costs increase more when activity rises than they decrease when activity falls by the equivalent amount. This study formulates two main and eight subsidiary hypotheses. To validate them, data of 86 companies listed in Tehran stock exchange was selected using systematic deletion method for a 7-year period, i.e. from 2008 to 2014. Eviews and Minitab were used to assess the hypotheses and to analyze derived data. According to findings, the relationship of the number of employees, the amount of current assets, the amount of fixed assets and the amount of debts with SGA (selling, general and administrative) costs and cost of goods sold is sticky in the studied firms.

Key Words: cost stickiness, sales revenues change

Introduction

The main aim of a commercial firm is to provide its customers with products or services at a given time, to make money and to bear costs with a rational profitability in long-term. Managers need pre-determined costs in planning process in order to be able to forecast profitability. The amount of pre-determined costs can be defined by determining the behavior of such costs to sales revenue. It can be argued, indeed, that by establishing a connection between cost and revenue, the cost change can be identified via sales revenue change.

Awareness of costs behavior to the changes of activity or sales is an important data to be used by managers in the process of making decisions about planning, budgeting, pricing, determining breakeven points and other managerial issues. To assess cost stickiness, one can study and examine that whether the behavior of SGA costs to the changes in sales revenue is significance or not because the latter is a well driver of many costs of the former components. This examination is of high importance. [Namazi and Davanipour, 2010].

Managers need to assess their reasoning about cost stickiness through concentrating on the sensitivity of changes to size decrease. They should increase their firms' capacity in responding to decreased demand for products or services. This assists the

improvement of responding process. By determining cost stickiness, the owners of firms can analyze that whether or not their managers impose costs to the commercial firm [Zanjirdar, Ashtiani & Maddahi, 2014]. This paper tries to analyze the relationship of organizational costs and cost of goods sold with sales revenue and to assess that whether or not the costs are sticky.

Background

Anderson and Lanen [Anderson and Lanen, 2007] found evidences in their study indicating the difference in the intensity of cost stickiness between different industries and between some operational cost components associated with marketing, R&D and wage and salary costs.

Another study evaluated the impacts of a group of factors which are taken in managerial decisions into account including successive incremental or decremental changes of sale, customers' order, analysts' forecasts of sales and GDP growth. According to findings, if the factors imply a high-optimistic forecast of managers, costs will increase more quickly and will decrease with a low speed [Banker et al, 2011].

Another study assessed the influential factors of cost stickiness in the U.S. aerial transportation firms. It concluded that if the final cost associated with the increased capacity during increased demand is higher than the final profit associated with decreased costs due to decreased demand, cost stickiness will be increased. In addition, since price reduction during decreased demand is higher than price increase during increased demand, cost stickiness is severer in the event of decreased demand [Cannon, 2011].

Anderson and Jaimovich [Anderson and Jaimovich, 2012] studied the asymmetric cost behavior in relation with earning change. Their results indicate sticky behavior of costs in the event of introducing economic variables and indices such as inflation and interest rates. Furthermore, the findings of another study revealed that in the absence of profitability motivations, heavy technological limitations result in severer cost stickiness while profitability motivations overcome such technological limitations and result in symmetric cost behavior. In other words, depending on structural motivations, some managerial decisions result in cost stickiness

while some others decrease it [Kama and Weiss, 2013].

A number of national studies have evaluated the stickiness of different costs. According to a study evaluated the casual relationship of sales revenue and cost with cost stickiness in the firms listed in Tehran stock exchange from 1996 to 2004, cost of goods sold, distribution costs and SGA costs are sticky [Ghaemi and Nematollahi, 2006]. They separately studied, in another research, the stickiness of material cost, direct labour cost, production overhead cost and financial cost. According to results, overhead cost is sticky while material cost, direct labour cost and financial cost are not [Ghemi and Nematollahi, 2007].

The evaluation of the effect of different factors on cost stickiness is the subject of a study distinguishing it from other national studies. According to the results of this study, a 10% increase in sale rises SGA costs by 0.65% while a 1% decrease in sale, the same costs decrease by 0.41%. The results revealed that the intensity of cost stickiness is lower within periods before which there was a decrease in revenue where it is higher in firms with a larger ratio of the sum of assets to sale [Namazi and Davanipour, 2010].

The same researchers identified in another study the determinants of cost stickiness in firms. According to their results, SGA cost stickiness become inverse after sale decrease where the decrease in sale in two successive periods decreases the stickiness of cost of goods sold as well as SGA costs in the second period. The higher assets, the higher the costs stickiness of cost of goods sold and SGA costs. However, no evidence was found for the effect of study period, economic growth and the number of employees on cost stickiness [Kordestani and Mortazavi, 2012].

Another study analyzed the stickiness behavior of SGA and product cost as well as the sum of product cost and SGA costs in Tehran stock exchange. According to findings, SGA cost, product cost and the sum of product cost and SGA costs show a sticky behavior. In addition, SGA costs show a sticky behavior for more than 30% change in sales revenue while product cost show a sticky behavior for 10% < change < 30% in sales revenue [Namazi et al, 2012].

Zanjirdar et al analyzed the influential factors of cost stickiness. Their results showed that SGA costs and cost of goods sold are sticky and the former is more sticky. In addition, they showed that a group of indices including the number of employees, the amount of current assets and debt ratio affect the intensity of the stickiness of SGA cost and cost of goods sold where product costs are low sticky in current assets than fixed assets. The awareness of

this properties and their effects on cost behavior can considerably help managers to conduct better analyzes and more comprehensive budgeting [Zanjirdar et al, 2014].

Sepasi et al conducted a study titled “empirical test of cost stickiness, evidences from Tehran stock exchange” and stated that for the same activity rise (1%) the increase in all three cost levels is higher than the decrease in all three cost levels for the same decreased activity (1%). In this way, they argued that cost of goods sold, SGA costs and other operational costs show a sticky behavior in the studied firms. In addition, the results showed that this stickiness is seen in total operational costs [Sepasi et al, 2014].

Another study assessed the effect of cost stickiness and conditional conservatism on the cost analysis, activity size and profitability of firms listed in Tehran stock exchange. Their results revealed that sticky costs affect the standard model for cost analysis, activity size and profitability. In addition, the negligence of conditional conservatism intensifies changes in profit stickiness (decreased profitability). Furthermore, the special attributes of firms affect cost stickiness as well as conditional conservation of the firms and significantly affect cost analysis, activity size and profitability [Kodadadi et al, 2014].

Population and size

The population of this study is all firms listed in Tehran stock exchange accounting to 592 firms. Systematic deletion sampling (screening) was used as sampling method.

Inclusion Criteria

- 1- Firms listed in Tehran stock exchange before 2008, which were active by the end of 2014 (to have a homogeneous population)
- 2- Firms with fiscal year ending to 19 Mars, (to have comparable population and avoid non-homogenous population)
- 3- Firms with available data, including statement of financial position and detailed description notes, during study scope
- 4- Firms with no change in their fiscal year during study scope, with no transaction halt with continuous activity in stock exchange.
- 5- Firms which are not intermediary financial or investment firms (insurances, leasing firms, and banks) In other words, only firms with a direct role in operational activities i.e. production or service activities are studied.

Considering the above inclusion criteria, 86 firms out of 592 firms were selected as the population of this study.

Data collection- method and tool

Data was collected using desk method. Collected data were divided into two classes: the first class covers literature-based data derived and reviewed by referring to desk sources and articles. The second class covers the hypotheses and variables of the study derived from the website of Tehran stock exchange.

Statistical analysis

This is an applied study in terms of objective and a descriptive-correlative study in terms of method. The main aim of this study is to determine the existence and extent of relationship between the studied variables. EVIEWS, MINITAB and Panel Data as well as descriptive statistical techniques and inferential tests, fit to the type of studied data and variables, were used to analyze data and to assess the study hypotheses.

Study variables

Dependent variable

This study considers the stickiness of SGA costs and cost of goods sold as the dependent variable. The dependent variable is affected by independent variable and changes as the independent variables change.

Independent variables:

- ✓ Fixed assets
- ✓ Current assets
- ✓ Amount of debt
- ✓ Number of employees

Variables symbols

- log cost : cost ratio logarithm
- log employ: employee ratio logarithm
- log sale: sale ratio logarithm
- log SGA: SGA ratio logarithm
- log G x1: fixed assets ratio logarithm
- log G x2: debt ratio logarithm
- log G x3: current assets ratio logarithm
- D log sale: virtual variable in sale ratio
- D log sale employ: virtual variable in sale ratio in employee ratio
- C; constant
- B_{0-i} : coefficient of variables
- D: virtual sale variable
- D log sale x1: virtual variable in fixed asset sale to sale ratio
- D log sale x2: virtual variable in sale to sale debt ratio
- D log sale x3: virtual variable in current assets sale to sale ratio

Statistical method for examining the hypotheses and findings of study

Inferential and descriptive analyses results, regression fitness results-subsidary hypothesis 1

$$\log\left(\frac{cost_{i,t}}{coct_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_3 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) \log\left(\frac{employees_{i,t}}{employees_{i,t-1}}\right) + \epsilon_{i,t}$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	0.913807	33.16511	0.0000	Is influential
DLOGSALE	B ₂	-0.023783	-0.484657	0.6281	Is not influential
DLOGSALEEMPLOY	B ₃	-1.109853	-1.449376	0.1478	Is not influential
C	B ₀	0.015165	3.133624	0.0018	-----
Coefficient of determination	79%	F statistics		729.66	
Adjusted coefficient of determination	79%	p-value		0.000	
		Durbin-Watson statistics		2.12	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (2.70) indicates that the whole regression equation is significant. As it can be observed in the bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 12.9% and 5.4%, respectively. It can be argued, therefore, that only about 12.9% of the changes in the stickiness of SGA costs are determined by the mentioned independent and control variables. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on SGA costs stickiness in the studied firms.

Inferential and descriptive analyses results, regression fitness results-subsidary hypothesis 5

$$\log\left(\frac{cost_{i,t}}{coct_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_3 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) \log\left(\frac{employees_{i,t}}{employees_{i,t-1}}\right) + \epsilon_{i,t}$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	0.913807	33.16511	0.0000	Is influential
DLOGSALE	B ₂	-0.023783	-0.484657	0.6281	Is not influential
DLOGSALEEMPLOY	B ₃	-1.109853	-1.449376	0.1478	Is not influential
C	B ₀	0.015165	3.133624	0.0018	-----
Determination coefficient	79%	F statistics		729.66	
Adjusted determination coefficient	79%	p-value		0.000	
		Durbin-Watson statistics		2.12	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (729.66) indicates that the whole regression equation is significant. As it can be observed in the bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 79% and 79%, respectively. It can be argued, therefore, that only about 79% of changes in the stickiness of cost of goods sold are determined by the mentioned independent and control variables. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on the stickiness of cost of goods sold in the studied firms.

Inferential and descriptive analyses results, regression fitness results-subsidary hypotheses 2, 3 and 4

$$\log\left(\frac{SGA_{i,t}}{SGA_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_3 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) * \log\left(\frac{x}{sales_{i,t}}\right) + \epsilon_{i,t}$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	0.057557	1.441439	0.1500	Is not influential
DLOGSALE	B ₂	0.112183	1.310959	0.1904	Is not influential
DLOGSALEX1	B ₃₀	-0.007217	-0.067827	0.9459	Is not influential
DLOGSALEX2	B ₃₁	-0.0194127	-1.074077	0.2832	Is not influential
DLOGSALEX3	B ₃₂	-0.413187	-3.518365	0.0005	Is influential
c	B ₀	0.049358	7.267512	0.0000	--
Determination coefficient	46%	f-value		5.78	
Adjusted Determination coefficient	38%	p-value		0.0000	
		Durbin-Watson statistics		2.41	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (5.78) indicates that the whole regression equation is significant. As it can be observed in the bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 46% and 38%, respectively. It can be argued, therefore, that only about 46% of changes in SGA costs are determined by the mentioned independent and control variables. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on the SGA costs stickiness in the studied firms.

Inferential and descriptive analyses results, regression fitness results-subsidary hypotheses 6, 7 and 8

$$\log\left(\frac{cost_{i,t}}{cost_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) + \beta_3 D * \log\left(\frac{sales_{i,t}}{sales_{i,t-1}}\right) * \log\left(\frac{x}{sales_{i,t}}\right) + \epsilon_{i,t}$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	1.023447	29.03805	0.0000	Is influential
DLOGSALE	B ₂	-0.424245	-4.927846	0.0000	Is influential
DLOGSALEX1	B ₃₀	-0.365290	-3.790346	0.0002	Is influential
DLOGSALEX2	B ₃₁	-0.259006	-1.435072	0.1519	Is not influential
DLOGSALEX3	B ₃₂	-0.297066	-1.740959	0.0823	Is not influential
c	B ₀	0.022899	4.256394	0.0000	--
Determination coefficient	82.5%	f-value		24.32	
Adjusted Determination coefficient	79%	p-value		0.0000	
		Durbin-Watson statistics		2.22	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (24.32) indicates that the whole regression equation is significant. As it can be observed in the bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 82.5% and 79%, respectively. It can be argued, therefore, that only about 82.5% of changes in the stickiness of cost of goods sold are determined by the mentioned independent and control variables in the studied firms. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on the stickiness of cost of goods sold in the studied firms.

Inferential and descriptive analyses results, regression fitness results-main hypothesis 1

$$\log\left(\frac{SGA_{i,t}}{SGA_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{Sales_{i,t}}{Sales_{i,t-1}}\right)$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	0.047394	1.106650	0.0269	Is influential
DLOGSALE	B ₂	0.012845	0.2180182	0.25780	Is not influential
c	B ₀	0.083445	11.22322	0.0000	--
Determination coefficient	11%	f-value		7.45	
Adjusted Determination coefficient	9%	p-value		0.0000	
		Durbin-Watson statistics		2.009	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (7.45) indicates that the whole regression equation is significant. As it can be observed in the

bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 11% and 9%, respectively. It can be argued, therefore, that only about 11% of changes SGA costs are determined by the mentioned independent and control variables. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on the SGA costs stickiness in the studied firms.

Inferential and descriptive analyses results, regression fitness results-main hypothesis 2

$$\log\left(\frac{\text{cost}_{i,t}}{\text{cost}_{i,t-1}}\right) = \beta_0 + \beta_1 \log\left(\frac{\text{Sales}_{i,t}}{\text{Sales}_{i,t-1}}\right) + \beta_2 D * \log\left(\frac{\text{Sales}_{i,t}}{\text{Sales}_{i,t-1}}\right)$$

variable	Coefficient of variable	value of coefficient	t-statistics	Sig.level	
LOGSALE	B ₁	1.009605	29.14296	0.0269	Is influential
DLOGSALE	B ₂	-0.184743	-0.036050	0.25780	Is not influential
c	B ₀	0.023931	4.474427	0.0000	--
Determination coefficient	80.8%	f-value		24.78	
Adjusted Determination coefficient	77.6%	p-value		0.0000	
		Durbin-Watson statistics		2.31	

Regression assumptions were examined and it was assured that they are satisfied. The above table shows the results of regression equation fitness. F-value (24.78) indicates that the whole regression equation is significant. As it can be observed in the bottom of the table, the coefficient of determination and the adjusted coefficient of determination are 80.8% and 77.6%, respectively. It can be argued, therefore, that only about 80.8% of changes in SGA costs are determined by the mentioned independent and control variables. The positive (negative) sign in the values of coefficient column implies the direct (inverse) effect of the variables on the stickiness of cost of goods sold in the studied firms.

Conclusion and Suggestions

The results of this study agree with those of Sepasi et al (2014), Zanjirdar et al (2014), Namazi et al (2012), Ghaemi and Nematollahi (2006), Kent et al (2005), Namazi and Davanipour (2010), Anderson et al (2003), Medrios and Kushta (2004), Benker et al (2010) and Anderson and Anderson and Jaimovich (2012) studies.

According to results, the rejection of some main hypotheses of this study in other studies may root in the differences between samples and industries, no efficacy of Tehran stock exchange and Iranian special exonomic condition in recent years. In some cases, it may root in differences of study time and samples. Relying on the obtained results, the following suggestions are put forward:

- Considering the confirmation of the main hypotheses of the study approving that SGA costs

and cost of goods sold are sticky, managers are suggested to take cost stickiness and its intensity into account in the process of planning and budgeting firms activities for forecasting future costs in order to deliver a more comprehensive budgeting and more accurate forecasting.

- Auditors and auditing institutes are suggested to discover any fraud or fault in financial statements considering cost stickiness and the change of cost with the rate of changes in sales revenue.

- The effect of macro-economic factors, including inflation and GDP growth, on cost stickiness should be studied.

- Cost stickiness should be studied separately for service, business and production firms or by separating special industries.

- The indices of agency theory and the effects of items such as the number of non-executive board members, percentage of governmental organizations share, the percentage of the first major shareholder share and the amount of managers' share on cost stickiness should be studied.

References

- Anderson , E. Jaimovich , N. (2012) , Asymmetric Cost Behavior , Recent Researches in Business, 102 (9) : 152.
- Anderson S, Lanen W, (2007) , Understanding Cost Management : What Can We Learn from the Evidence on Sticky Cost? Working Paper , Rice University , University of Michigan.
- Banker R, Ciftci M, Mashruwala R.(2011) .Managerial Optimism and Cost Behavior. Working paper, Temple University.
- Ghaemi, Mohammadhosein, and Nematollahi. Masume, (2006), "evaluation of distribution, SGA and cost of goods sold costs in the production firms listed in Tehran stock exchange", Accounting studies, No. 16, pp: 71-89
- Ghaemi, Mohammadhosein, and Nematollahi. Masume, (2007), "behavior and structure of operational and financial costs in firms listed in Tehran stock exchange", Accounting knowledge, No. 22, pp: 16-29
- Kama , I and D . Weiss (2013)." Do earnings Targets and Managerial Incentives Affect Sticky Costs?" Journal of Accounting Research, 51(1):201-224.
-
- Khodadadi, Vali and Nikkar, Javad & Hajizade, Saeid (2015), "effect of sticky behavior of costs and conditional conservativeness on cost analysis, activity size and profit", journal of advanced accounting, Shiraz University, period 7, No. 1, spring and summer 2015, pp: 49-76
- Kordestani, Gholamreza, and Mortazavi, Seyyed Morteza, (2012), "identification of the determinants of cost stickiness in firms" financial accounting studies, No. 3, pp: 13-32

10. Namazi, Mohammad, Ghaffari. Mohammadjavad, Feridooni. Marzie, (2012), “fundamental analysis of sticky behavior of costs and product cost emphasizing the amplitude of changes in Tehran stock exchange”, Accounting advances, Shiraz University, period 4, No. 2, fall and winter 2012, pp: 151-177
11. Namazi. Mohammad, Davanipour. Iraj, (2010), “empirical study of cost stickiness behavior in Tehran stock exchange”, accounting and auditing studies, No, 62, pp: 85-102
12. Sepasi, Sahar and Zahra Fathi, Sakine Shibe (2012), “examination of cost stickiness, evidences from Tehran stock exchange”, accounting empirical studies, No 12, pp: 163-177
13. Zanjirdar, Majid, Peiman ghaffari Ashtiani and Zahra Maddahi (2014), “analysis of the influential factors of cost stickiness”, Management ccounting research and scientific quarterly, No. 20, pp: 79-91
- 14.