Effect of intensity of cost stickiness on stock price volatility as the role of accounting conservatism

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Abstract

Managers need the related information about costs to plan and achieve it. On the other hand, awareness about costs behavior by changes of the activity level or selling level are important information for managers' decision making about planning, budgeting, pricing products, determining of break even, and other managerial issues. The relationship between costs stickiness and stock price volatility and adjusting role of conservatism was studied in Tehran stock Exchange in this research. Statistical population and sample of this research includes 93 companies in seven years of 2009-2015. This research was applied based on its objective, and data collection method (research design) was descriptive. Hypotheses of this research were test using combined and rolling regression method. There is not a significant relationship between cost stickiness and stock price volatility based on research results, but there is a positive and significant relationship between cost stickiness in companies with high conservatism and stock price volatility.

Keywords: cost stickiness intensity, accounting conservatism, stock price volatility

Introduction

Managers must be aware of costs behaviors. It means cost changes. Cost behaviors refer to the costs reaction against change in activity level and other factors. Some hypotheses claim that costs react differently in ratio of descending and ascending changes of activity level. This characteristics makes them to be called sticky costs that this hypothesis challenge one of the initial management accounting hypotheses based on costs changes in relationship with increase and decrease in activity level. Cooper and kaplan fundamental hypothesis stats about making costs stickiness that managed sign contracts to supply resources which breaking is costly. Therefore, manager may decide to protect their used resources so company may reports income decrease, but costs don't decrease with the same ratio in income decrease. Thus, if costs increase size in activities increased time is more than their size decrease in activities decrease time, costs are called sticky. Companies with higher cost stickiness have more profit decrease while activities level decrease than companies with lower cost stockiness, because more sticky costs lead to adjust costs less in activities decrease which finally decreases profit more, this question is asked to know whether manager reports fewer profit for their costs stickiness and intends to break the accounting conservatism principle to compensate the profit decrease by it or not.

Literature and research background

Hutton et al (2009) believe that if there is not full transparency in financial reporting, managers intend to hide a part of losses to protect their jobs, this process, non-divulging, continues to that managers' presence in the company a great part of stored hidden loses inter to the market leading to stock price volatility after that manager leaves the company. In addition, in non-transparent reporting environment, investors are not able to identify and discover loss-making projects. Disability of investors in profitable and loss-making projects distinguishing in the initial steps make the losing projects continue and their losing increase gradually. The negative return of these projects accumulates inside the company chronically and stock price will fall whenever the related information is disclosed. The amount of negative accumulated information is different in various companies. Cost stickiness is one of the cost behavior characteristics than activity level

changes and shows the increase size in costs while increasing in activity levels is bigger than cost decrease size while decreasing in activity levels. Cost stickiness happens when companies are obliged to tolerate costs adjustments for demand return to the initial condition because of asymmetrical differences in resources adjustment (Zanjirdar et al., 2014).

Managerial motivation is made from shareholders wealth sensitivity to changes in price and ordinary stock price volatility. Stock price sensitivity may lead to the risk managerial procedures. However, price volatility sensitivity is not the same and may lead to selection of low risk managerial procedures. Cost stickiness may make an interesting opportunity to study structures of these motivations. Cost stickiness let us to study the relative level of stock price and stock price volatility sensitivity by the assumption of cost stickiness, and even the effect of this stickiness is tested on financial procedures and production policies of that company. It is expected cost stickiness to have great effects on market stock price volatility and decrease market stock price. The aim of this research is studying the adjusting role of accounting conservatism on market stock price volatility.

Yasukata and Kajiwara (2011) proposed two hypotheses of conscious decision making and delay in costs adjustment as two main reasons of costs stickiness. Based on conscious decision making hypothesis, costs stickiness is the result of correct decisions of managers. Anderson et al. (2003) stated that cost stickiness happens because managers adjust related resources with functional activities wisely. When managers predict selling decrease temporary and expect selling return to the previous level, properly resources removal by selling decrease and regaining it in future increase costs and consequently decrease profit in long-term. In contrary, although protecting extra resources in the selling decrease periods imposes more costs and consequently decreases profit in the current period, it decreases costs and increases profit in long-term. In addition, if managers decrease the related resources to the operational activities in proportion with selling decrease, regaining and re-preparation of resources in future needs time (Hashemi et al., 2014).

Therefore, if resources and consequently costs decrease in proportion with selling decrease, that company loses the opportunities of its selling development, because it can't use opportunities to develop its selling with a proper speed. This, mangers have to select one choice from costs decrease by resources removal or tolerating more costs to utilize

future selling increase fully, and one of the most principal reasons of costs stickiness is mangers wisely decision making who try to increase profit in long-term by prediction of future selling (Ghasem bolu et al., 2012).

Rajiv D. Banker et al (2016) in a research under the title of "unpleasant effect of cost stickiness on conservatism estimations" studied the effect of more selling on profit than its decrease (because of cost stickiness). They found that controlling a part of linear effects of changes in selling amount in timely asymmetrical standard models can decrease timely asymmetry significantly. Furthermore, this control will change the mean conservatism level and conservatism absolute sectional changes. The accuracy of their tests proved that selling asymmetrical changes is different and distinct from conditional conservatism and adjusted and agreed with costs stickiness.

Awad Elsayed Awad Ibrahim, Amr Nazieh Ezat (2017) in a research under the title of stick costs behavior from Egypt concluded that using corporate governance can influence on selling growth and cost stickiness as though the sticky costs change into non-sticky costs after using corporate governance.

Banker et al. (2013) believe that cost stickiness and conditional conservatism led to asymmetry of cost analysis model, activity volume, and standard benefit, they also believe that this asymmetry in companies with high assets volume and more employees is higher, and in bigger size companies it is smaller.

Weiss (2010) who studied the cost behavior and analysts profit prediction showed that precision in analysts profit in companies with less cost stickiness is fewer, and cost stickiness influences on analysts priorities and investors ideas about companies' value.

Por porato and Werbin (2010) in a research studied costs stickiness among Argentinian, Brazilian, and Canadian banks. Thierer results showed that one percent increase in income increase banks costs in Argentinian, Brazilian, and Canadian banks 0.6, 0.82, and 0.92, respectively. However, one percent decrease in income decreases banks costs in Argentinian, Brazilian, and Canadian banks 0.38, 0.48, and 0.55, respectively. They found that banks with the maximum cost increase in selling improvement conditions will have the maximum decrease in selling decrease, too.

Homburg and Nasev (2010) studied the effect of cost stickiness on time symmetry of profit by emphasis on the relationship between cost stickiness and conditional

conservatism. Results of their research show that cost stickiness increased time symmetry by making weakness in timely profit time for companies with positive news. On the other hand, it intensifies timely profit fir companies with negative news. In addition, the obtained results showed that profit time asymmetry for companies with cost stickiness is more strongly reinforced by the reflected accounting factors in accrual items than non-accounting factors in cash flows.

Costs become sticky because selling decrease and costs speeds can't be similar. This hypothesis states that the intensity of cost stickiness in short-term is more than long-term, and cost stickiness decreases in long-term, and cost volatilities get close to selling volatilities. Therefore, this hypothesis claims that cost stickiness is not a conscious and aware action by managers but costs intrinsically can't decrease by selling decrease the same as selling increase in short-term, and this matter is adjusted in long-term (Nik Kar and Hajizadeh, 2014).

Khodadadi et al (2016) believe that ignoring conditional conservatism intensifies changes in cost stickiness (profit level decrease), and specific characteristics of companies influence on cost stickiness behavior and conditional conservatism which significantly influence on cost analysis, activity volume, and profit. Zanjirdar et al (2014) research shows that public, administrative, and selling costs and also the target price of the sold goods are sticky, and stickiness intensity is very high in the target price of the sold goods, and indexes such as number of employees, current assets of company, debt ratio influence on the public, administrative, and selling costs and also target price of sold gods, while stickiness of the target price in current assets us less than fixed one, and recognition of these characteristics and their effect on cost behavior can have significant role for managers in better analysis and more comprehensive budgeting.

The obtained results from Hashemi et al (2014) research show that conservatism decreases after controlling cost stickiness. It means a part of time asymmetry model is resulted by cost stickiness. Moreover, results show that there is a positive and significant relationship between information asymmetry and cost stickiness which decreases the effect of information asymmetry on conditional conservatism.

Esmaeilzadeh and Mehrnoosh (2013) research results show that increase in public, administrative, and selling costs decrease total cost and target cost of the old goods, profit prediction, and profit quality.

Bahar Moghaddam and kavoosi (2013) believe that both conservatism and cost sickness simultaneously exist in the listed companies in stock exchange. In addition, if cost stickiness is ignored while estimation of conditional conservatism, the measured conservatism will be more than the estimated amount.

It is tried in this research to study whether managers in companies with high cost stickiness have any motivation to break the principle of accounting conservatism to prevent market price decrease or not?

Hypotheses

There is a significant relationship between cost stickiness and market price volatilities.

Accounting conservatism influences on the relationship between cost stickiness and market price volatilities.

Methodology

This research is classified as applied based on its objective. The objective of this applied research is development of the applied knowledge in a specific field. Moreover, this research is correlative based on methodology and nature. The objective of tis research is determination of relationship among variables. Therefore, proper indexes were selected based on variables measuring scales. Data measurement scales is relative scale. The relative scale measures highest and the most precise level. This scale has both other scales characteristics and absolute zero. Methodology id inductive in which theoretical bases and research background were collected by librarian method, articles, and internet, and inductive reasoning was used to reject or confirm hypotheses using proper statistical methods. Therefore, research was conducted in inductive-deductive reasoning framework. It means librarian method, other websites, and articles were in deductive reasoning and collected data to reject or confirm hypotheses was in inductive reasoning framework.

Statistical population and sample

Statistical population of this research is all listed companies in Tehran Stock Exchange in 2009-2015. The following conditions were used to select the statistical sample for the

extension of the statistical population volume and some inconsistencies among population members:

1- The active companies in Tehran Stock Exchange whose related data is accessible for 2009-2015.

2- Companies that are not investing, holding, and broker, and insurance companies.

3- Companies whose financial year ends to the last month of winter.

4- Companies whose trademarks don't not have more than 6 months of trading interruptions.

The experimental data was extracted by www.codar.ir website and based on the audited financial statements data. Since the obtained results from sample after data collection and related computations can be generalized to the research population (movement from detail to total), the methodology is inductive. This research is post-event based on time, because data of previous years was studied and applied based on objective. Data analysis method is correlative by regression analysis method. Moreover, this research is descriptive which describes the relationships among variables using statistical tests.

Operational definition of research models and variables

Independent variables

Cost stickiness intensity: Anderson et al (2003) model was used to show it, and also other researchers have used it to evaluate costs behaviors toward selling level changes in income increase and decrease periods individually.

$$log\left[\frac{SGA_{i,t}}{SGA_{i,t-1}}\right] = \beta_0 + \beta_1 log\left[\frac{sales_{i,t}}{sales_{i,t-1}}\right] + \beta_2 * decrease\_dummy_{i,t}$$

$$* log\left[\frac{sales_{i,t}}{sales_{i,t-1}}\right] + \varepsilon_{i,t}$$

$SGA_{i,t}$ = administrative, public, and selling costs of ith company in period t.

$sales_{i,t}$ =net selling of ith company in period t.

$decrease\_dummy_{i,t}$ اگر $= sales_{i,t} > sales_{i,t-1}$ is 1; otherwise, 0.

Since the studied population includes various companies ibn al type of industries in different sizes, sing this model based on relative and logarithmic indexes increases comparability among companies and equalizes the estimated coefficients interpretations. Since the value of variable $decrease\_dummy_{i,t}$ is zero while income increase, β_1

coefficient shows one percent increase in administrative, public, and selling costs because of 1% increase in selling income. Furthermore, $decrease\_dummy_{i,t}$ variable coefficient is 1 while income decrease, $\beta_2+\beta_1$ total coefficiets shows decrease percent in administrative, public, and selling costs. If administrative, public, and selling costs are sticky, costs increase percent in income increase periods must be more than cost decrease in income decrease periods. In other words, $\beta_1 > 0$ and $\beta_2 < 0$. In this model, β_2 shows cost stickiness.

Accounting conservatism: conservatism of ith company in year t is calculated by Givoly and Hayn (2000) model using the following formula:

$$\textbf{conversatism index} = \frac{\textbf{\textit{operationaal accrual items}}}{\textbf{\textit{sum of assets in thee virst period}}} * (-1)$$

Dependent variables:

Stock price volatilities: changes in stock market price are obtained by the difference of market price of each year from the previous year:

$(P_{it} - P_{it-1}) = \Delta P$

ΔP: stock price volatility

P_{it}: stock market price of ith company in year t

Control variables

$SIZE_{i,t}$: company's size that is obtained from market value logarithm.

$Leve_{i,t}$: company's financial leverage that is obtained by division of total debts to total assets.

$MtB_{i,t}$: companies' market value to their book value.

SG: selling growth that is obtained by division of annual difference of this and previous year on selling of the future year.

ROA: is return of assets which is obtained from division of divided net benefit to total assets.

Research models

The following regression model was used to test the first main hypothesis:

Model 1:

The following regression model was used to test the second hypothesis:

Model 2:

Data descriptive statistics

Table (1) shows the descriptive statistics of research variables in the studied period. The descriptive statistics of research variables was measured using company's data in 2009-2015 including mean, middle, standard deviation, min, max, skewness, and kurtosis.

Table (1): descriptive statistics of research variables

Variable	Maen	Median	St. Dev	Min	Max	Skewness	Kurtosis
CONSER	0.568	1.000	0.496	0.000	1.000	-0.276	1.076
LEV	0.623	0.609	0.229	0.227	1.094	0.272	2.452
MTB	1.792	1.534	1.490	-0.821	5.313	0.646	3.107
PΔ	0.221	0.020	0.716	-0.663	2.111	1.269	4.000
ROA	0.100	0.084	0.135	-0.411	0.615	0.425	4.572
SG	0.141	0.121	0.310	-0.389	0.851	0.451	2.898
SIZE	5.714	5.617	0.811	4.015	8.192	0.722	3.508
STICKY	0.329	0.358	0.113	-0.086	0.420	-2.553	9.716

For example, mean, middle, standard deviation, min, and max are 0.10, 0.08, -0.13, 0.41, 0.61, 0.42, and 4.57 respectively for company's return on assets. Since mean of ROA is more than its middle, ROA distribution in statistical sample has skewness toward right side. Similarly, descriptive statistics of other variables can be extracted from table (1).

Table (2): correlation among research main variables

	CONSER	LEV	MTB	ΔP	ROA	SG	SIZE	STICKY
CONSER	1.00							
LEV	0.10	1.00						
MTB	-0.13	-0.21	1.00					
ΔP	-0.18	0.17	0.24	1.00				
ROA	-0.31	-0.51	0.41	0.16	1.00			
SG	-0.25	-0.11	0.15	0.28	0.32	1.00		
SIZE	-0.18	-0.27	0.36	0.19	0.41	0.15	1.00	
STICKY	0.09	-0.06	0.02	0.00	0.05	-0.01	-0.07	1.00

Table (2) shows the correlation among research main variables, if coefficients are positive, it is concluded that the correlation among variables is positive and vice versa. For example, correlation coefficient between selling growth and company's size is 0.15, while correlation coefficient between selling growth and cost stickiness is -0.01.

Therefore, correlation coefficient and its significance for the other variables can be observed in table (2). If correlation coefficient is between 0-0.25, correlation is weak, if it is between 0.25-0.5, correlation is medium, if it is between 0.5- 0.75, correlation is relatively strong, and if it is between 0.75- 100%, correlation is very strong.

Inferential statistics

Determination of proper model to estimate regression model

Regarding to research literature and the nature of research hypotheses, combined data was used in this research. Therefore, Chow Hausman test has been used to test hypotheses in order to determine combined or panel data with fixed or random effects. Regression model as table (3) is used to test hypotheses.

Table (3): the related regression models to each hypothesis

Hypnosis	Regression equation
H_1	$\Delta P_{it} = \beta0 + \beta1\ COSTSTICKY_{it} + \beta2\ SIZE_{it} + \beta3\ LEV_{it} + \beta4\ MtB_{it} + \beta5\ ROA_{it} + \beta6\ SG_{it} + \varepsilon_{it}$
H_2	$\Delta P_{it} = \beta0 + \beta1\ STICKY_{it} + \beta2\ CONSER_{it} + \beta3\ COSTSTICKY_{it}*CONSER + \beta4\ LEV_{it} + \beta5MTB_{it} + \beta6\ ROA_{it} + \beta7SG_{it} + \beta8\ SIZE_{it} + \varepsilon_{it}$

The obtained results from research regression models fitting

After testing regression hypotheses and their confirmation, the obtained results from regression equation is stated as following:

Table (4): obtained results from regression equation fitting of the first hypothesis

Variable name	Variable coefficient	Coefficient value	Statistics t	P-value	VIF
β_0		-0.35	-1.63	0.10	–
STICKY	β_1	0.07	1.35	0.32	1.06
LEV	β_2	0.22	1.99	0.04	1.31
MTB	β_3	0.07	4.35	0.00	1.03
ROA	β_4	-0.14	-2.03	0.02	1.48
SG	β_5	0.47	5.91	0.00	1.08
SIZE	β_6	0.04	2.20	0.00	1.25
R2	0.37	Statistics F (P-value)		31.72 (0.000)	
R2*	0.36	Durbin-Watson statistic		2.25	
		Number of observations		651	
Statistics (J-B) (P-value)	3.67 (0.16)	White Statistics (P-value)		2.39 (0.00)	

F-value id 31.72 shows the significance of total regression model. As it is indicated at the end of table, determination coefficient and moderated determination coefficient for the mentioned model were obtained 37% and 36%. Therefore, it is concluded that only 36% of stock price changes for the studied companies is determined by the mentioned control and independent variable. In this table, positive (negative) numbers in coefficients column show direct (reverse) effect of each variable on stock market price volatility.

Table (5): obtained results from regression equation fitting of the second hypothesis

Variable name	Variable coefficient	Coefficient value	Statistics t	P-value	VIF
β_0		-0.22	-1.00	0.31	
STICKY	β_1	0.05	1.00	0.32	1.62
CONSER	β_2	-0.14	-2.21	0.00	2.46
CONSTICKY	β_3	0.08	1.97	0.03	2.96
LEV	β_4	0.21	1.96	0.03	1.32
MTB	β_5	0.08	4.42	0.00	1.03
ROA	β_6	-0.26	-2.11	0.02	1.58
SG	β_7	0.44	5.50	0.00	1.12
SIZE	β_8	0.03	2.21	0.01	1.25
R2	0.38	Statistics F (P-value)		27.79 (0.000)	
R2*	0.37	Durbin-Watson statistic		2.26	
		Number of observations		651	
Statistics (J-B) (P-value)	1.87 (0.39)	White Statistics (P-value)		1.92 (0.00)	

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F-value id 27.79 shows the significance of total regression model. As it is indicated at the end of table, determination coefficient and moderated determination coefficient for the mentioned model were obtained 38% and 37%. Therefore, it is concluded that only 36% of stock price changes for the studied companies is determined by the mentioned control and independent variable. In this table, positive (negative) numbers in coefficients column show direct (reverse) effect of each variable on stock market price volatility.

Conclusion

Based on discussion, the obtained results from data analysis were discussed as research hypotheses.

First hypothesis:

Based on table (4), p-value of cost stickiness is 0.32 and more than the considered p-value in this research (5%). Furthermore, absolute t value for this variable (1.35) is smaller than the obtained t from table with the sample degree of freedom, F-value shows total regression model significance to reject or confirm this hypothesis based on the obtained results from the regression equation fitting of the main hypothesis. Therefore, H_0 is

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confirmed in 95% p-value and H_1 is rejected based on "the significant relationship between cost stickiness and stock price volatilities".

Hence, cost stickiness doesn't influence on stock price volatility of the listed companies in Tehran Stock Exchange. Regarding to rejection of this hypothesis, it can be concluded that 95% of cost stickiness doesn't influence on stock price volatility of the listed companies in Tehran Stock Exchange in 2009-2015.

Second hypothesis:

Based on table (5), p-value of cost stickiness in conservative companies is 0.03 and less than the considered p-value in this research (5%). Furthermore, absolute t value for this variable (1.97) is bigger than the obtained t from table with the sample degree of freedom, F-value shows total regression model significance to reject or confirm this hypothesis based on the obtained results from the regression equation fitting of the main hypothesis. Therefore, H_0 is rejected in 95% p-value and H_1 is confirmed based on this hypothesis that "" accounting conservatism influences on the relationship between cost stickiness and stock market price volatility" and this effect is direct and positive.

It can be claimed in analysis of the second hypothesis that one of the effective factors on reinforcement of the relationship between cost stickiness and stick price volatility is conservatism. In other words, cost stickiness has a direct relationship with price volatility in conservative companies, while it was concluded in the first hypothesis that cost stickiness doesn't have a significant relationship with stock price volatility in absence of conservatism.

It was expected in companies with high cost stickiness (it means which increase their costs while income increase periods, but don't decrease their cost in income decrease periods) to to have higher stock price volatility. Since costs are relatively high in income decrease periods, companies face with cash operational flows and can't flow the expected profit by shareholders and face with stock price decrease. However, the result of this hypothesis was opposite of the expectances, in other words, stock price volatility isn't influenced by cost stickiness directly, but if the other factors influence on these volatilities when there is cost stickiness. The moderating role of conservatism in relationship with cost stickiness and stock volatility was studied in the second hypothesis. Result of this

hypothesis is that there is no significant and negative relationship between the relative price gap and the cost-stickiness intensity.

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