

The effect of cost stickiness on the estimation of accounting conservatism by considering the effect of the company's life cycle

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Abstract

Recent studies show two important factors in the nonlinear behavior of cost and profit. The first factor is cost stickiness, which expresses economic asymmetry in the reaction of cost to increase and decrease in sales. The second factor is related to accounting conservatism, which indicates the asymmetry of financial reporting in identifying good news versus bad news. Although conservatism and cost stickiness are conceptually based on two different and separate phenomena, but they create two similar patterns in the temporal asymmetry of profits. This study examines the relationship between cost stickiness, levels of conservatism and firm life cycle. In this research, by using the combined data technique and by using three models of non-operating accrual items, Basu's model and market value model, and with a sample consisting of 113 companies admitted in the Tehran Stock Exchange during the years 2010-2019, this goal has been investigated. The research results indicate that the stickiness of costs is related to conservatism in all three models. The findings of the research show that in the growth stage between cost stickiness and conservatism of companies, there is a significant negative relationship in all three models, of which Basu's model has more explanatory power. In the maturity stage, there is a negative and significant relationship between the stickiness of costs and the conservatism of companies in the Basu's model and non-operating accruals, but no significant relationship has been observed in the market value model. In the recession stage, the effect of cost stickiness on the reduction of conservatism is significant only based on the market value model. Finally, in the decline stage, no significant relationship was found in any of the three models.

Keywords: Conservatism levels, Stickiness of costs, Life cycle
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1 Introduction

In management accounting texts, the relationship between costs and changes in activity levels has been assumed to be a symmetrical and linear relationship. In other words, as the volume of activity increases or decreases, the level of

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costs increases or decreases proportionally. However, recent research results [3, 9, 14, 16, 30, 43] indicate an asymmetric and nonlinear relationship between activity levels and costs. This means that the cost response to a decrease in activity level is less than its response to an increase in activity level. This asymmetric behavior is called cost stickiness. Cost stickiness describes a phenomenon that shows managers quickly focus on developing company resources when demand for sales increases but, for various reasons, maintain unused capacity during periods of decreasing demand. As a result, costs do not change proportionally with changes in activity levels. In other words, costs will increase more than they decrease for the same observed changes in activity levels during an increase in demand for sales and a decrease in demand for sales [45]. On the other hand, along with the development of the new theory of cost behavior, various researchers have identified factors that affect it. Multiple studies have shown that one of the reasons for the emergence of cost stickiness is the asymmetric differences of adjustments in company resources [6]. In other words, factors involved in resource adjustments prevent or slow down the adjustment of reduced resources compared to the adjustments made during an increase in activity levels [28]. According to Anderson et al. [3], the active role of managers in adjusting accrual resources when there is a change in demand for activity levels is recognized in the new cost behavior model. The results of studies conducted by other researchers [8, 9, 16, 25, 52, 54] also indicate that managerial discretion and behavioral tendencies can lead to asymmetric cost behavior and resource hoarding [31].

Since the types of company costs are generally within the scope of managerial discretion, management decisions can be considered as one of the influential factors on asymmetric cost behavior. Due to the irregular behavior of some costs, managers make independent decisions regarding changes in resources related to each of the company's costs. This is because increasing or decreasing such resources is not possible to a negligible extent, and on the other hand, changing such resources does not have enough speed and coordination with small changes in demand [42]. Banker et al. [10] identified three main factors affecting the cost-benefit of maintaining or adjusting unused resources by managers: managers' estimation and prediction of the company's sales in future periods, and their personal managerial motivations to achieve target profits. According to the theory of deliberate choice, managers reduce or maintain resources in periods of decreasing sales by assessing the costs of adjustment and maintaining resources. It is obvious that if managers have a positive outlook on future demand, they will maintain surplus and unused resources. On the other hand, the agency theory addresses cost stickiness from the perspective of creating an empire and achieving target profits [54]. However, the fundamental question is under what conditions do managers make decisions about adjusting or maintaining resources? Generally, managers choose the amount of resources based on various constraints (production technology, resource adjustment costs, corporate governance power, demand conditions, governance regulations, debt contracts), motivations (such as performance rewards, profit goals, ownership type), and biases (such as overconfidence) [38]. Therefore, cost stickiness is not a phenomenon that managers cannot prevent, but rather a result of managerial decisions regarding resource adjustments for business units [23].

Since costs have a decreasing effect on profits, cost stickiness causes profits to be more sensitive to a decrease in sales compared to an increase in sales. Additionally, since changes in sales have a positive correlation with stock returns, when costs are sticky, the relationship between profits and negative stock returns compared to positive stock returns should be stronger. In other words, cost stickiness leads to an asymmetric pattern of profits, which has been previously referred to as accounting conservatism [26]. Accounting conservatism is a cautious approach to predicting costs and a conservative approach to predicting revenues. Gioly et al. [22], defined conservatism as an accounting solution under conditions of uncertainty. According to them, conservatism has the least positive effect on shareholders' equity and ultimately leads to the presentation of the least assets and revenues. Conservatism reduces information asymmetry between managers, investors, and other contracting parties and enables them to have more accurate expectations of future accounting income. Conservatism also provides early warning signals about the profitability of projects to shareholders and the board of directors and forces managers to identify and stop unprofitable projects immediately [47]. New research results [9, 27] show that cost stickiness affects the level of accounting conservatism in companies. It can be said that conservatism, by limiting management's power to maximize profits and minimize losses, confronts management's motivations and reduces information asymmetry. Therefore, companies with cost stickiness are more exposed to higher conservatism [27]. Several factors affect the level of conservatism in companies and its relationship with cost stickiness, including the life cycle of the company.

One of the new concepts that has recently entered the field of accounting research is the company life cycle or life curve [53]. In recent decades, numerous studies [2, 4, 17, 39] have been conducted in various fields of humanities, including accounting and finance, regarding the concept of the company life cycle. The main content of all these studies is based on two axes. First, the existence of various stages during the company life cycle, and second, each of these stages has unique characteristics of its own. The theory of the company life cycle assumes that companies and economic enterprises, like all living organisms that are born, grown, and died, have a life cycle curve. Previous studies have shown that measures of earnings' quality (including conservatism) are related to business principles, strategies,

and financial resources that form the basis of the life cycle stages [19].

Given the above, it can be said that understanding cost behavior is important for accountants, researchers, and anyone involved in management who evaluates changes in costs based on changes in revenue. Managers who understand how costs behave have better conditions for predicting cost trends in different operational situations. One of the factors that should be considered in analyzing the behavior of contract costs is the phenomenon of cost stickiness and accounting conservatism. Therefore, considering the conceptual nature of conservatism and cost stickiness and the importance of these two categories in decisions related to companies, it is expected that the results of this research can shed light on important aspects of these concepts based on the conditions governing companies active in the Iranian stock market and enrich the accounting literature in this regard.

2 Theoretical foundations and research background

One of the issues that management always deals with in creating value for the company under its management is cost management and how to plan resource consumption. However, this requires a complete understanding of how costs behave and the factors that influence this behavior. One of the topics that is influenced by managers' behaviors and their strategic approach is cost stickiness [48].

In the traditional cost behavior model, no explicit role is considered for managers' decisions in the process of resource adjustment, and according to this model, costs are determined by the level of activity in the current period without considering the level of activity in the past and future. As a result, an equal relationship is assumed between changes in sales and changes in costs [49]. However, research conducted in the field of cost behavior challenges the traditional view of symmetric or proportional responses of costs to changes in activity and introduces a new pattern in which cost changes depend not only on the level of activity but also on the direction of changes [20]. Cost stickiness research shows important results of asymmetry in cost behavior that contradict the standard model. On the other hand, simultaneously with the introduction of the theory of cost stickiness, various researchers have focused on identifying factors affecting it. Among these, managers' expectations and decisions have been introduced as the main determinants of cost behavior. Specifically, Anderson et al. [3] consider managers' expectations about future sales growth trends, previous decisions by managers that have led to resource accruals, and the issue of agency theory and conflicting interests between managers and owners as factors affecting cost stickiness. Anderson et al. [3] argue that if a manager expects a permanent decrease in sales volume, they will reduce unused resources. They mention indicators such as repeated sales declines and economic growth trends in the next year as messages that send a permanent recession message to managers. On the other hand, if a manager expects the market to trend towards prosperity in the future, they will not adjust the surplus resources currently available due to current sales declines and their previous commitments. This is because in these circumstances, adjustment costs are higher than the cost of maintaining and preserving surplus resources. Anderson et al. [3] also state that cost stickiness depends on managers' past resource commitment decisions. That is, if a manager has previously committed resources, adjusting these surplus resources during sales declines will be difficult and expensive [31].

Another factor that creates sticky cost behavior is the conflict of interest between managers and owners. According to agency theory, shareholders consider two predictions regarding asymmetric cost behavior. On the one hand, power-seeking motivations to maintain costs in the current situation lead to more cost stickiness. On the other hand, management profit motives for achieving target profits through reducing administrative and surplus sales costs will result in less cost stickiness [18, 30]. Also, due to the conflict of interest between management and shareholders, the level of cost stickiness increases with management self-centeredness in decision-making [11]. Chen et al. [16] stated that with considering agency conflicts, the more selfish management decisions are, the more cost stickiness will increase. Although subsequent studies have enriched Anderson et al.'s predictions about cost stickiness and revised them in some cases, all of these studies have been based on Anderson et al.'s fundamental view of asymmetric management decisions. Following Anderson et al. [3], numerous studies [6, 14, 25, 29, 43, 50, 51, 54] have been conducted to clarify the factors affecting cost stickiness. Also, Namazi & Davani [41], Kordestani & Mortazavi [35], Zanjirdar et al. [55], Bahar Moghaddam & Khademi [5], Mortazavi et al. [38], Valipour et al. [49], and Khajouyi & Ghayouri Moghaddam [31] have examined cost stickiness in Iranian companies.

Factors affecting cost stickiness in companies can be classified into external and internal categories. Some studies [3, 18] have focused on internal factors such as asset structure, company size, return on equity, profitability, earnings management, and conservatism on cost stickiness. On the other hand, others [9, 16] have examined the impact of external factors such as corporate governance systems, labor laws, and economic growth on asymmetric cost behavior. The present study investigates the effect of accounting conservatism on cost stickiness, which falls into the first category of factors.

Conservatism is a cautious response to information asymmetry between shareholders and management, which plays an important role in financial reporting and provides information to help shareholders monitor company management [37]. Accounting conservatism is defined as temporal asymmetry in identifying good news versus bad news [12]. In simpler terms, profit temporal asymmetry means that asset value increase upon receiving good news is not as quickly as asset value decrease upon receiving bad news [19]. Accounting conservatism has a very important place in accountants' beliefs, so much so that conservatism increases despite information asymmetry [32], affects debt contract durations, and can reduce negative results of information asymmetry for debt and equity markets [34]. Lafond & Watts [36] believe that conservatism is a balanced response to asymmetric information between aware and unaware investors.

Although accounting conservatism and cost stickiness are conceptually different phenomena, they create two similar patterns in temporal asymmetry of earnings. While conservatism in the information system that converts real economic events into accounting information creates asymmetry, cost stickiness indicates asymmetry in the underlying real economic events [9]. On the one hand, conservative decisions of managers to increase or decrease activity levels lead to changes in the level of costs, and on the other hand, cost stickiness causes temporal asymmetry in increasing and decreasing costs simultaneously with changes in activity levels. Therefore, it can be said that the level of conservatism in companies is influenced by cost stickiness [40].

Recent research also shows that studies that do not consider the potential simultaneous effect of cost stickiness overestimate the degree of conservatism. Hamburg & Nasu [27] have argued that cost stickiness resulting from managers' decisions to maintain unused resources is effective in conditional conservatism. Banker et al. [11] believe that both theories (cost stickiness and accounting conservatism) affect the relationship between earnings and other performance measures, and the presence of one reduces the effect of the other. They provide evidence that in companies with cost stickiness, earnings reflect negative news faster and companies have higher conditional conservatism. Banker et al. [9] have studied the effects of cost stickiness on conservatism and found that the conservatism model mistakenly considers changes in cost stickiness as changes in conservatism. According to them, periodic changes in cost stickiness can indicate conservatism. Ultimately, their research shows that cost stickiness has unknown effects on conservatism studies.

Previous studies have paid less attention to the impact of economic factors on conservatism and cost stickiness. One of these economic factors is the business unit life cycle. According to the life cycle theory, companies exhibit specific financial and economic behaviors in different stages of the life cycle, meaning that the financial and economic characteristics of the business unit are influenced by the stage of the life cycle in which the business unit is located [4]. The stages of the life cycle can be defined as separate and identifiable phases that result from changes in internal factors such as strategy selection, financial resources, and managerial capabilities or external factors such as competitive environment and macroeconomic factors [17]. Since organizational behavior differs in different stages of the life cycle, it is expected that financial reporting behavior will also change with the stages of the company's life cycle. Park & Chen [44] argued that conservatism and the life cycle have a common effect on the relevance of accounting information. According to Charito et al. [15], growing companies tend to be more conservative (for both good and bad news) and have a higher ability to show losses compared to mature companies. They believe that cost stickiness increases in the birth and growth stages of companies. Also, cost stickiness in these stages is higher than the maturity stage. Additionally, cost stickiness increases in the decline stage as well. According to Hansen et al. [24], unconditional conservatism decreases during the stages of the company's life cycle. As research shows, the stages of the life cycle have an effect on the degree of conservatism adopted by companies, and this effect can be due to the characteristics and conditions present in each stage of the life cycle that affect managerial reporting behavior, especially on the level of conservatism.

As mentioned, recent studies have shown that studies that do not consider the effect of cost stickiness overestimate the degree of conservatism. To reduce this erroneous conclusion, the mutual effects of cost stickiness and conservatism must be tested separately and controlled so that the degree of conservatism can be evaluated accurately and distinguished from the effects of cost stickiness. Therefore, given the increasing importance of predicting cost behavior and accounting conservatism, the present study aims to investigate the long-term relationships between cost stickiness, levels of conservatism, and the business unit life cycle. What distinguishes this study from other studies is the simultaneous use of three non-operating accrual, Basu, and market value models to measure the levels of conservatism and their relationship with cost stickiness. Despite the importance of life cycle studies, scant studies have been conducted on the examination of the life cycle and conservatism. Therefore, this study attempts to examine the moderating role of the business unit life cycle in the relationship between cost stickiness and levels of conservatism.

2.1 Research hypotheses

Based on the theoretical foundations presented, the research hypotheses can be categorized as follows:

First category hypotheses:

H1: There is a significant relationship between cost stickiness and conservatism based on the non-operating accrual model.

H2: There is a significant relationship between cost stickiness and conservatism based on the Basu model.

H3: There is a significant relationship between cost stickiness and conservatism based on the market value model.

Second category hypotheses:

H1: The business unit life cycle moderates the relationship between cost stickiness and conservatism based on the non-operating accrual model.

H2: The business unit life cycle moderates the relationship between cost stickiness and conservatism based on the Basu model.

H3: The business unit life cycle moderates the relationship between cost stickiness and conservatism based on the market value model.

2.2 Research methodology

The research method is an analytical, comparative-inductive study with a longitudinal (post-hoc) approach. Multiple linear regression is used to test the research hypotheses, and Eviews version 9 and Stata version 13 are used for final data analysis. The statistical population of this study includes all companies listed on the Tehran Stock Exchange. A systematic elimination method is used to obtain a representative sample from the target population. A total of 113 companies were analyzed for the period 2010-2019, based on the predetermined criteria.

2.3 Research model and variables

To test the research hypotheses, which examine the effect of cost stickiness on levels of conservatism in companies, the following models are used:

First category models:

$$NOACCR_{i,t} = \beta_0 + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t} \quad (2.1)$$

$$E_{i,t}/P_{i,t-1} = \alpha_0 + \alpha_1 DU_{i,t} + \alpha_2 RET_{i,t} + \alpha_3 DU_{i,t} \times RET_{i,t} + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t} \quad (2.2)$$

$$MTB_{i,t} = \beta_0 + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t} \quad (2.3)$$

Model (2.1) measures conservatism using non-operating accruals, taking into account the confounding effect of cost stickiness. Model (2.2) is the Basu model, which is expanded by adding the dummy variable $DS_{i,t}$ and the variable $DS_{i,t} * SALECH_{i,t}$. These variables are indicators of cost stickiness. In this model, sales are explicitly controlled as earning stimulus for two reasons: one aspect of cost of goods sold is that sales are the primary driver of expenses and then profits, so removing it in standard conservatism models should distort the removed variable, which could potentially bias conservatism measures even in the absence of stickiness. The second reason is that cost stickiness creates an asymmetric relationship between profits and sales. Therefore, removing sales (including its asymmetric effect on profits) in standard models may directly bias conservatism measures. In fact, model (2.2) is Basu model according to the distorting effect of cost stickiness, which is based on the research of Banker et al. [9] and is the expansion of the conservatism model of Basu [12] and the cost stickiness model of Anderson et al. [3]. Model (2.3) measures conservatism using market value, taking into account the confounding effect of cost stickiness.

Second category models:

$$NOACCR_{i,t} = \beta_0 + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \beta_4 FLC_{i,t} + \beta_5 FLC_{i,t} \times DS_{i,t} + \beta_6 FLC_{i,t} \times SALECH_{i,t} + \beta_7 FLC_{i,t} \times DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t} \quad (2.4)$$

$$E_{i,t}/P_{i,t-1} = \alpha_0 + \alpha_1 DU_{i,t} + \alpha_2 RET_{i,t} + \alpha_3 DU_{i,t} \times RET_{i,t} + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \beta_4 FLC_{i,t} + \beta_5 FLC_{i,t} \times DS_{i,t} + \beta_6 FLC_{i,t} \times SALECH_{i,t} + \beta_7 FLC_{i,t} \times DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t} \quad (2.5)$$

$$\begin{aligned}
MTB_{i,t} = & \beta_0 + \beta_1 DS_{i,t} + \beta_2 SALECH_{i,t} + \beta_3 DS_{i,t} \times SALECH_{i,t} + \beta_4 FLC_{i,t} + \beta_5 FLC_{i,t} \times DS_{i,t} + \beta_6 FLC_{i,t} \\
& \times SALECH_{i,t} + \beta_7 FLC_{i,t} \times DS_{i,t} \times SALECH_{i,t} + \varepsilon_{i,t}
\end{aligned} \tag{2.6}$$

In these models, the moderating role of the company's life cycle on the relationship between conservatism and cost stickiness has been investigated, where:

$E_{i,t}$: net profit before unexpected items in year t .

$P_{i,t-1}$: stock market value at the beginning of the financial period

$MTB_{i,t}$: market value to book value of shares in year t .

$NOACCR_{i,t}$: non-operational accrual items in year t .

$DU_{i,t}$: a dummy variable, if there is bad news (changes in stock returns are negative compared to the previous year) it is equal to one and otherwise it is equal to zero.

$RET_{i,t}$: return of the company's stock in year t

$DS_{i,t}$: dummy variable of sales with a value of one if the sales of company i in year t is smaller than the sales of the same company in year $t - 1$, otherwise it is zero.

$SALECH_{i,t}$: The percentage of changes in company i 's sales in year t compared to year $t - 1$.

$FLC_{i,t}$: company life cycle

$\varepsilon_{i,t}$: model estimation error

2.4 Operational definition of variables

Dependent variable: The dependent variable in this study is conservatism. Different models and methods have been used to measure conservatism, which are well-known in the accounting literature. Gioly & Hayn [22] argue that although the models used to calculate conservatism indicators are theoretically correct, they are also subject to errors. Each of these models has its own advantages and limitations. Therefore, it is better to use different models simultaneously to measure conservatism. Moreover, it is possible that each of the models available in Iran, due to the country's special conditions such as economic sanctions, inflation, inefficient stock market, periodic recessions, complexity of business processes and extensive institutional ownership, does not provide an accurate measure for evaluating conservatism in Iranian listed companies alone. Therefore, in this study, we have tried to simultaneously examine the relationship between cost stickiness and conservatism using three models of non-operating accruals, Basu, and market value, and determine which model has more explanatory power in measuring conservatism and its relationship with cost stickiness among the existing models in Iran.

1. Non-operating accrual model: Gioly & Hayn [21] model is used to measure conservatism based on non-operating accruals. The sum of total accruals, operating accruals (working capital), and non-operating accruals is calculated according to the following formula:

$$ACC_{it} = NI_{it} + DEP_{it} - CFO_{it}$$

$$OACC = \Delta AR_{it} + \Delta I_{it} + \Delta PE_{it} - \Delta AP_{it} - \Delta TP_{it}$$

$$NOACC_{it} = ACC_{it} - OACC_{it}$$

Where the variables are defined as follows:

ACC: Sum of total accruals

NI: Net income before extraordinary items

DEP: Depreciation expense

CFO: Cash flow from operations

OACC: Operating accruals

ΔI : Change in inventory

ΔAR : Change in accounts receivable

ΔPE : Change in prepayments

ΔAP : Change in accounts payable

NOACC: Non-operating accruals

Since smaller (more negative) values of non-operating accruals indicate higher levels of conservatism, in this study, the symmetry ratio of these accrual items was used to align the algebraic values of non-operating accruals with the level of conservatism. This measure has also been used by Paeik et al., Gioly & Hayn [21], and Ahmad et al. To calculate unconditional conservatism, the following model from Zhang [56] is used:

$$\text{Unconditional conservatism} = (\text{Non-operating accruals}) / (\text{Total assets of the first period}) \times (-1)$$

In this model, the ratio of non-operating accruals to total assets indicates the level of conservatism. The higher the ratio for a company, the lower the level of conservatism. According to Gioly & Hayn [21], the growth of accruals can be an indicator of changes in accounting conservatism over a long period. This model shows that the growth of accruals over several long-term financial periods is an indicator of accounting conservatism. Therefore, the more accrual items created in the current year, the less conservatism is expressed. Thus, the identification of accruals should be delayed for applying conservatism in financial reporting.

2. Basu Model: In the conservatism Basu model, positive stock returns represent good news and negative stock returns represent bad news. Basu obtained a regression between earnings and stock returns, where the response of earnings to bad news (negative stock returns) is timelier than the response of earnings to good news (positive stock returns). The model is as follows:

$$\frac{E_{i,t}}{P_{i,t-1}} = \beta_0 + \beta_1 DU_{i,t} + \beta_2 RET_{i,t} + \beta_3 DU_{i,t} \times RET_{i,t} + \varepsilon_{i,t}$$

where:

$E_{i,t}$: Net income before extraordinary items in year t .

$P_{i,t-1}$: Market value of equity at the beginning of the fiscal period.

$DU_{i,t}$: A dummy variable that is equal to one if there is bad news (a decrease in stock returns relative to the previous year) and zero otherwise.

$RET_{i,t}$: Stock return for the company in year t .

In this model, if β_3 is not zero, it indicates the degree of conservatism calculated separately for each company and each year. The greater β_3 , the more conservatism is applied.

3. Market Value Model: Since conservatism usually leads to undervaluation of owners' equity or net book value of assets relative to market value, companies that use conservative accounting have a lower ratio of book value to market value. In other words, the book-to-market ratio is inversely related to conservatism, which when multiplied by negative one yields a direct measure of conservatism. The level of conservatism based on this method is as follows:

$$\text{Conservatism} = (\text{Market value of equity} / \text{Book value of equity}) \times (-1)$$

Independent Variable: The independent variable in this study is cost stickiness. Cost stickiness was first introduced by Anderson et al. [3]. They used a virtual regression model to measure cost stickiness as follows:

$$\ln \left[\frac{SGA_{i,t}}{SGA_{i,t-1}} \right] = \beta_0 + \beta_1 \ln \left[\frac{\text{sales}_{i,t}}{\text{Sales}_{i,t-1}} \right] + \beta_2 D_{i,t} + \beta_3 D_{i,t} \times \ln \left[\frac{\text{Sales}_{i,t}}{\text{Sales}_{i,t-1}} \right] + \varepsilon_{i,t}$$

where,

$SGA_{i,t}$: selling, general, and administrative expenses in the current year

$SGA_{i,t-1}$: selling, general, and administrative expenses in the previous year

$\text{sales}_{i,t}$: total sales revenue in the current year

$\text{Sales}_{i,t-1}$: total sales revenue in the previous year

$\frac{SGA_{i,t}}{SGA_{i,t-1}}$: the ratio of current-year expenses to previous-year expenses

$\frac{\text{sales}_{i,t}}{\text{Sales}_{i,t-1}}$: the ratio of current-year sales to previous-year sales

To homogenize the data, natural logarithms were taken of these ratios. The dummy variable is $D_{i,t}$ that has two values of 0 and 1. This variable takes the value of 1 when current-year sales revenue is lower than the previous year and 0 otherwise.

If the results of the model estimation indicate a negative β_3 coefficient, the null hypothesis is rejected, and it can be claimed that costs are sticky. In other words, if selling, general, and administrative expenses are sticky, it is expected that the percentage of increase in expenses during periods of revenue growth will be greater than the percentage of decrease in expenses during periods of revenue decline, and $\beta_1 > 0$ and $\beta_3 < 0$ will hold.

Moderating variable: The moderating variable in this study is company life cycle. In this study, Dickinson's [17] model is used to classify companies into different stages of the company life cycle. Dickinson [17] uses a combination of cash flow, investment, and financing. Based on the sign of these three cash flows, eight different combinations can exist, which end up in five stages of birth, growth, maturity, recession, and decline in the company life cycle based on the expected behavior of cash flow. The patterns of cash flow are used to determine the life cycle stages by combining positive (inflow) and negative (outflow) signs of cash flows. Dickinson divides the life cycle stages into four stages using the patterns obtained from the three categories of cash flow statements. It should be noted that in Iran, the cash flow statement has five categories, which are aligned with the three-category cash flow statement of companies by making necessary adjustments to the data. There is no specific theory for the recession stage, and only some cash flows are placed in this stage that do not belong to any of the other four stages. To test the research hypotheses for the five stages of the company life cycle based on Dickinson's model, companies are classified according to their position in each stage of the life cycle mentioned above, respectively represented by values 0, 0.25, 0.50, 0.75, and 1 [24]. In this study, considering that companies do not exist in the birth and emergence stage in Iran, this stage has not been separately investigated, and the birth and growth stages have been considered together and under the title of growth stage. Therefore, companies are classified into life cycle stages as growth, maturity, recession, and decline as follows:

Table 1: Company Life Cycle Stages

CF	1	2	3	4	4	4	5	5
	Birth	Growth	Maturity	Recession	Recession	Recession	Decline	Decline
Cash flows from operating activities	-	+	+	-	+	+	-	-
Cash flows from investing activities	-	-	-	-	+	+	+	+
Cash flows from financing activities	+		-	-	+	-	+	-

Source: Dickinson (2011)

3 Research Findings

To conduct preliminary data analysis, a summary of the descriptive statistics of research variables, including central and dispersion indices, after screening and removing outliers, is presented in Table 2.

Table 2: Results of Descriptive Statistics of Research Variables

Variable	Average	Median	SD	Min.	Max.	Skewness	Kurtosis	observations
Profit to market value ratio	0.145	0.155	0.132	-0.400	0.400	-0.390	3.606	1130
Non-operating accrual items	0.033	0.040	0.136	-0.31	0.46	-0.084	2.944	1130
Market value to book value of shares	2.765	2.190	1.915	0.040	8	1.119	3.471	1130
Dummy variable of stock returns	0.492	0	0.500	0	1	0.031	1	1130
Stock returns	36.44	14.79	67.051	-37.25	224.6	1.486	4.568	1130
Dummy variable of sales	0.290	0	0.454	0	1	0.924	1.854	1130
Sales changes	0.169	0.100	0.378	-1.50	1.20	0.935	4.643	1130
Growth stage	0.476	0	0.499	0	1	0.092	1.008	1130
Maturity stage	0.334	0	0.472	0	1	0.701	1.492	1130
Recession stage	0.111	0	0.313	0	1	2.482	7.164	1130
decline stage	0.025	0	0.158	0	1	5.999	36.991	1130

Based on the Table 2, the average and median of the ratio of earnings to market value at the beginning of the period are 0.145 and 0.155, respectively, indicating that the profitability of the companies under study was approximately 15%. The average of the dummy variable of stock returns is 0.492, indicating that about half of the companies in the study period had negative changes in their stock returns compared to the previous year. Also, the average of the

dummy variable of sales is 0.290, indicating that about 29% of the companies under study had a decrease in sales. The average life cycle stages of companies show that approximately 48% of companies are in the growth stage, 33% of companies are in the maturity stage, 11% of companies are in the recession stage, and 2% of companies are in the decline stage in the period under study. On the other hand, the stock return variable has the highest standard deviation among the variables with a deviation of 67.051.

3.1 Descriptive Findings

3.1.1 First category hypotheses testing

The first category of hypotheses suggests that there is a significant relationship between cost stickiness and accounting conservatism based on the three abovementioned models. The results of first category hypotheses testing are shown in Tables 3 and 4.

According to the results in Table 4, the coefficient of explanatory variable DS*SALECH in the non-operating accrual model is 0.052, which is positive and significant at the 0.05 error level, indicating a significant relationship between cost stickiness and accounting conservatism based on the non-operating accrual model.

According to the results in Table 3, the coefficient of explanatory variable DU*RET in Basu [12] model is 0.0004, which is significant at the 5% error level and indicates the difference in slope between positive and negative stock returns. The positive coefficient implies that the response to bad news is stronger than the response to good news. In other words, conservatism exists in the accepted companies in the Tehran Stock Exchange at this confidence level. The results of fitting model 2 show that after controlling for the effect of cost stickiness, the coefficient of explanatory variable DU*RET decreases from 0.0004 to 0.0003, which is significant at the 5% error level. The decrease in DU*RET indicates that part of the pattern of temporal asymmetry of earnings due to cost stickiness leads to a decrease in conservatism after controlling for this effect.

The results of market value model (Table 4) show that the coefficient of explanatory variable DS*SALECH is -0.486 , which is negative and significant at the -0.05 error level, indicating that costs have sticky behavior. Therefore, there is a significant relationship between cost stickiness and accounting conservatism based on market value.

Table 3: Results of the regression model estimation of the first category hypothesis (Basu Model)

Variable	Basu model			Adjusted Basu model		
	Coefficient	T statistics	Sig. level	Coefficient	T statistics	Sig. level
C	0.143	27.71	0.000	0.130	8.807	0.000
DU	-0.007	-1.30	0.193	-0.008	-0.899	0.368
RET	-0.0001	-4.302	0.000	-0.0002	-2.043	0.041
DU*RET	0.0004	3.194	0.001	0.0003	2.101	0.035
DS				-0.006	-0.872	0.383
SALECH				0.086	6.358	0.000
DS*SALECH				-0.030	-1.994	0.046
First-order autoregression AR(1)	0.262	9.354	0.000	0.275	2.708	0.006
Coefficient of determination		0.593			0.607	
Adjusted coefficient of determination		0.541			0.555	
F- statistics		11.327(0.000)			11.649(0.000)	
Durbin-Watson		1.97			1.99	

3.1.2 Second category hypotheses testing

The second category of hypotheses suggests that there is a significant relationship between cost stickiness and accounting conservatism based on the three abovementioned models in different stages of the company life cycle. The results of second category hypotheses testing are shown in Tables 5, 6, 7, and 8. To test these hypotheses, each stage of the company life cycle, including growth, maturity, recession, and decline (represented by coefficients F1, F2, F3, and F4, respectively) is examined based on the three models mentioned above.

Growth stage: Table 5 shows the results of the regression model of the hypothesis in the growth stage of the company. The results of the regression of the first model show that the coefficient of the explanatory variable F1*DS*SALECH

Table 4: Results of the regression model estimation of the first category hypothesis (non-operating accruals model and market value)

Variable	Non-operating accruals model			Market value model		
	Coefficient	T statistics	Sig. level	Coefficient	T statistics	Sig. level
C	0.031	5.891	0.000	2.645	13.126	0.000
DS	0.020	2.339	0.019	-0.258	-1.932	0.053
SALECH	-0.003	-0.269	0.787	0.670	3.180	0.001
DS*SALECH	0.052	2.457	0.014	-0.486	-2.593	0.009
First-order autoregression AR(1)				0.220	1.596	0.110
Coefficient of determination		0.207			0.499	
Adjusted coefficient of determination		2.314			0.434	
F- statistics		2.374(0.000)			7.728(0.000)	
Durbin-Watson		2.27			2.10	

in the first model is equal to -0.062 and its significance level is 0.035 , which has a negative and significant relationship at the error level of 0.05% . The results of the adjusted Basu model show that the coefficient of the explanatory variable $F1*DS*SALECH$ in the second model is equal to -0.047 and its significance level is 0.008 , which is a negative and significant relationship at the error level of 0.05% . The results of the regression of the market value model show that the coefficient of the explanatory variable $F1*DS*SALECH$ in the third model is equal to -0.652 and its significance level is 0.023 , which has a negative and significant relationship at the error level of 0.05% . In other words, there is a significant relationship between cost stickiness and conservatism based on all three models in the growth stage of companies. This means that in the growth stage of the company, cost stickiness reduces accounting conservatism.

Table 5: Results of estimating the regression model of the second category hypotheses (growth stage)

Variable	Non-operating accruals model			Basu model			Market value model		
	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level
C	0.025	3.749	0.000	0.143	9.370	0.000	2.672	14.729	0.000
DU				-0.012	-1.327	0.185			
RET				-0.0003	-2.635	0.009			
DU*RET				0.0003	1.442	0.149			
DS	0.029	2.862	0.004	-0.007	-0.893	0.371	0.531	3.442	0.000
SALECH	-0.001	-0.084	0.933	0.089	6.664	0.000	0.717	3.547	0.000
DS*SALECH	0.080	3.306	0.001	-0.015	-1.012	0.312	-0.314	-1.774	0.076
F1	0.009	1.103	0.271	-0.017	-2.910	0.004	-0.119	-1.353	0.176
F1*DS	-0.021	-1.352	0.176	-0.005	-0.504	0.614	-0.660	-3.635	0.000
F1*SALECH	0.0003	0.021	0.983	0.012	1.189	0.235	-0.065	-0.527	0.598
F1*DS*SALECH	-0.062	-2.111	0.035	-0.047	-2.638	0.008	-0.652	-2.281	0.023
First-order autoregression	-0.141	-1.131	0.258	0.339	3.281	0.001	0.186	1.431	0.153
Coefficient of determination		0.240			0.621			0.522	
Adjusted coefficient of determination		0.138			0.568			0.458	
F-statistics		2.353(0.000)			11.882(0.000)			8.160(0.000)	
Durbin-Watson		2.07			2.03			2.04	

Maturity stage: The results in Table 6 show the estimation of the regression model for the hypothesis in the maturity stage. The results of the first model regression show that the coefficient of explanatory variable $F2*DS*SALECH$ is -0.096 and its significance level is 0.028 at the 0.05 error level, indicating a negative and significant relationship between cost stickiness and accounting conservatism based on the non-operating accrual model in the maturity stage. The results of the adjusted Basu model show that the coefficient of explanatory variable $F2*DS*SALECH$ is -0.043 and its significance level is 0.027 at the 0.05 error level, indicating a negative and significant relationship between cost stickiness and accounting conservatism in the maturity stage of companies. Therefore, cost stickiness leads to a decrease in accounting conservatism in the maturity stage of companies. The results of the market value model show that the coefficient of explanatory variable $F2*DS*SALECH$ is 0.442 and its significance level is 0.184 , indicating no significant relationship at the 0.05 error level; therefore, there is no significant relationship between cost stickiness and

accounting conservatism based on market value in the maturity stage of companies.

Table 6: Results of estimating the regression model of the second category hypotheses (maturity stage)

Variable	Non-operating accruals model			Basu model			Market value model		
	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level
C	0.027	4.224	0.000	0.143	8.523	0.000	2.672	14.135	0.000
DU				-0.012	-1.501	0.133			
RET				-0.0003	-2.714	0.007			
DU*RET				0.0003	1.302	0.193			
DS	0.019	1.865	0.062	0.133	-0.105	0.916	-0.079	-0.449	0.653
SALECH	-0.005	-0.454	0.649	-0.014	6.514	0.000	0.435	2.056	0.040
DS*SALECH	0.113	4.116	0.000	-0.0003	-1.348	0.178	-0.926	-3.287	0.001
F2	0.019	2.491	0.013	0.0002	1.863	0.063	0.322	4.327	0.000
F2*DS	-0.002	-0.166	0.868	-0.001	-2.581	0.010	-0.001	-0.004	0.997
F2*SALECH	-0.003	-0.374	0.708	0.091	0.933	0.351	0.032	0.384	0.700
F2*DS*SALECH	-0.096	-2.195	0.028	-0.019	-2.220	0.027	0.442	1.330	0.184
First-order autoregression	-0.157	-1.288	0.197	0.010	3.312	0.001	0.193	1.457	0.145
Coefficient of determination		0.256			0.619			0.533	
Adjusted coefficient of determination		0.156			0.566			0.471	
F-statistics		2.569(0.000)			11.783(0.000)			8.533(0.000)	
Durbin-Watson		2.08			2.03			2.06	

Recession stage: The results of Table 7 show the hypothesis regression model in the stage of recession. The results of the regression of the first model show that the coefficient of the explanatory variable F3*DS*SALECH in the first model is equal to 0.003 and its significance level is 0.972, which means that there is no significant relationship at the error level of 0.05%; in other words, there is no significant relationship between the stickiness of costs and conservatism based on the non-operating accrual model in the recession stage of companies. The results of the second model show that the coefficient of the explanatory variable F3*DS*SALECH in the second model is equal to 0.001 and its significance level is 0.985, which means that there is no significant relationship at the error level of 0.05%; in other words, there is no significant relationship between cost stickiness and conservatism based on the adjusted Basu model in the recession stage of companies. The results of the regression of the market value model show that the coefficient of the explanatory variable F3*DS*SALECH in the third model is equal to -1.446 and its significance level is 0.027, which has a negative and significant relationship at the error level of 0.05%; in other words, there is a significant relationship between cost stickiness and the level of conservatism based on the market value model in the recession stage of companies.

Decline stage: The results in Table 8 show the estimation of the regression model for the hypothesis in the decline stage. The results of the first model regression show that the coefficient of explanatory variable F4*DS*SALECH is 0.206 and its significance level is 0.366, indicating that there is no significant relationship at 0.05 error level. The results of the second model regression show that the coefficient of explanatory variable F4*DS*SALECH is 0.163, with a significance level of 0.103, indicating that there is no significant relationship between at 0.05 error level. The results of the market value model also show that the coefficient of explanatory variable F4*DS*SALECH is 0.279, with a significance level of 0.848, indicating that there is no significant relationship between at 0.05 error level. In summary, there is no significant relationship between cost stickiness and accounting conservatism in the decline stage of companies based on all three models.

4 Discussion and conclusion

The aim of this study was to empirically test the long-term relationships between cost stickiness, accounting conservatism levels, and the life cycle stage of companies. As previously mentioned, if management decisions regarding resource allocation adjustments lead to cost stickiness and its confounding effect is not considered in estimating the degree of accounting conservatism, the level of conservatism will be overestimated. Therefore, cost stickiness is expected as one of the influential factors on the estimation of accounting conservatism levels. In this research, it was

Table 7: Results of estimating the regression model of the second category hypotheses (recession stage)

Variable	Non-operating accruals model			Basu model			Market value model		
	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level
C	0.041	6.681	0.000	0.134	8.498	0.000	2.712	13.961	0.000
DU				-0.013	-1.351	0.177			
RET				-0.0002	-2.568	0.010			
DU*RET				0.0003	1.503	0.133			
DS	0.011	0.901	0.367	-0.006	-0.760	0.447	0.004	0.022	0.982
SALECH	-0.005	-0.372	0.710	0.095	7.041	0.000	0.675	3.277	0.001
DS*SALECH	0.016	0.606	0.544	-0.032	2.011	0.044	-0.756	-2.889	0.004
F3	-0.001	-0.038	0.969	0.017	1.805	0.071	0.103	0.750	0.453
F3*DS	-0.040	-1.116	0.264	-0.013	-0.618	0.536	-0.374	-1.475	0.140
F3*SALECH	-0.013	-0.418	0.675	0.005	0.257	0.797	-0.134	-0.405	0.685
F3*DS*SALECH	0.003	0.035	0.972	0.001	0.019	0.985	-1.446	-2.205	0.027
First-order autoregression	-0.151	-1.225	0.221	0.334	3.201	0.001	0.205	1.556	0.119
Coefficient of determination		0.231			0.615			0.533	
Adjusted coefficient of determination		0.128			0.562			0.471	
F-statistics		2.245(0.000)			11.603(0.000)			8.537(0.000)	
Durbin-Watson		2.09			2.03			2.05	

tried to design and examine a new experimental test with the help of the findings from previous researches related to conservatism and stickiness of costs, which separates these two phenomena from each other, even if these two phenomena coexist.

In this study, two main hypotheses were proposed. The first hypothesis examined the relationship between cost stickiness and accounting conservatism levels. Generally, the empirical evidence obtained from testing the first category of research hypotheses indicated that both accounting conservatism and cost stickiness exist among the sample companies, regardless of the presence or control of the other phenomenon. Three models of non-operating accrual, Basu, and market value were used to measure accounting conservatism in this study. The results showed that cost stickiness is related to accounting conservatism in all three models and reduces it. By comparing the results of the three models, it is observed that the determination coefficient of the Basu model is higher than that of the other models. On the other hand, a higher determination coefficient indicates that the observed values are closer to the fitted line in the regression model. Therefore, it can be concluded that among these three models, the Basu model has a higher explanatory power in measuring accounting conservatism in sample companies. This can be due to various reasons such as the improvement of market indicators' quality in Iran, high inflation, and special market conditions in Iran. These results are consistent with theoretical foundations and consistent with the findings of Banker et al. [9, 7, 11], Hamburg & Nasu [27], Bahr Moghaddam & Kavousi [13], Hashemi et al. [26], Safarzadeh & Beig Panah [46] and Khodadadi et al. [33].

Given that companies have unique financial and non-financial characteristics at each stage of their life cycle, each of these characteristics can have various effects on the stickiness of costs relative to the level of conservatism of companies, and this effect may be due to the characteristics and conditions that exist in each stage of the life cycle that affect the reporting behavior of managers, especially the level of conservatism. Additionally, the level of conservatism of companies in order to achieve their long-term and short-term goals, based on their executive plans and policies to achieve these goals, is influenced by a stage of the life cycle in which they are located, as the performance of companies at different stages of their life cycle will be different. In this regard, the second main hypothesis of the study was proposed to examine the moderating role of the company's life cycle in the relationship between cost stickiness and the level of conservatism of sample companies based on three models of non-operating accrual, Basu, and market value. The results of testing the second category research hypotheses showed that in the growth stage of the company, there is a significant negative relationship between cost stickiness and accounting conservatism in all three models, meaning that in the growth stage, cost stickiness reduces accounting conservatism. Among these models, the Basu model had a higher explanatory power due to its higher determination coefficient. In addition, in the maturity stage, there was a significant negative relationship between cost stickiness and accounting conservatism in two models of Basu and non-operating accrual, but no significant relationship was observed in the market value model. Furthermore, in the

Table 8: Results of regression model estimation for second category hypotheses (decline stage)

Variable	Non-operating accruals model			Basu model			Market value model		
	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level	Coefficient	t-statistics	Sig. level
C	0.042	6.782	0.000	0.131	8.333	0.000	2.736	14.931	0.000
DU				-0.011	-1.194	0.232			
RET				-0.0002	-2.243	0.025			
DU*RET				0.0002	1.267	0.205			
DS	0.006	0.499	0.617	-0.005	-0.606	0.544	-0.071	-0.457	0.647
SALECH	-0.005	-0.420	0.674	0.101	7.041	0.000	0.617	3.387	0.000
DS*SALECH	0.010	0.361	0.717	-0.038	-2.494	0.013	-0.799	-3.274	0.001
F4	-0.041	-1.202	0.229	-0.002	-0.101	0.919	-0.108	-0.438	0.661
F4*DS	-0.034	-0.490	0.624	0.040	1.0001	0.317	1.759	3.612	0.000
F4*SALECH	-0.062	-0.510	0.610	0.049	0.773	0.439	-0.245	-0.202	0.839
F4*DS*SALECH	0.206	0.904	0.366	0.163	1.632	0.103	-0.279	-0.191	0.848
First-order autoregression	-0.153	-1.237	0.216	0.289	2.917	0.004	0.218	1.659	0.097
Coefficient of determination		0.235			0.610			0.552	
Adjusted coefficient of determination		0.133			0.556			0.493	
F-statistics		2.299(0.000)			11.351(0.000)			9.220(0.000)	
Durbin-Watson		2.08			1.95			2.05	

recession stage, the effect of cost stickiness on reducing conservatism is only significant based on the market value model. Finally, in the decline stage, no significant relationship was found in any of the three models. The results of testing this hypothesis are similar to those of Charito et al. [15], Banker et al.[9], Hashemi et al. [26], Bahar Moghaddam & Kavousi [13] and Maleki et al. [19], but in contrast to the results of Abdallah & Saleh [1], and Hansen et al. [24].

Users of financial statements should be aware that in the growth stage of a company, there is not much expectation from companies compared to other stages of the life cycle, and the market does not react much to reported losses and high costs. Therefore, the ability of companies in these stages to identify and report costs on time, even in bad news situations, is high. Thus, companies in this stage have a higher level of conservatism compared to other stages, which can reduce the effect of cost stickiness. In the maturity stage, competition increases and profitability becomes a priority, leading companies to delay identifying losses and reducing their level of conservatism. Therefore, the decreasing effect of stickiness on conservatism is intertwined with the decreasing effect of the maturity stage on conservatism and causes the effect of stickiness on conservatism to intensify. In the recession stage, negative expectations about a company's future are stronger, causing companies to be more sensitive to sales decline and reduce their resources and costs. Therefore, cost stickiness may have decreased to the point where it no longer has a significant effect on conservatism. Finally, in the decline stage, most assets are sold, and losses from selling them as well as losses from projects and other outstanding costs are identified, leading to an increase in conservatism.

Considering the effect of life cycle stages on the relationship between cost stickiness and levels of conservatism, the correct evaluation of current and future performance and financial structure of companies requires attention to the stages of the company's life cycle. Understanding the behavior of cost stickiness by managers can lead to better planning and control. Accurate planning can reduce sticky cost behavior. Managers need to be able to identify and manage unused capacity and resources to prevent or minimize the effects of sticky cost behavior. Additionally, profit characteristics such as temporal asymmetry of profits, stability, and predictability of profits are directly influenced by cost behavior. Therefore, managers' accurate awareness of cost stickiness and conservatism helps them better predict future profits. Investors and analysts should also consider the impact of good or bad news (conservatism) and the impact of increasing or decreasing sales (cost stickiness) in predicting profits.

This study used three models to measure conservatism. It is possible that each of the existing models alone may not provide an accurate measure for evaluating conservatism in Iranian listed companies due to specific country conditions. Therefore, researchers are advised to investigate the impact of other internal and external factors on the phenomenon of cost stickiness and the level of conservatism in companies based on other measurement models in future research.

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