



## Does asymmetric cost behaviour impact conditional conservatism practices? A quantile regression approach

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## **Does asymmetric cost behaviour impact conditional conservatism practices? A quantile regression approach**

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### **Abstract**

This study examines the asymmetric cost behaviour at different levels of activity, and its impact on the accuracy of predicting and understanding earnings patterns. Furthermore, it provides additional empirical evidence regarding the timeliness of earnings, specifically focusing on conditional conservatism, within the context of an emerging economy, Egypt. To address the limitations in previous studies relied on traditional ordinary least squares regression models, this study implements a quantile regression model. This model provides a framework to test the study hypotheses across various scenarios, encompassing different levels of costs and earnings for diverse firms. The sample consists of 164 publicly listed firms during the period from 2017 to 2022(984 observations). The study findings suggest that Egyptian-listed firms besides conditional conservatism commonly exhibit asymmetric cost behaviour, as evidenced by the stickiness of their operating costs during the study period. The degree of asymmetric cost behaviour is greater for firms with low changes in activity levels compared to firms with higher changes in activity levels. The study findings remain statistically significant even with accounting for the influence of industry and year-specific factors. Findings also remain robust with operating accruals be the dependent variable. This study contributes to the existing financial accounting literature by presenting empirical evidence that emphasises the significance of understanding cost behaviour for accurately predicting and understanding the asymmetric timeliness of earnings. Additionally, this study is one of the first to examine the association between asymmetric cost behaviour and the asymmetric timeliness of earnings using a quantile regression approach.

**Keywords:** Sticky cost, conditional conservatism, agency theory, deliberate choice theory, asymmetric timeliness of earnings

## **1. Introduction**

Recent realm of research provides a proof of asymmetric behaviour of costs resulting in a non-linear association between costs and the level of activity (Banker et al., 2013; Kama and Weiss, 2013; Pamplona et al., 2016; Fourati et al., 2020; Ghazalat and Abu-Serdaneh, 2020; Imani et al., 2023). This phenomenon is attributed to the cost stickiness that represents a case in which the costs respond to a decrease in activity level in a manner that is less equivalent to its rise due to an equal increase in activity level. The cost stickiness concept is firstly introduced by Anderson et al. (2003). Firm management resource adjustment choices are cited as the core reason behind cost stickiness; as such choices may deliberate or prevent the adjustment of resources to cope with change in the level of activity, resulting in asymmetric cost behaviour. In other words, there is a lack of costs simultaneous reaction to activity level change. Accordingly, when sales decrease managers are not likely to cut unnecessary costs such as those associated with asset disposals, labor training, compensations to unneeded workers, although they respond to increase in sales by injecting all the necessary resources to support the increased demand (Ghazalat and Abu-Serdaneh, 2020). This behaviour is also justified through the agency lens (Yasukata, 2011; Chen et al., 2012; Pamplona et al.; 2016, Ghazalat and Abu-Serdaneh, 2020; Imani et al., 2023), as management discretion, self-interests and empire building considerations are likely to influence their behaviour resulting in a symmetric behaviour of costs and resource adjustment choice.

An increase in costs decreases corporate earnings, accordingly, sticky costs are likely to increase corporate income sensitivity to the decrease in corporate activity (i.e., sales reduction) compared to the case of activity level increase. In other words, cost stickiness results in earnings asymmetry, which is known in financial accounting literature as accounting conservatism (Hashemi et al., 2015). This proposition is justified by Imani et al. (2023), who argues that as there is a positive association between sales volume and stock returns, cost stickiness causes the association between corporate profit and negative stock-return more resilient than its association with positive stock returns.

Conservatism is defined by Givoly et al. (2007), as a tool to overcome the problems relating to uncertainties. Accordingly, it is assumed to help in reducing the information asymmetry between management and users of financial statements, and hence improves their estimation of the corporate future earnings. Additionally, conservatism signals the unprofitable projects and exerts pressure on management to discontinue on them (Imani et al., 2023). Hence, accounting conservatism results in adjustments based on the interpretation of good and bad news. Based on Basu (1997), earning-return association for bad news would be stronger than for good news, resulting in asymmetrical timeliness of earnings (Ghazalat and Abu-Serdaneh, 2020). Given that cost stickiness represents a case of an asymmetric reaction of costs to the change in sales, this will also lead to asymmetric earnings behaviour. Hence, it is concluded that cost stickiness influences conservative accounting practices (Homburg and Nasev, 2009; Banker et al., 2013; Ghazalat and Abu-Serdaneh, 2020). Higher cost stickiness leads to a higher level of conservatism, as conservatism restricts management practices that aim at overstating profits while understating losses (Imani et al., 2023). Hence, the higher the cost-stickiness, the higher the level of conditional conservatism, as management is likely to avoid the cost associated with resource cut and rebuild to cope with changing demand, by bearing the cost of excess resources when demand is low (Homburg and Nasev, 2009). It is induced that conditional conservatism represents the level of asymmetry in accounting information systems, while cost stickiness represents asymmetry in the economic activity (Fourati et al., 2020).

According to Banker et al. (2016), assessment of expected future sales, self-motives associated with achieving targeted profit are important factors that are likely to affect management decision concerning resource-adjustment. Hence, management choice can be explained in line with the deliberate choice theory, which attributes management choice to maintain or cut resources in periods suffering low level of activity, depending on their estimation of the future demand on company goods or services. Managers are likely to maintain resources if they expect an improvement in future sales. Meanwhile, from the agency theory perspective, management decision is influenced by their opportunistic behaviour and their target of empire-creation and meeting planned profit (Yasukata, 2011; Guenther et al., 2014; Bu et al., 2015; Imani et al., 2023).

To overcome the limitations of the traditional statistical analysis techniques and to improve the accuracy of the empirical analysis findings, this study employs an advanced econometric technique- the quantile regression. To the best of authors' knowledge, this paper is one of the first to employ this econometric analysis tool applying to the Egyptian context.

The above discussion highlights the need to improve our understanding of cost behaviour and how it affects the reported financial results of firms. It also emphasises the need to employ advanced empirical techniques to examine the extent to which the level of conditional conservatism is influenced by cost-stickiness. As one of the basic concepts of financial reporting practices, conditional conservatism has received special attention in financial accounting research. In this study, we explore the influence of another concept that influences asymmetric timeliness of earnings, cost stickiness. The results suggest that besides conditional conservatism Egyptian firms commonly exhibit asymmetric cost behaviour, as evidenced by the stickiness of their operating costs during the study period. The degree of asymmetric cost behaviour is greater for firms with low changes in activity levels compared to firms with higher changes in activity levels. These results are of importance for accounting practitioners, management, investors, and researchers to evaluate the extent of cost stickiness influence on the level of conditional conservatism at different activity levels. Results also emphasise the need of researchers to employ advanced econometric analysis techniques to improve the accuracy of the analysis by overcoming the many limitations of the traditional statistical regression analysis tools. This paper adds to financial accounting and management accounting literatures. It responds to the call of Banker et al. (2016) and Yang (2019) to investigate whether cost stickiness has merits (i.e. it supports rational management of resources to avoid future adjustments rather than merely reflecting abuse of corporate resources due to agency problems). It provides recent evidence on cost stickiness and its influence on conditional conservatism in an emerging Arab and African market, the Egyptian capital market. This market is in need for such research to improve financial statements users' ability to predict and understand earnings patterns, by considering the influence of cost stickiness factor.

The remaining part includes clarification of the theoretical foundation, discussion of the prior related literature and hypotheses formulation in section 2. Research design is demonstrated in section 3, followed by results discussion in section 4, and presentation of the results of robustness checks in section 5. Finally, section 6 provides conclusions, implications, and limitations of the current study, as well as suggesting avenues for future research.

## **2. Theoretical background and hypotheses development**

### ***2.1. Theoretical background***

To date, no single theory has proven to be superior in interpreting cost stickiness, conditional conservatism, or the influence of cost stickiness on conditional conservatism. According to Chi et al. (2009), these variables can be examined from multiple theoretical standpoints, including accounting-based theories, contracting-based theories, and behavioural theories, to enrich a deeper perspective about their mechanisms and effects. The existing research on the relationship between cost stickiness and conditional conservatism primarily draws its theoretical underpinnings from management deliberate choice, and agency theories. Accordingly, this study relies on both theories in explaining the potential reasons behind the findings of the empirical analysis.

From the perspective of deliberate choice theory, management expectations regarding the potential future demand for company goods affect their decisions concerning whether to keep or cut resources when demand decreases. Management optimistic or pessimistic expectations regarding future sales are likely to affect cost-stickiness (Anderson et al., 2003; Bu et al., 2015; Yang, 2019; Imani et al., 2023). In the pursuit of long-term firm profitability, management relies on forecasting future demand to determine whether to reduce costs by eliminating unused resources or to incur these costs in anticipation of future sales growth. Such a decision is justified, as it takes time to reacquire the resources when sales improve resulting in a higher profit (Abdelsalam, 2022). Taking cost asymmetric behaviour into consideration management can evaluate benefits against costs of resource adjustment decisions to cope with changes in demand (Cannon, 2014; Yang, 2019). Accordingly, empirical analysis of cost stickiness should consider the dynamic influence of resource adjustment as a determinant of firm future

earnings (Banker et al., 2016; Yang, 2019). This argument is further supported by Imani et al. (2023), who claim that the asymmetric resource adjustment contributes to the asymmetric cost behaviour as management may choose to keep or slowdown resource cut when there is a decrease in activity level, while choosing to adjust resources simultaneously in response to an increase in activity level. In a similar vein, Bu et al. (2015) argue that management is likely keep slack resources such as machine disposing costs and compensations to retired workers, when they expect sales to rebound after a while, which in turn creates cost stickiness. As a result, decisions to adjust resources in response to demand changes may lead to cost asymmetry, and management's expectations about future demand are likely to influence conditional conservatism, eliminating management need for practicing conditional conservatism as cost stickiness causes a reduction in firm earnings.

On the other hand, from the perspective of agency theory, management incentive to meet targeted earnings, increase their rewards, create their empire through maximisation of resources under their control, or overconfidence that sales will improve in the near future (Chen et al., 2012; Bu et al., 2015; Yang, 2019; Imani et al., 2023), may motivate them to overstate earnings. According to agency theory, a conflict of interest between management and users of financial statements is likely to increase when demand decreases, as managers may prefer to keep unused resources when they assume that the decline in demand is temporary and expect an improvement in demand in the future. Given the uncertainty regarding future sales, there is a possibility that the choice to keep unneeded resources is against the best interests of users who are likely to prefer disposing unused resources when demand decreases to increase firm profits (Hosomi and Nagasawa, 2018). Hence, conditional conservatism has the potential to mitigate management discretion to overstate firm earnings by reducing the information asymmetry associated with future improvement in sales (Homburg and Nasev, 2009). This implies that conditional conservatism can serve as a tool to close the information gap between management and financial statements users, and, consequently, decreases agency costs.

## ***2.2.Literature review and hypotheses development***

### **2.2.1 Sticky cost behaviour**

Asymmetric cost behaviour is the outcome of managerial decision to keep the unused resources, although the firm is witnessing a decline in demand (Bu et al., 2015; Eltivia et al., 2019). This behaviour is known in accounting literature as cost stickiness (Anderson et al., 2003; Mustafa, 2022) Cost stickiness represents the situation whereas the reduction in sales is not decreasing costs in an equal proportion as when sales increase with the same percentage (Bu et al., 2015; Kim et al., 2020). Traditional cost models assume that management resource adjustment decisions have no influence on the association between cost and firm activity level. Cost stickiness is mostly derived by management expectations about future sales volume. It may be attributed to management overconfidence regarding improved future sales (Ibrahim, 2018; Reimer, 2019). It is also likely to be a result of agency conflict of interest that motivates opportunistic managers to avoid resource-adjustment to cope with sales decline to meet their empire building goals(Chen et al., 2012), or to preserve their esteem and reputation by avoiding terminating the processes in a production-line or firing distinguished workforce (Mustafa, 2022). On the contrary management opportunism may diminish cost-stickiness, when managers cut resources just to meet profit expectation of financial analysts and owners (Banker et al., 2013; Kama and Weiss, 2013), or to preserve their compensation (Guenther et al., 2014), regardless of the impact of the resource-cut on the long-run profits when sales rebound.

Following the pioneer investigation of Anderson et al. (2003), who applying to the US context, claim that SG&A costs go up by 0.55 % while decrease by 0.35 per 1 % increase and decrease in demand respectively, many researchers have revisited this issue applying to different contexts and industrial sectors. Applying to the Japanese context, Yasukata (2011) confirms the presence of cost stickiness due to management deliberate resource adjustment decisions in companies listed on Tokyo stock exchange. They further report that cost stickiness increases when management is optimistic about future sales supporting the deliberate theory assumption (Yasukata, 2011). Applying to Argentina, Brazil and Canada, Porporato and Werbin (2012) conclude that a downward decrease by 1 percent in sales



results in a cut in costs by 0.38 %, 0.48 %, and 0.55 % respectively, compared to an increase by 0.60 %, 0.82 % and 0.94 % when sales increase by 1 percent. Dalla Via and Perego (2014), applying to Italian context, support the stickiness of total labour costs and report that operating costs stickiness is noticed in only listed firms.

Applying to the Jordanian context, Abu-Serdaneh (2014), supports the presence of cost-stickiness. Banker and Byzalov (2014) and Banker et al. (2016) confirm that cost-stickiness is a global practice applying to 20 countries during the period from 1988 to 2008. Evidence provided by Bugeja et al. (2015) applying to the Australian context indicates that Australian listed firms have sticky costs. Additionally, Bu et al. (2015), support the presence of sticky-cost behaviour applying to the Chinese context. In a more recent study, Fourati et al. (2020) findings support the sticky cost presence applying to 18 countries. Ghazalat and Abu-Serdaneh (2020) also report the presence of sticky cost behaviour in Gulf Cooperation Council states (Bahrain, Kuwait, Qatar, UAE, Oman, and Saudi Arabia). Meanwhile, it is also assumed based on the prior research findings and the theoretical underpinning employed in prior research (Fourati et al., 2020; Abdelsalam, 2022; Restuti et al., 2022), that management resource adjustment decision is likely to be influenced by the extent of downward fluctuation in firm activity level. Management in firms that are witnessing a limited reduction in demand are more likely to choose to avoid cutting costs, as the likelihood of such a diminishment in demand being temporary is higher than in firms facing a serious reduction in demand. Hence, cost-stickiness is possible to be higher in firms with low changes in activity level.

Applying to the Egyptian context, Ezat (2014) applying to a sample of Egyptian listed firms during the period from 2009 to 2013, Ibrahim (2015), Ibrahim and Ezat (2017) and Ibrahim (2018) applying to the period from 2004 to 2011 support the presence of sticky cost behaviour. This evidence encourages re-examining the presence of asymmetric timeliness of earnings behaviour in Egyptian firms using more recent evidence given the improved monitoring over listed firms by the financial market authorities during the most recent years. Additionally, it seems interesting to further explore whether the magnitude of cost-stickiness is likely to be higher in firms with

low change in activity level. Accordingly, the first and second study hypotheses are articulated as follows:

*H1: The behaviour of costs for Egyptian-listed firms remains asymmetric across different levels of activities.*

*H2: Firms with low activity level fluctuations generally exhibit higher levels of asymmetric cost behaviour compared to firms with high activity level fluctuations.*

### **2.2.2 Conditional Conservatism**

Accounting conservatism is one of the essential accounting concepts that reflects the attitude of prudence in dealing with possible future gains and losses. Basu (1997) refers to conservatism as the propensity of accounting practitioners to recognise losses swifter than gains. It is also assumed by Zhang (2008) that gains (good news) require a careful verification compared to losses (bad news). Accordingly, conservatism requires accountants to give special consideration to bad news (losses) recognition compared to good news (gains) recognition (Ghazalat and Abu-Serdaneh, 2020). According to Basu (1997), the association between earnings and return is stronger in case of bad news than in case of good news. Chi et al. (2009), highlight two main characteristics of accounting conservatism: asymmetric timeliness in gain versus loss recognition and net assets systematic underestimation. Conservatism is classified as conditional and unconditional. According to Basu et al. (2005), Beaver and Ryan (2005) and Ghazalat and Abu-Serdaneh (2020), unconditional conservatism results in understating the book value of net assets as a result of preset aspects of the accounting process, while under conditional conservatism, book value is written-down in response to bad news, while not modified upward in response to good news. This implies that conditional conservatism is very sensitive to bad news, requiring a timely recognition for bad news than good news on earnings (Harakeh et al., 2024).

Opponents of conservatism criticise on the ground that it results in an asymmetric timeliness of earnings, hence earnings will be understated in the current fiscal year while be overstated in future ones. According to Bu et al. (2015), the requirement of recognising the impact of bad news on earnings quicker than in case of good news results in a stronger earning-stock return association in case of bad news than for good news (positive returns). On the

other hand, proponents argue that conservatism improves reliability of accounting reports as it limits adverse selection and uncertainty (Mora and Walker, 2015). In a similar vein, Fourati et al. (2020), emphasise the importance of conservatism in financial recognition, reporting, and measurement and hence its role in evaluating financial-information quality. Similarly, Nasr and Ntim (2018), claim that conservatism has an important role in guiding the preparers of financial reports on the appropriate treatment in issues not covered by accounting standards. According to Xie (2015) it affects management reputation as conservatism calls for timely recognition of bad news and a postponement in the recognition of good news. For conditional conservatism the issue of interest in this study, it is considered as an income statement related as it is linked with profit undervaluation (Fourati et al., 2020).

The review of prior research on conditional conservatism supports its practice in different contexts (Homburg and Nasev, 2009; Bu et al., 2015; Banker et al., 2016; Fourati et al., 2020; Imani et al., 2023). In Banker et al. (2016) study, the results show the change in sales in US firms is linked with significant reduction in asymmetric timeliness, which in turn affects conditional conservatism. In a global study of Fourati et al. (2020), applying to 18 countries including Brazil, Russia, India, China and South Africa (BRICS), Mexico, Indonesia, South Korea and Turkey (MIST), Morocco, Tunisia and Egypt (North Africa), USA, Germany, France, Spain, UK and Greece (European Union), researchers reach the same conclusion.

Applying to the Egyptian context, the only study available to the best of authors' knowledge is the one of Elbrashi and Elgharory (2019) which examine the influence of asymmetric cost behaviour on the level of accounting conservatism applying to companies listed on the EGX during the period from 2012 to 2017 (654 firm-years). Accordingly, it seems interesting to re-examine conditional conservatism practices within the Egyptian context using data that is more recent and a bigger sample size. Additionally, it is interesting to investigate whether the practice of conditional conservatism is more extensive in high earnings firms, which seems to be investigated for the first time in this study.

Management in profitable firms are not in need to inflate earnings, hence conditional conservatism will be highly recognised in such firms (Lara et al., 2020). According to Basu (1997) conditional conservatism requires timely and complete consideration for bad news. This is likely to be translated in accounting practice into limited incentives for management to overstate earnings (Ball, 2001; Lafond and Watts, 2008). In order to mitigate the information gap between firm management and financial statements users, conditional conservatism can restrict the managerial power to inflate gains and deflate losses (Ghazalat and Abu-Serdaneh, 2020). Accordingly, with very strict verification requirements for gain recognition compared to loss recognition, the magnitude of conditional conservatism is probable to be higher in firms with high earnings compared to those with low earnings. From the perspective of the political costs theory (Rahayu and Gunawan, 2018), firms with high earnings are more in the public eye and are subject to more scrutiny from stakeholders. Conditional conservatism may alleviate pressures by facilitating prompt acknowledgment of probable losses or risks, indicating a prudent attitude and helps protecting the firm's reputation. Hence, it can be used as a strategy to manage stockholders' expectations to avoid the consequences of future fluctuations in earnings that can severely affect the trading price of its stock. Hence, mitigate the information gap between management and different stakeholder parties and reduce agency costs. In addition, acknowledging prospective losses may help firms reduce litigation risks by showing a proactive attitude towards risk management. Accordingly, the third and fourth hypotheses are articulated as follows:

*H3: The Egyptian listed firms adopt conditional conservatism accounting practices.*

*H4: The magnitude of conditional conservatism is significantly higher in firms with high earnings compared to those with low earnings.*

### **2.2.3 The implications of cost-stickiness on accounting conservatism**

The review of extant studies on cost stickiness and conditional conservatism (Anderson et al., 2003; Banker et al., 2016; Fourati et al., 2020; Ghazalat and Abu-Serdaneh, 2020; Imani et al., 2023), promulgates that cost-sales asymmetric behaviour is a product of management choice regarding whether to adjust resources responding to the expected fluctuation in sales. Management's reaction to fluctuation in demand leads to earnings

asymmetry, as firm earnings are likely to be more sensitive to decline in sales compared to increase in sales. As there is a positive linkage between activity level (firm sales) and stock return, it is likely that sticky costs result in earnings-stock return asymmetry, with earnings-stock return association being more significant in case of having negative returns (Banker et al., 2016; Fourati et al., 2020). Given that conditional conservatism results in a linear earnings-return correlation, with more swift recognition of bad news (sales decline) than good news (sales growth), this creates asymmetric timeliness of firm earnings (Homburg and Nasev, 2009; Fourati et al., 2020). Accordingly, recent line of research supports the argument that management expectations regarding the demand volume are likely to impact the influence of cost stickiness on conditional conservatism practices.

Applying to Egypt, Elbrashi and Elgharory (2019), provide evidence regarding the association between sticky cost and conditional conservatism using a relatively smaller sample than the one used in this study (654-year observations) over the period from 2012-2017. Hence, this emphasises the need to re-examine this issue using a bigger sample and more recent data. Applying to other contexts, Homburg and Nasev (2009) is one of the earlier studies that provide evidence on the influence of cost stickiness on earnings asymmetric timeliness applying to a sample of 44630 firm-observations covering years (1988-2004), from the intersection of CRSP and COMPUSTAT. This association is confirmed by more recent studies as Ghazalat and Abu-Serdaneh (2020) and Fourati et al. (2020). However, Standard conservatism models are accused of overestimating asymmetric timeliness of earnings due to their lack of control over cost asymmetric behaviour. Based on Bu et al. (2015), conservative accounting practices and asymmetric cost behaviour are different aspects as conservatism results in an asymmetry in accounting information system that report economic events, while sticky costs generate asymmetry in real economic events. Hence, the lack of control over the consequences of conditional conservatism asymmetric timeliness and the operational asymmetry due to sales fluctuation, results in upward bias in asymmetric timeliness of earnings. In a similar vein, Fourati et al. (2020), argue that the presence of perplexing impact between sticky cost behaviour and conditional conservative practices in standard models can mislead interpretations of the results of running such models. In this regard, Bu et al. (2015), applying to China report a bias of

27.2% , and Banker et al. (2016), applying to the US context conclude that controlling for sales asymmetry results in overestimate of the level of earnings asymmetric timeliness by more than 25%. This finding highlights the weaknesses in Basu (1997) model as it lacks control over cost stickiness. Additionally, Fourati et al. (2020), applying to global context with 18 countries from different parts of the World as previously indicated report that Basu (1997) model result in overestimated asymmetric timeliness of earnings by 46.55 %. Accordingly, the fifth hypothesis is articulated as follows:

*H5: Standard conservatism models overestimate asymmetric timeliness of earnings due to their lack of control over asymmetric cost behaviour.*

### **3. Research design**

#### **3.1. Sample selection and data**

The study sample consists of firms listed on the Egyptian Stock Exchange from 2017 to 2022 across six sectors. The selected time frame is primarily based on the Central Bank of Egypt's (CBE) decision on November 3, 2016, to float the Egyptian pound (PWC, 2016). Businesses are the primary entities affected by economies, leading to an impact on their financial figures. Consequently, the study period began in 2017, aligning with a significant policy change, and continued until the most recent year, 2022. To test the relationship between asymmetric cost behaviour and conditional conservatism, this study utilises financial data obtained from the Refinitiv Eikon database. The initial sample size consists of 1,422 firm-year observations. We have excluded the financial sector (276 observations) from the analysis. We subsequently have excluded firms with insufficient data (162 observations) from the study sample, following Khan and Watts (2009) and Fourati et al. (2020). The final sample consists of 164 non-financial listed firms, totaling 984 observations (balanced panel data). Table 1 presents the distribution of the sample across different sectors. The Basic materials sector has the highest representation at 22.6%, followed by Consumer cyclicals at 20.7%, Consumer non-cyclicals at 17.7%, Real estate at 15.2%, Industrials at 14.6%, and Healthcare at 9.1%.

Table 1: Study sample sector-frequency distribution

<b>Sector</b>	<b>Frequency</b>	<b>Percent</b>
Basic_materials	222	22.6
Consumer_cyclicals	204	20.7
Consumer_noncyclicals	174	17.7
Real-estate	150	15.2
Industrials	144	14.6
Healthcare	90	9.1
Total	984	100.0

### **3.2. Empirical models and variables measurement**

#### **3.2.1. Quantile regression model**

This study proposes the use of quantile regression as an advanced econometric technique to address the limitations of the traditional OLS regression method. The quantile regression model (QRM) is a statistical method employed to estimate the conditional quantiles of a response variable within a linear model rather than the conditional mean estimated by OLS regression (Koenker and Bassett 1978). QRM is employed in this study, which allows us to test the asymmetric behaviour of costs across different levels of cost change. QRM, introduced by Koenker and Bassett (1978), has been recently used in several accounting studies (Gallego-Álvarez and Ortas, 2017; Maji and Goswami, 2020; Muhammad and Migliori, 2022) to analyse relationships in which the conditional distribution of the dependent variable exhibits substantial variations with the independent variables. Moreover, several studies have highlighted the merits of quantile regression models and demonstrated that it is a suitable method for business research due to the presence of outliers or some skewness in financial data (Aguinis et al., 2013; Li et al., 2015). Since OLS regressions fail to meet the normality and homoscedasticity assumptions, this study employs quantile regression models.

QRM serves as an alternative to the limitations associated with OLS regression. In cases where residuals depart from normality or have heavy tails, OLS may produce biased estimators (Khalifa et al., 2014). On the other hand, QRM is more resilient to non-normal residuals and outlying points (Gallego-Álvarez and Ortas, 2017). QRM provides a comprehensive analysis of data by assessing the impact of a covariate on the entire distribution of the dependent variable rather than solely focusing on its conditional mean, as observed in OLS regressions. Moreover, QRM can expose differences between quantiles in terms of how they respond to changes in the dependent variable (Coad and Rao, 2006). Following Buchinsky (1998) approach, a concise summary of the QRM is explained. Let  $(R_i, P_i)$  represent a sample of observations from a population, where  $P_i$  is a vector of predictor variables that explain the response variable  $R_i$ . The following is a model for conditional quantile regression, assuming that the  $\theta$ th quantile of the conditional effect  $R_i$  is linear in  $P_i$ .

$$R_i + \beta_{\theta} P'_i + \mu_{\theta i}$$
$$Q_{\theta}(R_i|P_i) \equiv \text{INF} \{ R_i = F_i (R | P) \geq 0 \} = \beta_{\theta} P'_i$$
$$Q_{\theta}(\mu_{\theta i}|P_i) = 0 \tag{1}$$

where  $R_i$  represents the response variable for firm  $i$ ,  $P_i$  represents a vector of independent variables with dimensions  $k \times 1$ ,  $\beta_{\theta}$  represents an unknown vector of regression parameters related to the  $\theta$ th quantile, and  $\mu_{\theta i}$  represents the model residual. The  $\theta$ th quantile, which is greater than zero and less than 1 of  $R_i$  represents the minimisation of the sum of the absolute deviation residuals.

### **3.2.2. Asymmetric cost model**

This study follows Banker et al. (2013) to investigate the asymmetric behaviour of costs for Egyptian-listed firms across different levels of cost variation (H1). The ABJ 2003 model is used, which is based on an asymmetric-linear relationship between changes in costs and concurrent changes in sales. In addition, this study employs QRM to investigate whether firms with high activity level fluctuations generally exhibit lower levels of asymmetric cost behaviour compared to firms with low activity level fluctuations (H2). Thus, the following quantile regression model is formulated:



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$$Q_{\theta}(\Delta\text{Lopr}_{it}|P_{it}) = \lambda_1 + \lambda_2\Delta\text{Lsal}_{it} + \lambda_3\text{DC}_{it} + \lambda_4\Delta\text{Lsal}_{it} * \text{DC}_{it} + \varepsilon_{it} \quad (2)$$

Where  $\Delta\text{Lopr}$  represents the natural logarithm of the change in operating expenses in year  $t$  from the previous year ( $t-1$ ) at quantile  $\theta$ ;  $i$  and  $t$  represent the firm and year, respectively;  $\Delta\text{Lsal}_{it}$  represents the natural logarithm of the change in sales in year  $t$  from the previous  $t-1$  year;  $\text{DC}_{it}$  is a dummy variable equals to 1 if there is a negative variation in sales and 0 otherwise.  $\text{DC}$  is considered as a measure of managerial sentiment towards future demand, as stated by Li and Zheng (2017).  $\Delta\text{Lsal}_{it} * \text{DC}_{it}$  is a two-way interaction between a dummy variable and the natural logarithm of sales change;  $\lambda_1$  represents the intercept, while  $\lambda_2, \lambda_3, \dots, \lambda_n$  represent the regression coefficients of the independent variables.; and  $\varepsilon_{it}$  is the model residual.  $\lambda_2$  represents the estimated percentage change in costs resulting from a 1% increase or decline in sales. On the other hand,  $\lambda_4$  measures the extent of asymmetry in cost behaviour in response to sales decline versus increases, with negative values indicating cost stickiness and positive values indicating anti-cost stickiness. A higher value of  $\lambda_4$  indicates a reduced level of cost stickiness (Han et al., 2019). Coefficients  $(\lambda_2 + \lambda_4)$  calculates the percentage decrease in operating expenses with a 1% fall in sales revenue (i.e.,  $\lambda_2 + \lambda_4 < \lambda_2$ ). A significantly positive coefficient of  $\lambda_2$  with a significantly negative coefficient of  $\lambda_4$  would be associated with cost stickiness. We incorporate sector and year fixed effects in order to account for sector-specific and time-invariant factors. Continuous variables included in the interaction terms are mean-centred to mitigate the issue of multicollinearity (Aiken, 1991).

### 3.2.3. Conditional conservatism model

This study uses the standard Basu (1997) regression model to examine whether Egyptian listed firms employ conservative accounting practices (H3) by measuring the earnings asymmetric timeliness. The quantile regression model (conservatism model) is expressed as follows:

$$Q_{\theta}(\text{ER}_{it}/M_{it-1}/P_{it}) = \alpha_1 + \alpha_2\text{RE}_{it} + \alpha_3\text{DEC}_{it} + \alpha_4\text{RE}_{it} * \text{DEC}_{it} + \varepsilon_{it} \quad (3)$$

Where  $(\text{ER}_{it}/M_{it-1}/P_{it})$  is the net income before extraordinary items for firm  $i$  at year  $t$  at quantile  $\theta$ , deflated by the lagged market value of equity,  $\text{RE}_{it}$  is the 12-month period stock returns for firm  $i$  at year  $t$ ;  $\text{DEC}_{it}$  is a dummy variable, equal to 1 for bad news ( $\text{RE}_{it} < 0$ ), and zero otherwise.

$\alpha_1$  represents the intercept, while  $\alpha_2, \alpha_3, \dots, \alpha_n$  represent the regression coefficients of the independent variables, and  $\varepsilon_{it}$  is the model residual. RE serves as an indicator of forthcoming cash flow information, with a negative return implying unfavorable news. Thus,  $\alpha_2$  measures the relationship between positive returns and earnings.  $\alpha_4$  represents the discrepancy in the slopes of positive and negative returns. Conservatism implies that  $\alpha_4$  is positive due to the fact that negative returns, or unfavorable news, have a greater impact on earnings compared to positive returns, or favorable news, Thus, As a result  $(\alpha_2 + \alpha_4) > \alpha_2$ . A higher significant coefficient  $\alpha_4$  indicates a greater level of asymmetric timeliness of earnings. We incorporate sector and year fixed effects in order to account for sector-specific and time-invariant factors.

Next, we extend the model to account for the confounding variable of the asymmetric cost behaviour (full model) following Bu et al. (2015), Banker et al. (2016), and Fourati et al. (2020) studies. The aim is to determine if not accounting for the confounding influence of asymmetric cost behaviour in the conservatism standard model, leads to an upwardly biased estimation of asymmetric timeliness (H5). Model 4 integrates the Basu (1997) model of conservatism with the cost accounting approach to analyse the relationship between costs, earnings, and sales. Thus, the quantile regression model (full model) can be expressed as follows:

$$Q_{\theta}(ER_{it}/M_{it-1}/P_{it}) = \alpha_1 + \alpha_2 RE_{it} + \alpha_3 DEC_{it} + \alpha_4 RE_{it} * DEC_{it} + \lambda_2 \Delta Lsal_{it} + \lambda_3 DC_{it} + \lambda_4 \Delta Lsal_{it} * DC_{it} + \sum_{j=5}^9 \alpha_j Sector_{it} + \varepsilon_{it} \quad (4)$$

All variables are previously defined in model 2 and model 3. Sector is a dummy variable that controls sector.  $\lambda_4$  captures the asymmetric cost behaviour. Asymmetric cost behaviour implies that, after controlling conditional conservatism, earnings tend to decline more significantly in response to decreases in sales compared to the extent to which they increase in response to equivalent sales increases. In this study, we propose that an increase in asymmetric cost behaviour is linked to a reduction in conditional conservatism(H4). Hence, the coefficient of  $RE_{it} * DEC_{it}$  in model 4 will be smaller compared to that of model 3 after controlling for the confounding variable. The coefficients  $\lambda_2$  and  $\lambda_4$  illustrate the earnings-sales relationship, accounting for asymmetric cost behaviour.  $\alpha_4$  reflects the asymmetric timeliness in earnings, which is exclusively due to conservatism since we

explicitly control for asymmetric cost behaviour. Hence, it is anticipated that  $\alpha_4$  will have a positive value.  $\Delta\text{Lsal}$  impacts the slope of the relationship between costs and sales. It is anticipated that the slope of earnings in relation to sales will be lower in the event of a sales reduction compared to a sales rise. Similar to Bu et al. (2015) study, this study expect that  $\lambda_4$  will be negative. Finally, this study proposes that the impact of cost asymmetric behaviour on conditional conservatism may differ among different quantiles of earnings(H4). Thus, we run model 4 (full model) for low and high quantiles (q0.25, q0.5, q0.75, and q0.95) to capture estimates of cross-quantile variation in asymmetric timeliness. We incorporate sector and year fixed effects in order to account for sector-specific and time-invariant factors.

#### **4. Empirical results**

##### **4.1. Descriptive statistics and correlation analyses**

Table 2 displays the descriptive statistics of the study variables, encompassing the mean, standard deviation, minimum, maximum, first quartile, median, third quartile, and fourth quartile. The results reveal that the average rate (standard deviation) of the logarithm of change in operating expense score is 1.1369 (0.7924), with a minimum of.1748 and a maximum of 15.4822. Furthermore, the average rate (standard deviation) of the logarithm of change in sales score is 0.2129 (standard deviation = 1.5317), ranging from a minimum of 0.00003 to a maximum of 32.840. The direction of change in the rate of change in the cost of sales is the same as the rate of change in sales. The ratios reported by Anderson et al. (2003), Chen et al. (2012), and Fourati et al. (2020) are not comparable to the ratios reported in this study. The variation in country, sample size, and time period may account for the discrepancy. The average net income before extraordinary items, deflated by the lagged market value, is 6.53%, while the median is 4.59%. This suggests that the net income exhibits a positive skew. The average annual stock return is.4237, while the median is.0858. The mean (median) values of operating accrual are.21759 (-.0019), and the standard deviation is 0.21759, which indicates cross-sample variance.

Table 2: Descriptive statistics

Variables	Mean	Std. Dev.	q0.25	q0.5(Median)	q0.75	q0.95	Minimum	Maximum
ΔLopr	1.1369	.7924	.8608	1.0623	1.2518	1.8827	.1748	15.4822
ΔLsal	.2129	1.5317	.0060	.0235	.0752	.4327	.00003	32.840
ΔLsal*DC	.0282	.1966	0	0	.0134	.1155	0	5.7788
ER	.0653	.2589	.0003	.0459	.1399	.3943	-1.287	1.831
RE	.4237	1.215	-.1523	.0858	.5340	2.3428	-.8888	9.656
RE*DEC	-.0887	.1473	-.1523	-.0137	-.0063	-.0004	0	-.8888
OpAcc	.21759	6.3378	-.0801	-.0019	.0583	.4325	-73.8171	128.7801

Table 3 presents the correlation matrix for the study variables. Most correlations are statistically significant, yet they tend to be of small magnitude. This indicates that the study models are not suffering from the problem of multicollinearity (Hartlieb and Loy, 2022). The results reveal that the change in sales revenue (ΔLsal) is positively and significantly correlated with the dependent variable cost of sales (ΔLopr). Furthermore, ΔLsal\*DC is negatively and significantly correlated with the dependent variable (ΔLopr). This may support the first assumption that the Egyptian listed firms have asymmetric cost practices. Furthermore, the annual stock return (RE) and RE\*DEC are positively and significantly correlated with the dependent variable net income before extraordinary items (ER). This may support the second assumption that the Egyptian listed firms have an asymmetric timeliness of earnings.

Table 3: Correlation analysis

	ΔLopr	ΔLsal	ΔLsal*D C	ER	RE	RE*DEC	OpAcc
ΔLopr	0						
ΔLsal	.119**	0					
ΔLsal*DC	-.021*	.111**	0				
ER	.069*	.427**	-.018	0			
RE	-.014	.015	-.011	.083**	0		
RE*DEC	.016	.028	-.006	.141**	.376**	0	
OpAcc	.011	.561**	-.011	.254**	.029	.004	0

Notes: \*\*( $p < 0.01$ ), \*( $p < 0.05$ ).

## 4.2. Multivariate analysis

### 4.2.1. Asymmetric cost model analysis

For the purpose of comparison and robustness, Table 4 displays the findings of the OLS and quantile regression analyses conducted on the asymmetric cost model (model 2). The purpose of this analysis is to investigate whether the costs of Egyptian-listed firms exhibit asymmetric behaviour and if this behaviour persists across various quantiles, representing different levels of activities. According to the OLS results, the regression analysis indicates that the model is statistically significant, with an adjusted R-squared value of 64.5%. This suggests that the independent variables account for 64.5% of the variability in the changes of operating costs. Additionally, the coefficients  $\lambda_2$  (1.198) and  $\lambda_4$  (-0.528) exhibit statistical significance at the 0.01 level. The positive coefficient of  $\lambda_2$  suggests that a 1% rise in sales revenue leads to a corresponding increase of 1.198% in the cost of revenue. In contrast, the combined values of  $\lambda_2$  and  $\lambda_4$  suggest that a 1% decrease in sales revenue results in a corresponding decrease of 0.67% in the cost of revenue (calculated as  $1.198 + (-0.528)$ ). This implies that costs exhibit a greater increase with increasing activity levels but do not experience an equivalent decrease when activity levels decrease. This suggests the presence of asymmetric cost behaviour. The findings align with previous studies by Ibrahim and Ezat (2017) and Ibrahim (2018), which indicate that Egyptian-listed firms commonly exhibit asymmetric cost behaviour. Additionally, finding of this study aligns with the findings of research applying to other contexts such as Banker et al. (2016), as well as Fourati et al. (2020), that also demonstrate the presence of cost stickiness in the international context. This finding is in line with the notions of deliberate choice theory as management resource adjustment decision in response to changes in demand creates cost asymmetry (Bu et al., 2015; Banker et al., 2016; Imani et al., 2023). Accordingly, it seems that in Egyptian firms management may choose to keep, or slowdown resource cut when there is a decrease in activity level, while choose to adjust resources simultaneously in response to an increase in activity level. This in turn results in cost stickiness. This also agrees with the notions of agency theory and management intervention and desire to create their empire through maximisation of resources under their control or overconfidence as they expect that sales will improve in the near future (Bu et al., 2015; Ibrahim and Ezat, 2017; Yang, 2019; Imani et al., 2023).

The quantile regression results indicate that the coefficient  $\lambda_2$  is positive and statistically significant across the four quantiles (0.25, 0.5, 0.75, and 0.95), with corresponding values of 0.999, 1.157, 1.289, and 2.498, respectively. The analysis demonstrates that a 1% increase in sales revenue is associated with a corresponding rise of 0.999%, 1.157%, 1.289%, and 2.498% in the cost of revenue at the 25th, 50th, 75th, and 95th percentiles, respectively. On the other hand, the coefficient  $\lambda_4$  exhibits negative and statistically significant effects across all quantiles, with corresponding values of -0.479, -0.695, -0.929, and -2.292, respectively. This finding corroborates the outcomes of the ordinary least squares (OLS) regression and affirms the enduring presence of asymmetric cost behaviour across different quantiles. Thus, we accept H1 that the behaviour of costs for Egyptian-listed firms remains asymmetric across different levels of activity change. Additionally, the estimated values of  $\lambda_4$ , obtained from the 0.25, 0.5, 0.75, and 0.95 quantiles, consistently exhibit an increasing trend, as shown in Figure 1 (c) and illustrated in Table 4. Following Anderson et al. (2003) model, a higher absolute value of  $\lambda_4$  signifies a lower degree of cost stickiness, indicating that costs are more responsive to changes in sales.

Following Paternoster et al. (1998), the z test was conducted to examine the difference between two regression coefficients. The coefficient  $\lambda_4$  was found to be -0.528 (s.e. = 0.005) in the OLS regression. However, in the 0.5, 0.75, and 0.95 quartiles, the coefficients were -0.695, -0.929, and -2.292, respectively. The z test results for the difference between slopes are 20.654, 27.890, and 15.574, respectively. Thus, we reject the null hypothesis of equal coefficients as the p-value of z test is less than 0.05. This suggests that Egyptian firms demonstrate asymmetric cost behaviour, with a greater effect observed at lower quantiles compared to the higher quantile. Specifically, an increase in the value of  $\lambda_4$  indicates a decrease in the level of asymmetric cost behaviour. The z test results show an insignificant difference between slopes ( $\lambda_4$ ) in the OLS regression and the 0.25 quantile. However, the z test results show a significant difference between slopes ( $\lambda_4$ ) in the low (0.25) and high (0.95) quantiles. Thus, the degree of asymmetric cost behaviour is greater for firms with low changes in activity levels compared to firms with higher changes in activity levels. This finding aligns with H2 and is in line with the deliberate choice theory as well as management empire building desire and overconfidence under agency theory (Banker and Byzalov, 2014; Ezat, 2014; Ibrahim and Ezat, 2017).

The results can be attributed to multiple factors. Managers in stable firms (low change in the level of activity) may exhibit reluctance to frequently adjust cost structures due to the predictability of their operating environment, potentially resulting in asymmetric cost behaviour (Restuti et al., 2022). Furthermore, companies that maintain a consistent level of activity often develop dependable relationships with suppliers, customers, and employees. These relationships are based on the stability of the company's activity level. Making significant cost adjustments to the cost structure during periods of activity downturns can have negative consequences by disrupting relationships and causing firms to retain higher costs than necessary (Mustafa, 2022). In contrast, firms that undergo substantial fluctuations in activity levels possess a higher capacity to modify their cost structure in accordance with shifts in demand. These firms typically possess greater resource allocation flexibility and may exhibit more adaptable cost structures, resulting in a reduced level of asymmetric cost behaviour.

Finally, the slope equality tests of parameters, as proposed by Koenker and Bassett (1978), provide confirmation that the slope parameters differ between the upper and lower quantiles. Figure 1 presents a line representing different quantiles of changes in costs, specifically 0.25, 0.50, 0.75, and 0.95. The line demonstrates the estimated relationship between the independent variable and the quantile of the change in costs. The figure illustrates a positive correlation between quantiles and changes in sales, indicating that changes in sales tend to be lower at lower quantiles and increase as quantiles increase. On the other hand, the interaction variable that signifies the asymmetrical cost behaviour exhibits a decreasing trend in the upper quantile of cost changes when compared to the lower quantile. This suggests that firms with high sales and significant cost changes are experiencing a reduction in the degree of asymmetric cost behaviour.

Table 4 OLS and quantile regression results for asymmetric cost model

$Y = \Delta Lopr_{it}$	OLS	q0.25	q0.5	q0.75	q0.95
$\Delta Lsal_{it}$	1.198** (0.004)	0.999** (0.036)	1.157** (0.051)	1.289** (0.040)	2.498** (0.181)
$DC_{it}$	-0.013** (0.003)	-0.092** (0.023)	-0.053** (0.011)	-0.028** (0.010)	-1.334** (0.500)
$\Delta Lsal_{it} * DC_{it}$	-0.528** (0.005)	-0.479** (0.083)	-0.695**+ (0.059)	-0.929**+ (0.052)	-2.292**+% (0.181)
Cons.	0.991** (0.002)	1.001** (0.004)	0.996** (0.009)	1.007** (0.007)	2.800** (0.499)
Pseudo $-R^2$	----	0.595	0.594	0.544	0.412
Adjusted $R^2$	0.645	0.594	0.593	0.542	0.411
Obs	984	984	984	984	984

Notes: \*\*( $p < 0.01$ ), \*( $p < 0.05$ ). Standard error is between brackets. + indicates statistical differences in the regression coefficients between OLS and different quantiles at 0.01 level. % indicates differences in the regression coefficients between the low (q0.25) and the high quantiles (q0.95) at 0.01 level.

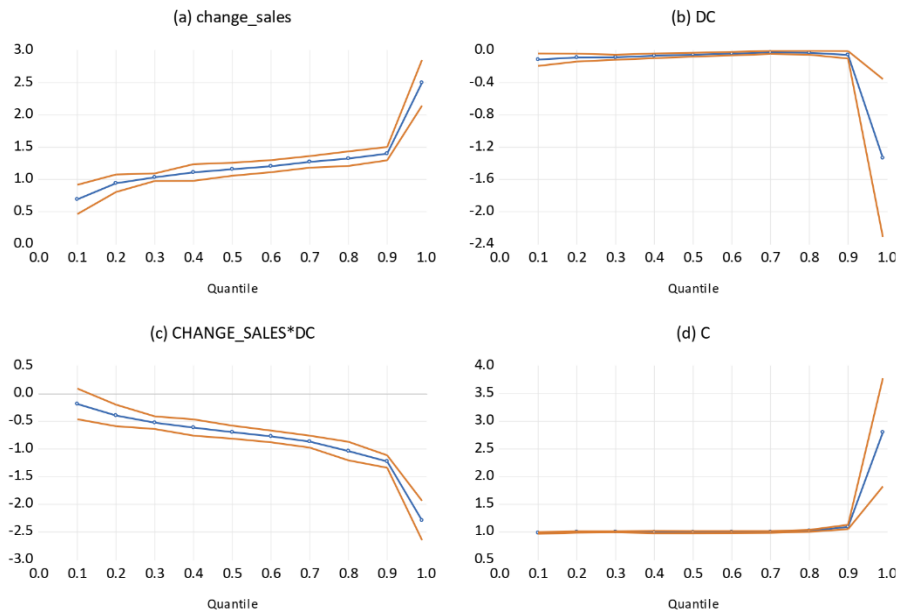


Fig.1. Quantile processes Estimates for the asymmetric cost behaviour model.



#### 4.2.2. Conditional conservatism model analysis

Table 5 displays the findings of the OLS and quantile regression analyses conducted on the Basu (1997) model (model 3) and the full model (model 4). Additionally, Figure 2 displays a graphical representation of the point estimates of the full model parameters. Regarding the OLS regression, the coefficient of  $DEC_{it} * RE_{it}$  ( $\alpha_4$ ) is positive and significant at the 0.01 level for both the conservatism model and the full model. This suggests that there is significant conservatism and implies a faster and more comprehensive recognition of negative news compared to positive news. Additionally, the results confirm that conditional conservatism has significant economic implications, even after controlling for the cost asymmetric behaviour. Consistent with H3, the results confirm that the Egyptian listed firms adopt conditional conservative accounting practices. This result is in line with those of prior studies applying to other contexts (e.g., Bu et al., 2015; Banker et al., 2016; Fourati and Ghorbel; Ghazalat and Abu-Serdaneh, 2020; Imani et al., 2023). This confirms the arguments of the theoretical underpinning employed in this study. Based on deliberate choice theory, management expectations regarding increase (good news) or decrease (bad news) in demand may lead to a situation whereas management is not in need to practice conditional conservatism as cost stickiness causes a reduction in firm earnings. However, based on the agency theory, conditional conservatism practices helps in diminishing the information gap between management and users of financial reports.

Additionally, the full model denotes a significant negative coefficient of  $\Delta L_{sal} * DC$  ( $\lambda_4$ ), which denotes the existence of asymmetric cost behaviour. The comparison of the coefficient of conditional conservatism ( $DEC_{it} * RE_{it}$ ) between the conditional conservatism model and the full model reveals a significant decrease from 0.135 to 0.074 (82%). This decrease is statistically significant at the 0.05 level, as indicated by a t-statistic of 1.648 and a p-value of less than 0.05. In line with hypothesis H5, the findings support the notion that the estimation of conditional conservatism is linked to a significant upward bias of 82%. This bias arises due to the conditional conservatism model's failure to account for asymmetric cost behaviour. This finding aligns with that of Banker et al. (2016) which reports a bias of 25.4%. This also supports that of Fourati et al. (2020) study, which demonstrates that the conditional conservatism model overestimates the degree of asymmetric timeliness of earnings by 46.5% due to the absence of control over asymmetric cost behaviour. Similarly, Bu et al. (2015) confirm that the standard measure of conservatism overestimates the true level of conservatism by 27.2% on average because it fails to account for the confounding effect of asymmetric cost behaviour. Furthermore, this finding

supports that of Elbarashi and Elgharory (2019) which reports 60% measurement bias. Therefore, it is crucial to consider stickiness to make accurate inferences. The adjusted  $R^2$  shows the goodness of fit of the models. The results show that the conditional conservatism  $R^2$  has lower explanatory power than the full model one (the adjusted  $R^2$  is equal to 6.4% and 11.9%, respectively).

The results of the quantile regression in Table 5 demonstrate that the coefficient estimate  $\lambda_2$  is positive and statistically significant for the quantiles 0.25, 0.5, 0.75, and 0.95. These findings hold true when accounting for conditional conservatism in the full model. Furthermore, the coefficient  $\lambda_4$  demonstrates a consistent and statistically significant negative impact across all quantiles. This finding supports the results in Table 4 for the asymmetric cost model (model 2). It confirms the study hypothesis H1, the persistent existence of asymmetric cost behaviour across various quantiles and strengthens the reliability of the study's findings. The results are consistent with the study conducted by Bu et al. (2015) in China, which also confirms a significant negative coefficient for  $\lambda_4$  when considering conditional conservatism. This emphasises the existence of cost-stickiness.

Regarding the asymmetric timeliness of earnings, Table 5 demonstrates that the coefficient of  $DEC_{it} * RE_{it}$  ( $\alpha_4$ ) is insignificant at the lowest quantile (q0.25) and at the central (q0.50) quantile at the conservatism model and full model. This indicates that firms with lower level of earnings lack conditional conservatism practices in their reports. On the other hand, the results reveal that the coefficient of  $DEC_{it} * RE_{it}$  ( $\alpha_4$ ) is positive and significant at the highest quantiles (q0.75–q0.95). Besides, the results show that as the quantile levels move up, the strength of the conditional conservatism increases monotonically in magnitude from 0.027 in the full model at q0.25 to 0.176 at q.95, indicating that the effect of conditional conservatism is more pronounced for firms with higher earnings, as shown in Figure 2 (c). Furthermore, this increase is statistically significant at the 0.05 level, as shown by a t-statistic of 1.719 and a p-value below 0.05, when comparing the q0.25 coefficient estimates with the q0.95 coefficients estimates for the full model. The results are consistent with hypothesis H4, indicating firms with high earnings have greater levels of conditional conservatism in comparison to those with low earnings. This result supports the claim of Ghazalat and Abu-Serdaneh (2020) as to mitigate the information gap between firm management and financial statements users, conditional conservatism can restrict the managerial power to inflate gains and deflate losses. Accordingly, with very strict verification requirements for gain recognition compared to loss recognition, the conditional conservatism magnitude is higher in firms with high earnings compared to those with low

earnings. From the perspective of the political costs theory (Rahayu and Gunawan, 2018), this might be attributed to the fact that firms with high earnings are subject to more scrutiny from stakeholders. Conditional conservatism may alleviate pressures by facilitating prompt acknowledgment of probable losses or risks, indicating a prudent attitude and helps protecting the firm's reputation. In addition, acknowledging prospective losses may help firms reduce lawsuit risks by showing a proactive attitude towards risk management (Ramalingegowda and Yu, 2012; Rahayu and Gunawan, 2018).

Finally, the comparison of the coefficient of conditional conservatism ( $DEC_{it} * RE_{it}$ ) between the conditional conservatism model and the full model at the highest quantiles (q0.95) reveals a significant decrease from 0.827 to 0.176. This decrease is statistically significant at the 0.05 level, as indicated by a t-statistic of 2.943 and a p-value= 0.001. The result aligns with the ordinary least squares (OLS) regression in Table 5 and supports hypothesis H5. This further confirms the notions of the theoretical underpinning employed in this study. This also highlights the great influence of asymmetric cost behaviour on conditional conservatism. Accordingly, it is crucial to consider cost-stickiness to make accurate inferences regarding conditional conservatism practices. The findings support the notion that the estimation of conditional conservatism is linked to a significant upward bias of 79% due to the absence of control over the asymmetric cost behaviour in the conditional conservatism model.

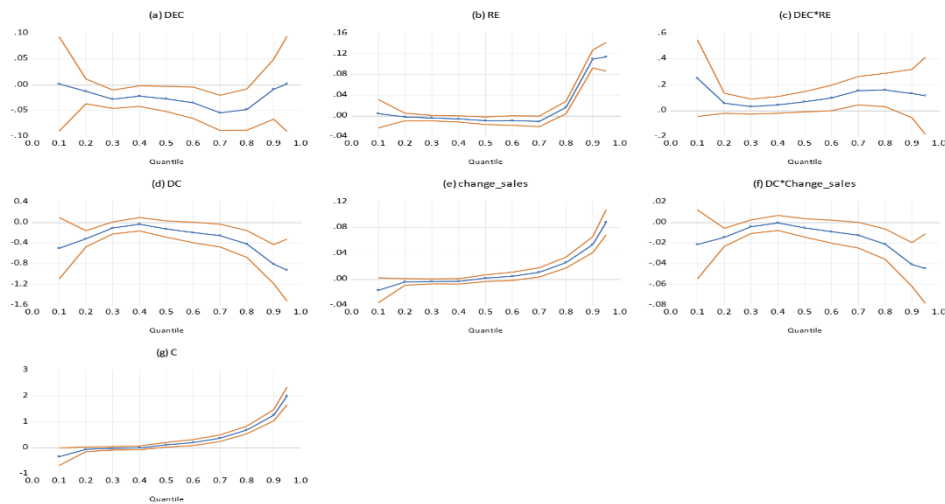


Fig.2. Quantile processes Estimates for the full model.

Table 5 OLS and quantile regression results for conditional conservatism model and full model.

Y = ER	OLS		q0.25		q0.5		q0.75		q0.95	
	Conservatism model	Full model	Conservatism model	Full model	Conservatism model	Full model	Conservatism model	Full model	Conservatism model	Full model
RE <sub>it</sub>	0.0092*** (0.003)	0.005** (0.000)	-0.003* (0.001)	-0.004* (0.001)	-0.008** (0.002)	-0.009** (0.000)	0.014** (0.008)	0.008** (0.002)	0.057** (0.009)	0.068** (0.019)
DEC <sub>it</sub>	-0.030** (0.011)	-0.037** (0.000)	-0.0131 (0.009)	-0.022* (0.009)	-0.025* (0.011)	-0.028** (0.011)	-0.060** (0.020)	-0.056** (0.017)	0.097 (0.257)	-0.126* (0.056)
DEC <sub>it</sub> *RE <sub>it</sub>	0.135*** (0.037)	0.074** (0.000)	0.048 (0.029)	0.027 (0.025)	0.078 (0.065)	0.068 (0.035)	0.155** (0.040)	0.138** (0.055)	0.827** (0.205)	0.176* (0.083)
ΔLsal <sub>it</sub>		0.006** (0.000)		0.003* (0.000)		0.002* (0.000)		0.019** (0.003)		0.131** (0.005)
DC <sub>it</sub>		-0.248** (0.001)		-0.230* (0.091)		-0.130* (0.064)		-0.401** (0.111)		-1.979** (0.175)
ΔLsal <sub>it</sub> *DC <sub>it</sub>		-0.011** (0.000)		-0.010* (0.004)		-0.008* (0.002)		-0.019** (0.006)		-0.096** (0.008)
Cons.	0.087*** (0.005)	0.205** (0.001)	0.008 (0.004)	-0.037 (0.033)	0.069** (0.006)	0.111 (0.062)	0.184** (0.009)	0.551** (0.063)	0.860** (0.135)	3.131** (0.129)
Sector	Included	Included	Included	Included	Included	Included	Included	Included	Included	Included
Pseudo -R <sup>2</sup>	----	----	0.051	0.068	0.061	0.067	0.088	0.098	0.084	0.447
R-squared	0.064	0.119	0.030	0.046	0.042	0.055	0.072	0.092	0.041	0.444
Obs	984		984		984		984		984	

Notes: \*\*( $p < 0.01$ ), \*( $p < 0.05$ ). Standard errors are between brackets.

## 5. Robustness test

The Robustness checks results are demonstrated as in Table 6 using Robust Least Squares analysis. The conditional conservatism model and the full model are presented using operating accruals (OpAcc) as an alternative measurement for the dependent variable as suggested by Collins et al. (2014) and Hsu et al. (2012). Operating accrual is calculated as earnings less cash flow from operating activities scaled by the market value of equity at the beginning of the fiscal year. The results in Table 6 confirm the original study results. The coefficients of  $DEC_{it} * RE_{it}$  (0.072) is positive and significant at 0.0 level. Additionally,  $\Delta Lsal_{it} * DC_{it}$  (-0.012) is positive and significant at 0.0 level. This finding demonstrates that the operating accruals asymmetry can indicate both conservatism and cost stickiness. The coefficient  $DEC_{it} * RE_{it}$  exhibited a decrease in magnitude in the full model when accounting for the confounding variable. Furthermore, the study has conducted a full model (model 4) on a subsample of 222 observations. The results presented in Table 6 validate the findings reported in Table 5. Finally, for endogeneity and robustness check, following Banker et al. (2016) model, the lagged values of the independent variables were added to the full model. This study investigates the impact of negative stock returns and sales decline in the previous period on the level of asymmetry in the current period. Thus, the robust least squares model (full model) can be expressed as follows:

$$ER_{it}/M_{it-1} = \beta_1 + \beta_2 RE_{it} + \beta_3 DEC_{it} + \beta_4 RE_{it} * DEC_{it} + \beta_5 \Delta Lsal_{it} + \beta_6 DC_{it} + \beta_7 \Delta Lsal_{it} * DC_{it} + \beta_8 RE_{it-1} + \beta_9 DEC_{it-1} + \alpha \beta_{10} RE_{it-1} * DEC_{it-1} + \beta_{11} \Delta Lsal_{it-1} + \beta_{12} DC_{it-1} + \beta_{13} \Delta Lsal_{it-1} * DC_{it-1} + DEC_{it-1} (\beta_{14} RE_{it} + \beta_{15} DEC_{it} + \beta_{16} RE_{it} * DEC_{it}) + DC_{it-1} (\beta_{17} \Delta Lsal_{it} + \beta_{18} DC_{it} + \beta_{19} \Delta Lsal_{it} * DC_{it}) + \sum_{j=20}^{24} \alpha_j Sector_{it} + \varepsilon_{it} \quad (5)$$

The variables are defined in models 2, 3, and 4. In the full model, we aim to estimate the relationship between prior and current periods by incorporating interactions with lagged sales decreases and lagged negative returns. The coefficient of the interaction term  $DC_{it-1} * \Delta Lsal_{it} * DC_{it}$  (-0.027) is statistically significant and has a negative value at a significance level of 0.01. Furthermore, the coefficient of the interaction term  $DEC_{it-1} * DEC_{it} * RE_{it}$  (0.052) exhibits a statistically significant and positive effect at 0.01 level. The outcome aligns with the findings presented in Table 5, which confirm the robustness of the study results.

Table 6 Robustness check results

	Robust OLS (Y = OpAcc)		Subsample (Y = ER)	Lagged values (Y = ER)
	Conservatism model	Full model	Full model	Full model
RE <sub>it</sub>	0.028 <sup>**</sup> (.000)	0.0280 <sup>**</sup> (.000)	0.028 <sup>**</sup> (.002)	0.002 <sup>**</sup> (.000)
DEC <sub>it</sub>	-0.012 <sup>**</sup> (.000)	-0.012 <sup>**</sup> (.000)	-0.039 <sup>**</sup> (.006)	-0.035 <sup>**</sup> (.001)
DEC <sub>it</sub> *RE <sub>it</sub>	0.072 <sup>**</sup> (.000)	0.061 <sup>**</sup> (.001)	0.106 <sup>**</sup> (.019)	0.063 <sup>**</sup> (.004)
ΔLsal <sub>it</sub>		0.007 <sup>**</sup> (.000)	0.033 <sup>**</sup> (.001)	0.011 <sup>**</sup> (.000)
DC <sub>it</sub>		-0.261 <sup>**</sup> (.001)	-0.836 <sup>**</sup> (.038)	-0.478 <sup>**</sup> (.008)
ΔLsal <sub>it</sub> *DC <sub>it</sub>		-0.012 <sup>**</sup> (.000)	-0.039 <sup>**</sup> (.002)	-0.023 <sup>**</sup> (.000)
RE <sub>it-1</sub>				-0.001 <sup>**</sup> (.000)
DEC <sub>it-1</sub>				0.011 <sup>**</sup> (.001)
DEC <sub>it-1</sub> *RE <sub>it-1</sub>				0.103 <sup>**</sup> (.003)
ΔLsal <sub>it-1</sub>				0.001 <sup>**</sup> (.000)
DC <sub>it-1</sub>				-0.304 <sup>**</sup> (.007)
ΔLsal <sub>it-1</sub> *DC <sub>it-1</sub>				-0.005 <sup>**</sup> (.000)
DEC <sub>it-1</sub> *DEC <sub>it</sub>				0.007 <sup>**</sup> (.002)
DEC <sub>it-1</sub> *RE <sub>it</sub>				0.005 <sup>**</sup> (.000)
DEC <sub>it-1</sub> *DEC <sub>it</sub> *RE <sub>it</sub>				0.052 <sup>**</sup> (.006)
DC <sub>it-1</sub> *DC <sub>it</sub>				0.511 <sup>**</sup> (.013)
DC <sub>it-1</sub> *ΔLsal <sub>it</sub>				-0.010 <sup>**</sup> (.000)
DC <sub>it-1</sub> *ΔLsal <sub>it</sub> *DC <sub>it</sub>				-0.027 <sup>**</sup> (.000)
Cons.	0.009(.000)	0.145(.000)	0.701 <sup>**</sup> (.020)	0.339 <sup>**</sup> (.004)
Sector	Included	Included	Included	Included
R-squared	0.025	0.045	0.140	0.096
Obs	984		222	984

Notes: <sup>\*\*</sup>(p < 0.01), <sup>\*</sup>(p < 0.05). Standard errors are between brackets.

## **6. Conclusions, implications, limitations, and future research**

This study provides auxiliary evidence on conditional conservatism, cost stickiness and the influence of cost stickiness on conditional conservatism practices in the Egyptian context, a leading emerging market that has been under-researched. This market needs such research to improve financial statement users' ability to predict and understand earnings patterns, by considering the influence of cost stickiness factor. Using an advanced econometric technique, the quantile regression approach and applying to firms listed on the EGX during the period from 2017 to 2022, this study contributes to enhancement of our understanding of cost behaviour, and how it affects the reported financial results of firms. The results indicate that the cost behaviour in Egyptian listed firms is asymmetric across different activity levels. Asymmetric cost behaviour is proved to be at a lower level in firms with high level of activity fluctuation compared to those with lower levels. Additionally, results show that conditional conservatism is evident in Egyptian firms. The magnitude of this practice is higher in firms with high earnings levels. The study findings confirm the measurement bias in traditional conservatism measurement models that proved to overestimate the level of conservatism by 82%, due to the absence of control over sticky costs. This supports the inferences provided in prior studies on the necessity to consider the asymmetric cost behaviour when predicting conservatism. The study results proved to be robust using different model settings and various measures of the response-variable.

The analysis results also demonstrate how the magnitude of asymmetric behaviour varies across different quantiles. This in turn further confirm the study findings. This is also in line with the theoretical underpinning employed. Results are of importance for accounting practitioners, management, investors, financial analysts, researchers, and policy makers to evaluate the extent of cost stickiness influence over the level of conditional conservatism at different activity levels. Results can help policy makers, investors, and financial analysts to assess current hurdles and the expected future performance of firms operating in Egypt. Results also emphasise the need of researchers to employ advanced econometric analysis techniques to improve the accuracy of the analysis by overcoming the many

limitations of the traditional statistical regression analysis tools. The finding that the magnitude of asymmetric cost behaviors is higher in firms with low activity level fluctuation in contrast to firms with significant fluctuations, suggests the importance of considering the influence of asymmetric cost behaviour over earnings patterns by firms management. This is likely to improve the efficiency of cost controls. This paper adds to financial accounting and management accounting literatures. It responds to the call of Banker et al. (2016) and Yang (2019) to investigate whether cost stickiness has merits (i.e. it supports rational management of resources to avoid future adjustments rather than merely reflecting abuse of corporate resources due to agency problems).

This study is not free from limitations. It investigates the presence of asymmetric cost behaviour, conditional conservatism and the influence of asymmetric cost behaviour on conditional conservatism practices in the Egyptian context. Hence, future work can examine the determinants and consequences of asymmetric cost behaviour and conditional conservatism. Future research can replicate the study applying it to other contexts and compare the results. Future research can investigate the mediating or moderating role of some variables such as corporate governance related variables (e.g., board characteristics, board diversity, audit committee effectiveness), and ownership structure (e.g., management ownership, concentrated ownership, government ownership) on the association between conservatism and cost stickiness. This study employs deliberate choice and agency theories to interpret the study findings, so future research can further develop the theoretical underpinning by hiring additional theories. Finally, this study employs quantitative approach to investigate the influence of sticky costs on conditional conservatism practices in Egyptian firms; future research can employ qualitative research methods such as interviews to give more insights on the quantitative analysis findings.

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## هل يؤثر السلوك المتباين للتكلفة على ممارسات التحفظ الشرطي؟ مدخل الانحدار الكمي

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### ملخص الدراسة

تبحث الدراسة في السلوك غير المتماثل للتكلفة عند مستويات مختلفة من النشاط، وأثر ذلك على دقة التنبؤ بالأرباح وفهم أنماط سلوكها. علاوة على ذلك، توفر هذه الدراسة أدلة إضافية فيما يتعلق بتوقيت الاعتراف بالأرباح، مع التركيز بشكل خاص على التحفظ الشرطي، وذلك بالتطبيق على مصر كنموذج لأحد الاقتصادات الناشئة. وللتغلب على نقاط الضعف الموجودة بنماذج تحليل الانحدار التقليدية التي اعتمدت عليها غالبية الدراسات السابقة مثل نموذج انحدار المربعات الصغرى العادية (OLS) Ordinary Least Squares، تعتمد هذه الدراسة على نموذج الانحدار الكمي Quantile Regression Model. ويتميز نموذج الانحدار الكمي بتوفيره إطارًا لاختبار فرضيات الدراسة عبر سيناريوهات مختلفة، تشمل مستويات مختلفة من التكاليف والأرباح لشركات مختلفة. وتتكون العينة النهائية للدراسة من ١٦٤ شركة مدرجة بالبورصة المصرية خلال الفترة من ٢٠١٧ إلى ٢٠٢٢ (إجمالي ٩٨٤ مشاهدة). وتشير نتائج الدراسة إلى وجود ظاهرة السلوك غير المتماثل للتكلفة بالشركات المدرجة بالبورصة المصرية، فضلًا عن ممارستها للتحفظ المحاسبي الشرطي. كذلك تشير النتائج إلى زيادة السلوك غير المتماثل للتكلفة في الشركات ذات التقلبات المحدودة في مستويات النشاط مقارنة بالشركات ذات التقلبات الكبيرة في مستويات النشاط. تظل نتائج الدراسة ذات دلالة إحصائية حتى مع مراعاة تأثير الصناعة والعوامل الخاصة بالسنة، كذلك تظل النتائج دون تغيير حتى مع استخدام الاستحقاقات التشغيلية كمتغير تابع. تساهم هذه الدراسة في الأدبيات الحالية في مجال المحاسبة المالية من خلال تقديم أدلة تؤكد على أهمية فهم سلوك التكلفة للتنبؤ بدقة بالأرباح وفهم عدم التماثل في توقيت الاعتراف بها. بالإضافة إلى ذلك، تعد هذه الدراسة واحدة من أولى الدراسات التي تبحث في العلاقة بين السلوك غير المتماثل للتكلفة وعدم التماثل في توقيت الاعتراف بالأرباح باستخدام مدخل الانحدار الكمي.

### الكلمات المفتاحية

التكاليف للزجة، التحفظ الشرطي، نظرية الوكالة، نظرية الاختيار المتعمد، عدم التماثل في توقيت الاعتراف بالأرباح