

Quality of audit and cost stickiness empirical evidence from emerging markets**Nahla Abdulrahman Mohammed Raweh^{a*} and Abdulwahid Ahmed Hashed Abdullah^b**^a*Department of Accounting, Faculty of Commerce and Economics, Hodeidah University, Hodeidah, Yemen*^b*Department of Accounting, College of Business Administration, Prince Sattam Bin Abdulaziz University, Saudi Arabia***ABSTRACT***Article history:*

Received May 25, 2023

Received in revised format July 28, 2023

Accepted October 8 2023

Available online

October 8 2023

*Keywords:**Cost stickiness**Sales**General, and Administrative costs**Audit committee meetings**Audit quality**Saudi Arabia*

This study aims to present further evidence of cost stickiness by employing Selling, General, and Administrative (SG&A) costs. It also provides empirical evidence on the effect of audit committee meetings and audit quality on cost stickiness. The study used data from listed companies on the Saudi Arabian stock exchange during 2015–2019. Based on pooled panel data regression, the study proves that the SG&A costs are sticky. The results show the level of SG&A costs increases more with an increase in sales revenue (activity) while it decreases less with an equivalent reduction in sales revenue (activity). Also, this study finds that the frequency of audit committee meetings decreases the magnitude stickiness of SG&A costs, which supports the view that frequent meetings of AC significantly enhance its overseeing function and effectiveness. The study further reveals that audit quality “by BIG4 audit firms” is not related to reduced cost stickiness. This result implies that there is no difference in CS between companies audited by BIG4 or by non-BIG4. In general, the research highlights the importance of AC diligence (i.e., meetings) in improving its effectiveness and controlling management’s discretions affecting the cost structure in the context of sticky cost behavior.

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1. Introduction

The term cost stickiness expresses an asymmetric cost behavior that responds differently to equivalent changes in the levels of activity. For instance, an increase in costs with an increased activity level is more than the costs decline associated with an equivalent decline in activity level (Cooper & Kaplan, 1998; Anderson et al. 2003; Xue & Hong, 2016). Cost-sticky behavior reflects the operation competence of companies’ assets (Gong et al., 2010). It also refers to decisions of managers that are taken deliberately to manage the organization’s resources inappropriately due to decreased activity volume of a company (Venieris et al., 2015; Salehi et al., 2018; Hartlieb & Loy, 2022).

Compared with the traditional model of cost behavior that describes the linear relationship between cost levels and activity volume, Cost Stickiness (CS) is better with the decisions of management related to resource adjustment in practical practices. The presence of cost stickiness is strongly related to the behavior of managers’ practice (Anderson et al., 2003; Chen et al., 2012; Xue & Hong, 2016; Chen et al., 2022). The traditional model of cost behavior assumes a direct relationship between the levels of costs and the magnitude of activity (costs fixed or variable), and these costs are driven mainly by the cost driver levels. However, recent research (see, for example, Anderson et al. 2003; Medeiros & Costa 2004; Chen et al. 2012; Banker et al. 2013; Ezat, 2014; Bugeja et al., 2015) has reported that the association of costs with alterations in drivers of cost is non-automatic as the volume of resources are obtained by conscious decisions of management. They assert that costs tend to lower slightly when sales decrease compared to the equivalent increase in sales, which is called cost stickiness or asymmetric cost.

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ISSN 2291-6830 (Online) - ISSN 2291-6822 (Print)

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doi: 10.5267/j.uscm.2023.10.005

It is also empirically recorded that change in costs is not consistent with demand change, as well as in many cases, costs show asymmetric behavior (Noreen & Soderstrom, 1997). Anderson et al. (2003) conducted the first study to examine cost stickiness and concluded that an increase of 1% in sales revenue led to a rise of 0.55% in Selling, General, and Administrative (SG&A) costs while they decline at 0.35% with a 1% decline in sales.

Previous empirical research reports that one of the primary causes behind CS behavior "asymmetric cost" is the opportunistic behavior of managers (Chen et al., 2012; Banker et al., 2013; Anderson et al., 2016). For instance, Chen et al. (2012) report that managers have motivations for growing a company exceeding its appropriate size by manipulating SG&A costs. The managers increase the costs of SG&A very quickly if the demand rises. However, if the demand drops, they lower SG&A costs very slowly to increase the company's size, leading to "sticky cost". Moreover, Dierynck et al. (2012) indicate that directors under burden for meeting or beating earnings targets have strongly motivated to do earnings management, which results in the occurrence of sticky costs, where managers here tend to manipulate costs of labor (i.e., upward or downward) based on demand. These cases show that managers seek to achieve or maximize their special benefits at the expense of stockholders by practicing moral hazard actions (Anderson et al., 2003; Dierynck et al., 2012; Chen et al., 2012). Previous studies recommend that scholars should do efforts in understanding and examining cost behavior's determinants in view of managers' incentives, particularly incentives driven by the agency that influence the decisions of resources adjustment (e.g., Kama & Weiss; 2013; Bugeja et al., 2015; Ibrahim, 2018; Chen et al., 2022).

Since cost asymmetry is produced mainly from opportunistic behavior and deliberate intervention of managers with the changes in demand. Thus, mitigating such managers' behavior is needed. Corporate governance (CG) mechanisms can reduce managerial opportunism behavior by monitoring managers effectively (Jensen & Meckling, 1976; Jensen, 1993; Shleifer & Vishny, 1997; Chen et al., 2012; Bugeja et al., 2015). The audit committee and external auditor are the critical internal mechanisms in CG that are accountable for monitoring and controlling managerial decisions to guarantee owners' and investors' rights and minimize agency costs (Jensen & Meckling, 1976; Fan & Wong, 2005; Islam et al., 2010; Raweh et al., 2019). Consequently, they could positively affect the decisions of managers concerning cost behavior as CG devices. It is claimed that Effective CG techniques could bring CS levels closer to the degree of optimal costs (Chen et al., 2012; Li & Zhang, 2022). Pichetkun (2012) reveals that cost asymmetry is less severe in companies with intense CG than in companies with poor CG, implying that a CG regime can reduce CS. Thus, the primary objective of this research is to investigate whether cost behavior is sticky in Saudi Arabia as an emerging market. The second objective is to examine whether audit committee meetings (ACMs) and audit quality affect the degree of cost stickiness.

This study delivers some contributions. First, it enriches accounting literature, especially regarding sticky cost, by discussing and investigating the effect of audit committee meetings as internal governance on cost stickiness. This considers the first evidence investigating how audit committee meetings affect cost stickiness to the authors' knowledge. It is found that effective of AC meetings is a significant character in internal governance to mitigate cost stickiness. Second, this study expands and complements the few empirical research that has examined the effect of CG on sticky cost behavior (e.g., Chen et al., 2012; Bugeja et al., 2015; Xue & Hong., 2016). However, these studies have focused on data from developed economies, where the legal contexts are very stringent. And they showed the level of cost stickiness is less pronounced in companies having robust governance systems. But this study provides evidence from developing economies such as Gulf countries, where the legal frameworks are weak. Assessing the CG Code of Saudi Arabia have a different approach like an asymmetric cost behavior approach (i.e., cost stickiness).

Third, it also contributes to introducing additional evidence concerning the impact of audit quality (proxied by the external auditor) on cost stickiness in emerging markets like the Arab markets, including GCC, as such communities lack this research in this field. To the researchers' knowledge, there is little empirical evidence for the effect of audit quality on cost stickiness. Liang et al. (2014) in China and Muluk et al. (2019) in Indonesia have investigated this issue before. However, this research extends these studies and provides third evidence examining the effect of audit quality on cost stickiness but in a different environment ruled by informal institutions, i.e., customs, cronyism, and nepotism like in Saudi Arabia. And the findings showed audit quality has no association with cost stickiness, which needs additional research. Fourth, the research is one of the first and the few research investigating the cost stickiness phenomenon in Saudi Arabia and the Arab region. Finally, this research provides practical implications for investors and stakeholders to understand costs behavior and their changes, which may enable them to forecast the company's future earnings and performance.

2. Theoretical framework and hypothesis development

The widespread agency issues in modern business resulted from the separation between management and ownership. From the agency theory approach, it is unexpected that the management behaves optimally; managers can make decisions out of self-interest that may not be optimal for investors and stockholders (Jensen & Meckling, 1976). This creates conflicts of interest between managers and owners. The management tends to practice opportunistic behavior to achieve its interests, which influences company value adversely (Jensen & Meckling, 1976). For example, the management manipulates a company's earnings to get advantages in compensation shape (Healy, 1985). Cost stickiness reflects the opportunistic intervention of managers by their deliberate decisions in resource adjustment costs of organization based on demand (Anderson et al., 2003; Chen et al., 2012).

The agency problem is shown in managerial "empire building," which happens if stockholders fail to observe management, letting managers grow the company beyond its optimal magnitude through adjusting controlled company's resources and increases of the activity or keeping unutilized resources toward pursuing their interests like positions, compensation, power, and prestige (Jensen, 1986; Chen et al., 2012; Han et al., 2019). This behavior leads to increased costs fast with demand increasing and hinders cost decrease with demand decrease, resulting in the sticky cost behavior (Chen et al., 2012; Banker et al., 2014; Chen & Wang, 2023). In other meaning, the effect of agency problem over cost stickiness is a decision for decision-makers to preserve unfavorable resources formed from private personal considerations (Salehi et al., 2018). Agency theory advocates that monitoring devices internal and external are significant devices that mitigate agency conflicts by limiting managerial moral hazard (Jensen & Meckling, 1976; Chen et al., 2012), hence reducing asymmetric costs (Chen et al., 2012; Liang et al., 2014).

Sound CG techniques, such as ACs and external auditors, can hinder management motivations to boost its self-benefits at the account of investors and owners, alleviating agency problems and costs (Shleifer & Vishny, 1997; Fama & Jensen, 1983). Some literature has examined techniques to deal with agency issues, for instance, the board of directors and external auditor, and established mixed and inconsistent evidence concerning their efficiency to reduce asymmetric costs behavior (e.g., Chen et al., 2012; Liang et al., 2014; Bugeja et al., 2015; Ibrahim, 2018). The present study expands prior literature by investigating how audit committee meetings and audit quality (proxied by the external auditor) contribute to reducing the agency problems with SG&A cost asymmetry. More specifically, it examines the influence of audit committee meetings and audit quality on stickiness cost behavior. Lower sticky behavior of costs reduces data asymmetry and agency conflicts, resulting in greater assurance of companies' performance and value.

2.1 hypotheses development

Cost stickiness signifies cost tends to be asymmetric during the response to rising and low in the firm's activity (Anderson et al., 2003). This implies that as activity grows, costs rise faster than they fall as activity declines (Noreen & Soderstrom 1997; Anderson et al. 2003; Chen & Wang, 2023). There are two primary points of view for the presence of cost stickiness. The first view is the motivational and rational decision. From this view, cost stickiness is treated because of managers choosing rationally between options after thoroughly comparing expenses "costs" and advantages. Several research studies have been conducted based on such a perspective (see, for example, Jaramillo et al., 1993; Goux et al., 2001; Cooper & Haltiwanger, 2006; Banker & Chen, 2007; Balakrishnan & Gruca, 2008). These studies reported that the cost of adjustment to decreasing inputs under decreasing activities is more than increasing inputs under raising activities. The second view: management motivations and personal interests. From this view, cost stickiness occurs because of incentives of managers to serve their self-interest, where managers maintain unused resources under their power to increase their benefits when sales decline to discard adjustment expenses. Such as severance payments of dismissed workers and employees, while management employs further resources to fulfill the demand concerning sales increases, suggesting increasing agency costs (Anderson et al., 2003; Chen et al., 2012; Banker et al., 2014). This perspective indicates management's opportunistic behavior, which leads to agency problems (Anderson et al., 2003; Chen et al., 2012). In this regard, managerial ambition is a significant factor in CS (Chen et al., 2012). Following Anderson et al. (2003) and Chen et al. (2012), our study focuses on cost stickiness behavior according to the second perspective.

The first pioneer model that explores the asymmetrical behavior of costs is presented by Anderson et al. (2003), where most studies related to cost stickiness follow the model of Anderson et al. (2003). The scholars applied their model based on a sample of US companies over 1979-1998 using costs of sales, general, and administrative (SG&A). They found that when sales revenue rose by 1%, SG & A increased by 0.55%, while when 1% decline in sales, SG & A went down by 0.35%. Their findings suggest that SG & A costs significantly increase during the prosperity period of activity compared to a parallel fall in activity, indicating the asymmetric cost behavior, called "cost stickiness". They also report that a CS degree is more significant for companies owning more assets and property and a large number of employees. In another research, Subramaniam and Weidenmier (2016) used 9,592 US-listed firms and found the stickiness of both COGS (cost of goods sold) and SG&A, indicating that both show the behavior of cost asymmetry, particularly in case of activity change by greater than 10%.

Moreover, Porporato and Werbin (2012) used a sample of 270 Argentina banks, 192 for Brazil, and 55 for Canada from 2004 to 2009. They found that total costs (TC) grow by 0.60, 0.82, and 0.94% in samples of banks for Argentina, Brazil, and Canada, respectively, while dropping by 0.38, 0.48, and 0.55 % for each 1% change in sales activity, signifying that cost stickiness in each sample of the three samples, despite with different levels. Finally, Chen et al. (2012) used Anderson et al. (2003)'s extended model, they examined the association between agency costs and cost stickiness. They were using a sample of companies from the S&P 1500 from 1996 to 2005. The authors found costs of SG&A have sticky behavior. Also, they found asymmetric cost behavior rises with managers' empire-building incentives (using free cash flow, CEO horizon, CEO tenure, and compensation structure as proxies for empire-building) owing to the agency problem.

In addition, Dalla Via and Perego (2014) collected data from Italian companies (small and medium listed and unlisted firms) during 1999-2008 to analyze cost behavior. They found that only total labor costs exhibit sticky behavior while SGA, COGS, or operating costs (OCs) are not sticky. However, OCs are shown to be sticky in listed companies. Bugeja et al. (2015), in a

study involving 10 528 firms in Australia from 1990 to 2010, found that cost behavior on average is sticky in Australia. They revealed that when sales activity increases at 1%, the OCs increase by almost 0.89%, whereas decrease by around 80% with a 1% decline in sales. Their results reported that the asymmetry degree of costs fluctuates on a curve form (i.e., take the "U" form)) throughout the study and rises after IFRS adoption. Furthermore, Xu and Hong (2016) examined cost stickiness and the effect of CG using a sample of 7,702 Chinese companies' observations from 2003 to 2010. Their findings revealed the existence of cost stickiness in Chinese companies. The authors showed that SA&G expenses increase by 0.518 with increasing sales revenue at the 1% level, and they reduce at 0.275 with growing revenue at the level of 1%. They also observed more significant cost stickiness in the sub-sample companies with non-earnings management than those with earnings management due to managers' ability to control costs, mainly reduced general costs. Recently, Kim et al. (2022) empirically show that the costs of SG&A behave sticky for companies having poor internal control due to the problems of internal information control inside the organizations. Han et al. (2019) studied the association of CS with managing earnings forecast, using a sample of 171063 firm observations from COMPUSTAT and CRSP databases over the period 2005 – 2016 in the USA. They followed Anderson et al.'s (2003) model to measure the asymmetric cost at the industry level and Weiss's (2010) model to measure the firm-level asymmetric cost. Their findings indicated that both SG&A and COGS behave asymmetrically. Further, the scholars recorded cost stickiness has a positive relationship with news of managerial earnings forecasts, concluding that this association may be attributed to management optimism. It is also more apparent with an increased cost of resource adjustment and when the efficiency of a company is high. Tileal et al. (2023) used data from companies listed in Tehran, finding that the asymmetry degree of labor cost is higher in state and family companies than non-state and family companies. In contrast, studies in Pakistan found SG&A found anti-sticky behavior (Ali & Shafique, 2020).

In Arab countries, little empirical research has been carried out, for example, a study by Abu-Serdaneh (2014) in Jordan. This study examined cost stickiness based on data taken from industrial companies listed from 2008 to 2012. They found that SG&A costs behave asymmetrically but are not sticky or anti-sticky. However, the behavior of COGS is anti-sticky. They also showed that companies with more significant assets have higher stickiness of COGS, while debt intensity shows low stickiness. In the Egyptian context, Ibrahim (2015) studied the behavior of COGS, SG&A costs, and OCs and the effect of economic growth on cost behavior for the period of 2004-2011. Their findings indicated that the behavior of SG&A and COGS is sticky, while OCs showed to be anti-sticky. In addition, they revealed that before the financial crisis in 2008 across the prosperity period, SG&A costs behaved sticky but non-sticky across the period of recession following the 2008 financial crisis. However, COGS showed are sticky over the two periods with a higher stickiness level in the prosperity time. In line with this, Ibrahim (2018) used data from 80 firm-year observations over 2008-2013, finding that COGS behave asymmetrically. His analysis showed that COGS rises at 1.05% but declines at 0.85% for an equal variation of activity at the level of 1%, which signifies that this cost differs from the traditional model for the cost that assumes the cost behavior is linear. In the same vein, it is found that the behavior of SG&A costs is highly sticky in companies listed in the Egyptian market (Abdel Megeid & El-Deeb, 2021).

The behavior of cost stickiness explains that through periods of an activity decrease, directors will barter the anticipated expenditures for moving surplus resources versus the expected adjustment costs to re-produce resources in case to restore demand. In this case, directors would be more hesitant to exclude resources if activity or sales drop instead of increasing resources during activity increase, leading to behaviors of asymmetric cost (Anderson et al., 2003; Bugeja et al., 2015). To examine Saudi evidence of SG&A costs stickiness, this research assumes the first hypothesis as follows:

H₁: *SG&A costs increase is higher with an increase in sales activity than the decline of costs with an equivalent decrease in sales activity.*

Managers might grow their interests opportunistically at the expense of a firm or owners beyond the firm's optimal magnitude or maintain unconsumed and unused possessions to serve their private benefits generated from positions and power. Such an issue is called management "empire construction" (Jensen 1986; Jensen & Meckling, 1976), which in turn results in agency problems between agents and principals (Jensen & Meckling, 1976). Managers are likely to practice empire-building by increasing the costs of SG&A more quickly when sales activity goes up and cost-cutting too slowly when sales go down, leading to a larger level of CS, implying cost asymmetry (Chen et al., 2012). Since the role of CG mechanisms is to mitigate agency issues (Bugeja et al., 2015; Abdel Megeid & El-Deeb, 2021), a company having an intense CG could restrain the empire-building behaviors of managers and hence cut the level of asymmetric cost produced by excessive managerial spending. As Chen et al. (2012) and Abdel Megeid and El-Deeb (2021) assumed, the CG regime is deemed as a better strategy to regulate the behavior of cost patterns to the most cost-optimal level. To support the above discussion, it is revealed the relationship of managerial incentives concerning empire-building with asymmetrical level of cost (cost stickiness) is positive. And this positive relationship becomes weaker in companies possessing a robust CG regime (Chen et al., 2012). Bugeja et al. (2015) and Abdel Megeid and El-Deeb (2021) found that companies with strong CG have less pronounced cost stickiness. Abdel Megeid and El-Deeb (2021) explained that, although the cost stickiness is more related to the managers' decisions, a high level of board independence with less CEO duality affects the managers' decisions in favor of the business and limits the cost stickiness.

Similarly, Pichetkun's (2012) study supposed that CS behavior is influenced by CG, and examined sample companies in the Thai market from 2001 to 2009. The study's findings indicate that companies with poor CG show CS with a larger degree than companies with an effective CG system. Xue and Hong (2015) showed that firms without earnings management exhibit more CS, and that sound CG contributes to alleviating CS level. Scholars also found the interaction of CG and managing earnings mitigates CS. In contrast, Ibrahim (2018) found that firms with greater boards, role duality for the CEO, and a greater ratio of non-executive directors exhibit higher asymmetric costs than others, while firms with institutional ownership show lower cost stickiness. However, the above studies do not examine any audit committee attributes' effect on cost stickiness.

Accordingly, one primary goal of this research is to explore the influence of audit committee meetings on cost stickiness. The audit committee (AC) is the most important corporate governance mechanism accountable for observing financial reports' quality, internal control systems, and external auditors (Beasley et al., 2009). It ensures the fairness and reliability of financial information. DeZoort et al. (2002) assert that frequent AC meetings promote directors acquiring experience and knowledge about company business. AC meetings also support monitoring the role of AC in reinforcing internal controls strategies and reducing business risks (Jensen, 1993; Fama & Jensen, 1983), hence limiting agency conflict between management and owners through controlling opportunistic executive actions (Sultana et al., 2015; Raweh et al., 2021). It is documented that ACs with frequent meetings can remedy the weaknesses of internal control in early time (Khlif & Samaha, 2016), detect and control the managers' opportunistic behavior, guaranteeing the reliability of earnings and quality of accounting information reported (Bedard et al., 2004; Bédard & Gendron, 2010). It is argued that the audit committee must meet frequently to achieve its tasks (Saleh et al., 2007). In line with that, it is reported that frequent AC meetings support the timeliness of reporting (Ika & Ghazali, 2012) and decrease earnings management (Saleh et al., 2007). Zaman et al. (2011) point out that effective monitoring of AC increases with more meetings and decreases with lower meeting frequency.

Thus, this study suggests that AC could influence the decisions of management through its oversight functions, which, in turn, enables it to impact cost behaviors, as when activity changes, directors must make decisions of adjustment, which, in turn, will influence cost behaviors. Baumgarten (2012) and Ibrahim et al. (2021) confirm that management decisions related to resource adjustments are closely associated with activity changes that represent the key drivers of cost behavior. Consequently, an audit committee as an effective monitoring mechanism for a company's activities and its process (through its characteristics such as meetings) can influence managerial decisions, curb managers' opportunistic behavior, and decrease asymmetric cost behavior. Therefore, this research tests the following hypothesis:

H₂: *The frequency of audit committee meetings significantly decrease the level of cost stickiness.*

Agency theory claims that investors authorize managers to manage and operate a company's business. However, managers are motivated to practice opportunistic activities and achieve their special interests at the expense of shareholders and investors (Shleifer & Vishny, 1997). This causes conflicts of interest between managers and owners, leading to agency problems (Jensen & Meckling, 1976). Agency theory assumes that the external auditor is one of the critical monitoring devices to mitigate agency problems between the principal and agent (Jensen & Meckling, 1976; Watts & Zimmerman, 1983), and conflict of interests between principal and agent by independent audits (Jensen & Meckling, 1976), and confirming on the extend of fairness of financial reports (DeAngelo, 1981, Cohen et al., 2008). As explained previously, the opportunistic behavior of managers is the main driver for cost stickiness (Banker et al., 2013; Chen et al., 2012; Anderson et al., 2016). To reduce such managers' practices and asymmetric costs, this study seeks to examine whether external quality audits (proxied by BIG 4 audit firms) can decrease cost stickiness.

Previous empirical studies indicate that high-quality audits significantly affect companies' behavior and procedures. For example, standardizing the accounting processes of firms and enhancing the quality and transparency of accounting information (Francis et al., 1999; Houqe et al., 2017). External audit quality can also detect and correct financial fraud and limit managing earnings (Qi et al., 2004; Houqe et al., 2017), indirectly impeding opportunistic activities by managers (Liang et al., 2014). Liang et al. (2014) point out that external audit quality could reduce asymmetric behavior of cost and make it closer to optimal across through constraining opportunistic behavior of managers. Likewise, Muluk and Herianti (2019) and Li and Zhang (2022) confirm that external auditor with high quality (defined by BIG 4) plays a critical role in controlling managerial opportunistic practices, assisting in decreasing cost stickiness.

Prior literature reports that BIG 4 audit firms have high-level specialization and independence and provide high-quality audits. The BIG 4 audit firms possess developed resources and sound technology and invest more in knowledge and expertise to perform audits rapidly than non-BIG 4 firms (O' Keefe & Westport, 1992; Basuony et al., 2016; Sharma et al., 2017). DeAngelo (1981) advocates that audits through BIG 4 accounting firms are more objective and independent. Afify (2009) and Basuony et al. (2016) argue that BIG 4 firms are more motivated to preserve their brand name and reputation and thus deliver high-quality audits. Also, they provide objective, fair, and timely audit reports and deter the managers from moral hazard practices (Liang et al., 2014; Raweh et al., 2019). Qi et al. (2004) report that, compared to local audit firms, Big 4 accounting firms possess pronounced attributes owing to their history, market share, specialization, size, and so on, guaranteeing their higher quality in the audit. It is proven that companies that hire BIG 4 audit firms have minimal asymmetric costs because they provide quality audit services (Liang et al., 2014).

Nevertheless, Chi et al. (2011) show that Big4 audit firms are related to a higher degree of earnings management. Further, in Saudi Arabia, a study by Habbash and Alghamdi (2017) found BIG 4 international firms cannot constraint managing earnings in Saudi firms. The study concluded that "auditors are powerless in front of opportunistic managerial activities" in Saudi-listed companies. The scholars indicated that the big four international firms follow domestic auditors; therefore, if they fail, this will back to the reputation of local auditors. BIG 4 international auditors hence are more likely to not care to deliver audits with quality. According to Maijoor and Vanstraelen (2006), the quality of BIG 4 audit firms may differ from one country to another due to differences in audit settings systems across countries. Few studies have investigated the association of audit quality with cost stickiness. For example, Liang et al. (2014), Muluk and Herianti (2019) and Li and Zhang (2022) found that audit quality, represented by the BIG 4 audit firms, leads to a pronounced decrease in CS. The researchers argue that companies should recognize the significance of selecting high-quality external audit firms in corporate cost management and minimize CS.

In sum, reducing asymmetric cost behavior should be related to the quality of monitoring systems over the management or lower the opportunistic activities of managers through high-quality external audits that will boost the quality of accounting information and reduce managerial moral hazard, enabling to mitigate the cost's stickiness. Thus, this research examines the following hypothesis:

H3: Audit quality (BIG 4) significantly decreases the level of cost stickiness

3. Research Design

3.1 Data and Sample

The study sample comprised all the listed companies on the Tadawul, Saudi Arabia stock exchange from 2015–2019, comprising 880 year-observations. Then, 370 observations for financial firms were excluded because they have different regulatory frameworks and accounting systems. Also, 12 observations with missing data for sales revenue and costs and 15 observations with incomplete data for some variables were deleted, leaving 483-year observations as a final sample. The primary data sources are the website of the Saudi capital market and companies' annual reports. In addition, this study extracted costs and sales data from audited financial statements, ACM -related data from CG reports, external auditor (BIG4) data from audit reports and CG reports, and other financial variables from audited financial reports.

3.2 Empirical Model and Variables Definitions

This study uses pooled OLS- panel data regression to examine the study's hypotheses. To tackle the possible effect of autocorrelation and heteroskedasticity problems; the current study runs a regression analysis that includes a robust standard error. This study tests the cost behavior of SG&A in terms of stickiness. Following Anderson et al. (2003), Chen et al. (2012), and Xue and Hong (2016), the piecewise-linear relation between the change in the logarithm of SG&A costs and the change in the logarithm of sales revenue has been used to measure and test cost stickiness, based on the following basic model that is derived from Anderson et al. (2003):

$$\Delta \ln SG\&A_{it} = B_0 + B_1 \Delta \ln REV_{it} + B_2 Sales_decsit \times \Delta \ln REV_{it} + \epsilon_{it} \quad (1)$$

where: the $\Delta \ln SG\&A$ is the natural log of changes in the SG&A costs from the year t-1; $\Delta \ln REV$ is the natural log of changes in sales revenue from the year t-1, where SG&A is the total costs of selling, general and administrative and REV is sales revenue; *Sales_decs* is a dummy variable for REV decrease which equals "1" if REV for the year t is lower than the REV in year t-1 ($\Delta REV < 1$) and "0" otherwise.

When the dummy value of decrease is "0" with sales increase, the coefficient of B_1 presents the percentage increase in SG&A costs following a 1% increase in sales activity. In contrast, when the dummy value of decrease is "1" with sales decrease, the total coefficients of $B_1 + B_2$ show the decrease in costs after a 1% drop-in sales activity. According to the definition of cost stickiness, a company exhibits sticky costs behavior if the coefficient of B_2 is negative and statistically significant; when $B_1 > 0$ and $B_2 < 0$. If B_2 is greater than B_1 indicates a lower level of sticky cost or anti-cost stickiness (Anderson et al., 2003; Bugeja et al., 2015; Han et al., 2019). This study runs regressions based on Model (1) as a basic Model to test cost stickiness.

To examine the second and the third hypotheses with cost stickiness, the basic model has been extended by incorporating the variables of audit committee meetings (ACM) and audit quality (presented by BIG 4 audit firms) as interaction terms, as presented in the following model:

$$\Delta \ln SG\&A_{it} = B_0 + B_1 \Delta \ln REV_{it} + B_2 Sales_decsit \times \Delta \ln REV_{it} + B_3 Sales_decsit \times \Delta \ln REV_{it} * ACM_{it} + B_4 Sales_decsit \times \Delta \ln REV_{it} \times BIG4_{it} + B_5 ACM_{it} + B_6 BIG4_{it} + B_7 SIZE_{it} + B_8 LEV_{it} + \epsilon_{it} \quad (2)$$

where:

ACM is calculated as the number of AC meetings held annually (Zaman et al., 2011; Khelif & Samaha, 2016; Raweh et al., 2021); audit quality is an indicator variable for BIG 4 audit firms that equals "1" if a client was audited by one of BIG 4 audit firms and "0" otherwise (Liang et al., 2014). The study also controls some variables, such as firm size (SIZE) measured by the logarithm of total assets; leverage (LEV) measured by total debt divided by total assets (Zaman et al., 2011; Khelif & Samaha, 2016). Finally, this study contains a dummy for the year (YFX) indicator to control the fixed influence of the year.

4. Empirical Results

4.1 Descriptive statistics analysis

Table 1 shows an analysis of descriptive statistics for explanatory variables of this study. Table 1 presents the mean (median) for $\Delta \ln SG\&A$ and $\Delta \ln REV$ are 0.04 (0.02) and -0.04 (0.00) respectively. The median value of $\Delta \ln REV$ is 0.00, and the mean is negative because the sales revenue for some firms during the sample period did not witness a change and some of them have a decrease in revenues. The results also show Sales_decs has mean (median) values of 0.40 (0.00) with a variation of 0.49, suggesting that most Saudi firms decrease their revenues by almost 40% compared to previous years. Furthermore, the mean (median) value of ACM is 5.59 (5.00). For audit quality (BIG4), the results show that 45% of Saudi firms employ high-quality BIG 4 audit firms.

Table 1

Descriptive statistics

variable	Median	Mean	SD	P25	P75
$\Delta \ln SG\&A$	0.02	0.04	0.37	-0.10	0.14
$\Delta \ln REV$	0.00	-0.04	0.88	-0.15	0.10
$\Delta SG\&A\%$	1.02	1.20	2.17	0.91	1.15
$\Delta REV\%$	1.00	1.60	4.44	0.86	1.10
Sales_decs	0.00	0.40	0.49	0.00	1.00
ACM	5.00	5.59	2.03	4.00	6.00
BIG4	0.00	0.45	0.50	0.00	1.00
SIZE	14.54	14.73	1.61	13.79	15.19
LEV	0.41	0.42	0.26	0.22	0.58

Table 2 shows the results of the correlation matrix. The correlations between all the variables are acceptable. The correlation coefficients between $\Delta \ln SG\&A$ and $\Delta \ln REV$ and between $\Delta \ln SG\&A$ and Sales_decs are significantly positive and negative, and low (0.13), respectively. This signifies that these variables are moving in the same direction. Also, the correlation between $\Delta \ln SG\&A$ and BIG4 is significant and low (0.10). The correlation analysis has the highest correlation coefficient of 0.44 between $\Delta \ln REV$ and Sales_decs. This indicates the absence of multicollinearity issues (Gujarati, 1995). Also, a variance inflation factor (VIF) is used to check the multicollinearity issue. As shown in Table 3 for regression results among Panel A and Panel B, the values of VIF are lower than 10, which confirms that there is no multicollinearity issue (Gujarati, 1995).

Table 2

Correlation Matrix

Variable	$\Delta \ln SG\&A$	$\Delta \ln REV$	Sales_decs	ACM	BIG4	SIZE	LEV
$\Delta \ln SG\&A$	1.00						
$\Delta \ln REV$	0.13*	1.00					
Sales_decs	-0.13*	-0.44*	1.00				
ACM	-0.01	0.04	-0.07	1.00			
BIG4	0.10*	0.06	-0.04	0.02	1.00		
SIZE	0.05	0.04	-0.01	0.07	0.42*	1.00	
LEV	-0.01	0.03	-0.12*	-0.03	0.11*	0.29*	1.00

* < .01

4.2 Regression analysis results

Table 3 illustrates the regression analysis for the study's models. Panel A reports the results for the basic model (Basic Model 1) to determine the behavior of sales, general, and administration costs (SG&A) in the periods t and t-1 in the sample. Panel B reports the results of the second model (Model 2) to show the interaction effect of ACM and BIG4 audit firms (audit quality proxy) on SG&A cost stickiness. Model 1 and Model 2 are significant at $p < 0.001$ with R^2 0.11 and 0.12, respectively, indicating that the two models describe the change in SG&A costs.

Based on Panel (A) results, the coefficient of $\Delta \ln REV$ (B_1) is 0.17 and significantly positive at the 1% level with $t = 5.05$, indicating that SG&A costs increase 0.17% per 1% increase in sales revenues. While the coefficient of Sales_decs (B_2) is -0.09 and significantly negative at the 5% level with $t = -1.02$, suggesting that the exists cost stickiness in Saudi listed firms. In other words, the costs of SG&A behave sticky, in which the sum of B_1 and B_2 presents that the SG&A costs decrease with only 0.08% per 1% sales revenues decline. Thus, H1 related to the presence of cost stickiness is supported. Furthermore, these

results indicate that the level of SG&A costs increases more with an increase in sales revenue (activity) while it decreases less with an equivalent reduction in sales revenue (activity), which supports Anderson et al.'s (2003) suggestion. These results are consistent with the model and findings of Anderson et al. (2003). These results are also consistent with those of Chen et al. (2012), Han et al. (2019) and Kim et al. (2022) in the USA, Liang et al. (2014) and Xue and Hong (2016) in China, and Ibrahim (2015) and Abdel Megeid and El-Deeb (2021) in Egypt, who applied Anderson et al.'s (2003) model and found that the behavior of SG&A costs is sticky.

Table 3
Regression Results

Variable	Basic Model 1		Model 2	
	Panel A		Panel B	
	Coef.	t-statistics	Coef.	t-statistics
B ₀ cons	0.01	3.42**	0.08	0.48
B ₁ Δ lnREV	0.17	5.05***	0.12	4.61***
B ₂ Sales_decs* Δ lnREV	-0.09	-3.52**	-0.06	-3.90**
B ₃ Sales_decs * Δ lnREV * ACM			0.09	2.62**
B ₄ Sales_decs * Δ lnREV * BIG4			0.01	0.62
ACM			0.00	0.58
BIG4			0.06	2.60*
SIZE			-0.01	-1.20
LEV			0.04	0.74
YFX	Yes		Yes	
R-squared	0.11		0.12	
Prob > F	0.00		0.00	
Max VIF	2.97		3.03	
N	483		483	

*** p < .01, ** p < .05, * p < .1

Panel B shows the results of Model 2. The results in Panel B also confirm the findings of Basic Model 1 that SG&A is sticky since B₁ is proved to be positive and significant (0.12) at the 1% level, and B₂ is negative and significant (-0.06) at the 5% level.

Regarding the results of the interaction effect of ACM and audit quality proxied by BIG4. As shown in panel B, the coefficient of ACM interaction term (B₃) is significantly positive at the level of 5% (B₃ = 0.09, t = 2.62, P < 0.05). This result implies that the frequency of ACMs decreases the magnitude stickiness of SG&A. Thus, H2 is supported. This result supports the view that the frequency of meetings of the audit committee indicates higher effectiveness and activity (Zaman et al., 2011; Salleh & Haat, 2014; Raweh et al., 2019) in supporting internal control and monitoring opportunistic behavior of managers and hence reduce fraud and earnings management (Xie et al., 2003; Bedard et al., 2004; Sáenz González & Garca-Meca, 2014). Consequently, reducing stickiness costs. This result is also aligned with agency theorists who claim that more audit committee meetings enable directors to gain expertise and knowledge about the operations of a business (DeZoort et al., 2002). This supports the monitoring function of AC to reinforce internal controls and reduce business risk (Fama & Jensen, 1983), hence mitigating agency conflict between managers and shareholders by reducing managers' opportunistic behavior (Fama & Jensen, 1983; Sultana et al., 2015).

The main reason behind cost stickiness is the opportunistic behavior of managers (Chen et al., 2012; Anderson et al., 2016; Muluk & Herianti, 2019; Chen & Wang, 2023), because managers have the incentive to act opportunistically to maximize their private interests at the expense of shareholders and company value (Stulz, 1990; Jensen, 1986) by manipulating and gradually adjusting costs when sales decrease (Chen et al., 2012). Therefore, the frequency of AC meetings is an essential mechanism in the CG system to monitor and limit the opportunistic behavior of managers (Xie et al., 2003; Saleh et al., 2007; Raweh et al., 2019), thus contributing to declined cost stickiness. This result supports previous studies that point out that a sound CG regime is a better strategy for governing the behavior of cost practices and limiting CS level (e.g., Chen et al., 2012; Xue & Hong, 2015; Abdel Megeid & El-Deeb; 2021)

Furthermore, it is found that the coefficient of the BIG 4 interaction term (B₄) is positive but insignificant (B₄ = 0.01, t = 0.62, p > 0.10), suggesting that audit quality by BIG4 audit firms has no significant effect on cost stickiness. This result means no significant difference in cost stickiness between companies audited by BIG4 and by non-BIG4. This result is relatively consistent with Habbash and Alghamdi (2017), who found no association between BIG4 audit firms (a proxy for audit quality) and earnings management in Saudi Arabia. They conclude that auditors cannot restrict opportunistic managerial activities. A

possible explanation for the insignificant finding for H3 is that the performance of BIG 4 audit firms may be different in the Saudi Arabia market than in developed markets. Due to lower lawsuits against auditors in case of failure, auditors protect the rights of shareholders. This is because developing economies such as Saudi Arabia are featured by weak legal frameworks to protect the rights of shareholders, particularly minority shareholders, and market control is poor compared to developed markets. In addition, BIG 4 audit firms are affiliated to the local auditors. Thus, in case of failure, be attributed to the local auditor's reputation instead of the BIG4 auditors (Habbash & Alghamdi, 2017). Therefore, BIG4 auditors would not struggle more to provide high-quality audits. As for the control variables, as presented in panel B in Table 3, SIZE and LEV have no significant effect on SG&A costs ($\Delta \ln \text{SG\&A}$).

5. Conclusion

This paper expands the cost behavior studies in terms of sticky and attempts to fill the literature gap regarding CG and audit quality with asymmetric cost behavior by examining the influence of AC meetings and audit quality, as internal and external monitoring mechanisms of GC mechanisms, on cost stickiness, where very little literature focused on GC mechanisms and audit quality with cost stickiness. Using data from a unique environment, the results indicate that behavior of SG&A costs is sticky; they increase (0.17%) more than decrease (0.08%) with a 1% activity change (sales revenues change). They also show AC meetings reduce the stickiness level of SG&A costs.

The results of ACMs support the main suggestion of the study that effective audit committees as an internal governance mechanism can affect the decisions and actions of managers and, hence, regulate the behavior of costs. While, the results show that audit quality, measured by BIG4 audit firms, has an insignificant association with the cost stickiness of SG&A in Saudi-listed companies. The general conclusion is that sticky cost is a prevailing cost behavior in developing markets and developed markets and that sound CG could influence managers' decision-making related to the adjustment of the company's resources when activity changes. And external audits by BIG 4 audit firms in the Saudi market are ineffective in affecting managers' decisions and thus the cost behavior.

This paper delivers insights for forecasting the performance future of the company for financial analysts, investors and users, auditors, and regulators. For example, investors and analysts should consider the behavior or pattern of asymmetric cost in designing their own prediction models of earnings forecasts. The findings showed that external audits by BIG4 audit firms are not effective, these results thus would be benefit for regulators of the accounting and auditing profession in the Saudi audit market to develop the profession of accounting and auditing by promoting auditors' competence and independence, also solving the present issues in the audit market of Saudi. CG organizers should consider how the deliberate intervention of managers can make the behavior of costs asymmetric and how CG mechanisms can alleviate or reduce this asymmetric behavior produced by management intervention, especially frequency meetings of AC as a variable that can reduce sticky costs.

6. Limitations and future research

There are some limitations to this study. First, the study employed one mechanism of CG mechanisms related to AC (i.e., meetings). Second, this research used audit quality proxied by auditor type (i.e., BIG 4 audit firms), although there are several other proxy measures of audit quality such as audit fees were not used owing to non-available data and lack of it. Consequently, this paper encourages future research to run this measure and others like audit opinions if they can get them. Besides, it encourages the use of other CG mechanisms such as independence and expertise of the audit committee, board characteristics, and internal audit functions. Third, this study examined the sticky behavior for SG&A costs, despite there being other costs, like COGS, TC, and OC, that still need examination, particularly in emerging markets. Finally, future studies could suggest solutions, as we noted that the majority of previous literature provided either evidence on the behavior of sticky cost or the relationship between this type of behavior or pattern and other factors.

Acknowledgement

This study is supported via funding from Prince Sattam bin Abdulaziz University project number (PSAU/2023/R/1445).

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