

## **The Predictive Power of Expenses for Future Sales: Disaggregation and Cost Stickiness**

**Tareq Zaki Mashoka \***

[tmashoka@mutah.edu.jo](mailto:tmashoka@mutah.edu.jo)

**Received: 1/3 /2026**

**Accepted: 23/6 /2026**

### **Abstract:**

This paper examines the information content and predictive ability of disaggregated expenses for forecasting future performance while considering how cost stickiness influences this relationship. Based on a sample of firms listed on the Amman Stock Exchange, the study examines the predictive power of cost of goods sold (COGS), selling and administrative expenses (SGA), and depreciation (DEP) for future sales over four-time horizons. The results show that all three expense items are significant predictors of future sales, with COGS showing the strongest predictive power in the near term but weakening in the longer term. On the other hand, SGA and DEP show increasing predictive power over longer periods, reflecting their roles as discretionary expenditures and capital investments. Furthermore, the analysis of cost stickiness shows that COGS and DEP exhibit sticky behavior, indicating operational rigidity, whereas SGA does not show any significant stickiness and adjusts proportionally to sales changes. The findings highlight the importance of disaggregating expenses to reveal their distinct information content and provide implications for financial analysis and forecasting.

**Keywords:** Disaggregated expenses, Information content, Cost stickiness, Forecasting.

---

\* Associate Professor, Department of Accounting, Mutah University, Jordan.

## القوة التنبؤية للمصاريف للمبيعات المستقبلية: تفصيل المصاريف ولزوجة التكاليف

طارق زكي مشوقة \*

[tmashoka@mutah.edu.jo](mailto:tmashoka@mutah.edu.jo)

تاريخ القبول: 2026/6/23

تاريخ الاستلام: 2026 /3/1

### الملخص:

تتناول هذه الدراسة المحتوى المعلوماتي والقدرة التنبؤية للمصروفات المفصلة في التنبؤ بالأداء المستقبلي، مع الأخذ في الاعتبار تأثير لزوجة التكاليف على هذه العلاقة. وبالاعتماد على عينة من الشركات المدرجة في بورصة عمان، تم اختبار القدرة التنبؤية لكل من تكلفة البضاعة المباعة، والمصاريف الإدارية والبيعية، ومصروف الاستهلاك في التنبؤ بالمبيعات المستقبلية عبر أربع فترات زمنية لاحقة. حيث أشارت النتائج إلى أن بنود المصروفات الثلاثة تُعدّ متغيرات ذات دلالة إحصائية في التنبؤ بالمبيعات المستقبلية، حيث تُظهر تكلفة البضاعة المباعة أعلى قدرة تنبؤية في الأجل القصير، إلا أن هذه القدرة تتراجع في الآجال الأطول. في المقابل، تُظهر المصاريف الإدارية والبيعية ومصاريف الاستهلاك تزايداً في قدرتها التنبؤية مع امتداد الأفق الزمني، بما يعكس طبيعتها كمصروفات تقديرية واستثمارات رأسمالية. كما يُظهر تحليل لزوجة التكاليف أن تكلفة البضاعة المباعة والاستهلاك يتسمان بسلوك لزج، مما يعكس درجة من الجمود التشغيلي، في حين لا تُظهر المصاريف الإدارية والبيعية لزوجة ذات دلالة؛ إذ تتكيف بصورة متناسبة مع التغيرات في المبيعات. تؤكد نتائج الدراسة أهمية تفصيل "تفكيك" المصاريف للكشف عن اختلاف محتواها المعلوماتي، وإظهار دلالات مهمة للتحليل المالي والتنبؤ بالأداء المستقبلي.

**الكلمات المفتاحية:** المصروفات المفصلة، المحتوى المعلوماتي، لزوجة التكاليف، التنبؤ.

\* أستاذ مشارك، قسم المحاسبة، جامعة مؤتة، الأردن.

**Introduction:**

Expenses are an essential component of a firm's operations because they are not just costs incurred but represent investments in the current period that will potentially generate future revenues (Srivastava, 2023). Prior research has investigated expenses in many contexts and highlighted their value relevance for decision-making. Specifically, expenses have been examined in assessing the matching principle (Oh and Penman, 2024; Donelson et al., 2011; Dichev and Tang, 2008), earnings disaggregation (Kumari and Mishra, 2020; Fan and Liu, 2017; Ertimur et al., 2003), and cost stickiness (Costa and Habib, 2023; Anderson et al., 2003). However, previous research has not fully examined how individual expense items — cost of goods sold (COGS), selling and administrative expenses (SGA), and depreciation (DEP)—contribute to predicting future performance. For example, Ertimur et al. (2003) document that revenue and expense surprises trigger different market reactions, but they do not assess the predictive power of individual expense items across future horizons. Similarly, Banker and Chen (2006) focus on one-year-ahead return on equity rather than multi-horizon sales prediction and do not incorporate cost stickiness as an explanatory framework for these predictive patterns. Therefore, this study addresses this gap by examining the information content of disaggregated expenses and their ability to predict future sales, and explores the role of cost stickiness in shaping the predictive power of these expenses.

Our paper is motivated by the fact that while revenues constitute a minority of line items in the income statement, the majority are expense items. Hence, each expense item has an essential role in the overall financial narrative of a firm's performance and aggregating them may conceal the distinct predictive signals embedded in each item (Wild and Wild, 2022; Doyle et al., 2003; Ertimur et al., 2003). For example, COGS reflects the cost of goods sold during the period but can also signal potential growth in future sales (i.e., inventory turnover). In contrast, SGA includes discretionary spending on marketing and investment in brand development and customer acquisition in the current period but with probable future benefits. Moreover, depreciation indicates a firm's long-term capital investment strategy to increase revenues in the future. We examine the predictive ability of disaggregated expenses for future sales over four-time horizons from period  $t + 1$  to period  $t + 4$ . The results show that cost of goods sold, selling and administrative expenses, and depreciation contain significant information for forecasting future sales. Moreover, the predictive power of these expense items varies across different time horizons, reflecting their primary economic properties as operational, discretionary, and capital-related expenditures. We also investigate the cost stickiness of these expense items to further explore their patterns and power in predicting sales. The results show that COGS and DEP are sticky costs and decrease less than proportionally when sales decline, reflecting managerial reluctance to adjust production costs and capital investments. On the other hand, SGA does not exhibit significant stickiness, consistent with its discretionary nature. Collectively, these findings provide additional evidence regarding the role of the information content of these expenses in predicting future performance.

The contributions of our paper are threefold: we extend the literature on earnings disaggregation by demonstrating the importance of analyzing individual expense items rather than relying on aggregated expenses, and by showing that each expense item has a distinctive ability to predict future sales. Additionally, we expand the literature on cost stickiness by providing new insights into the behavior of disaggregated expenses; the sticky behavior of COGS and DEP reveals their roles as core operating and long-term investment expenses, while the proportional adjustment of SGA reflects its discretionary nature. Finally, the paper provides practical implications for financial analysts and investors by enabling them to more accurately assess a firm's cost structure in order to predict future performance.

The paper is organized as follows: Section 2 reviews the relevant literature, Section 3 describes the paper's motivation and purpose, Section 4 outlines the methodology and research design, Section 5 discusses the results, and Section 6 concludes the paper

#### **Literature review:**

Expenses are an essential indicator and a main variable of interest in many studies, whether examined implicitly or explicitly. For instance, in earnings management research, a primary focus has been on detecting earnings manipulation through the deflation or inflation of expenses. Roychowdhury (2006) provides evidence that managers manipulate real activities to avoid reporting annual losses, such as by offering price discounts to temporarily boost sales, overproducing goods to lower the cost of goods sold, and reducing discretionary expenditures to enhance reported profit margins. Similarly, Kim et al. (2016) examine how managers exercise discretion over certain expenses to inflate earnings and improve perceived financial performance. Furthermore, Li (2019) finds that abnormal reductions in discretionary expenditures negatively impact earnings quality and decrease earnings persistence, thereby weakening the ability of current earnings to predict future cash flows. Moreover, the manipulation of expenses is a significant concern during periods of CEO turnover or in response to performance pressures. For example, new CEOs engage in real earnings management practices by cutting discretionary expenses such as R&D and advertising to enhance the company's short-term financial appearance. Consequently, this manipulation helps meet performance targets, reset expectations for future earnings, and align with compensation contracts (Wagener, 2024; Hensel and Schöndube, 2022; Geertsema et al., 2020).

Previous research has also investigated how misclassifying and aggregating expenses can mask their true economic implications. Gou and Zhou (2018), Amir et al. (2014), and Ertimur et al. (2003) argue that aggregating expenses introduces more noise and reduces persistence due to the mixed nature of expense items; some expenses generate long-term benefits, whereas others support current performance. Zang (2012) and Gunny (2010) also find that expense manipulation is generally easier to implement and more difficult to detect than revenue manipulation. Furthermore, Banker and Chen (2006) demonstrate that disaggregating costs into variable and fixed components enhances the prediction of one-year-ahead returns on equity. McVay (2006) shows that different expense line items carry varying levels of information about future earnings, and investors appear to understand this distinction, thereby treating line items accordingly. Moreover, Fan and Liu (2017) demonstrate that the discretionary components of expense items are often manipulated and misclassified to meet or exceed financial targets. They further show that disaggregating expenses reduces information masking, thereby revealing more about underlying financial performance.

Additionally, studies have examined how the degree to which expenses are properly matched with revenues can play a critical role in determining their information content. Dichev and Tang (2008) and Srivastava (2014) show that poor matching between revenues and expenses leads to more volatile and less informative earnings. Moreover, Mashoka (2017) shows a similar pattern for Jordanian firms. However, Oh and Penman (2024) argue that even if an expense item is not perfectly matched with its related revenue, it still contains valuable information about the firm's performance and reflects management's expectations for future profitability. In other words, while mismatching might introduce some noise, it does not necessarily reduce the overall information content. Barker and Penman (2020) had previously examined the role of expenses with long-term implications in reflecting a firm's capacity to generate revenue. For example, cost of goods sold and depreciation are important for assessing the levels and valuations of inventory and PPE in the current period as well as predicting future performance.

Other papers investigated the concept of sticky costs, which explains how some expenses do not decrease proportionally when sales decline. Anderson et al. (2003) find that SGA expenses tend to rise more significantly with sales increases but are less likely to decline when sales decrease, illustrating a stickiness in cost behavior. Weiss (2010) further demonstrates that the stickier these costs are, the smaller the adjustments are during downturns, leading to reduced cost savings and ultimately lower earnings. Additionally, He et al. (2020) show that firms exhibiting sticky costs are more likely to pay lower dividends due to diminished flexibility in managing costs during adverse periods. Furthermore, Han et al. (2020) find that firms with sticky costs are more likely to issue management earnings forecasts because sticky costs make expenses more predictable. Similarly, Habib and Costa (2022) show that cost stickiness can enhance the predictive ability, particularly for future stock price crashes. Conversely, Agarwal (2024) shows that the greater the cost stickiness, the lower the quality of the information content of different financial disclosures. Adding to this body of literature, Costa and Habib (2023) show that sticky costs are influenced by managers' decisions regarding resource adjustments, resulting in a non-linear response to changes in sales activity. They further argue that the greater the stickiness, the more challenging it becomes to adjust costs, leading to an unfavorable impact on profitability.

Moreover, expense line items are also a key focus in the non-GAAP earnings literature; firms frequently adjust or exclude certain expenses to present a more favorable view of their financial performance. The rationale for these adjustments is to provide a more normalized perspective on a company's operating performance by removing items considered non-recurring and not reflective of core operations (Black et al., 2021; Charitou et al., 2018; Leung and Veenman, 2018). However, the selective exclusion of some expenses can also result in earnings figures that may mask the actual economic circumstances (McVay et al., 2024). For instance, removing depreciation and amortization from earnings may increase reported profitability but obscure the costs associated with physical capital. Consequently, this may mask the information content of the excluded expenses reduce the ability of earnings to predict firms' future performance (Bradshaw et al., 2018; Doyle et al., 2003).

### **Motivation and Purpose of the Study:**

The motivation for our paper builds on the existing body of literature on the matching between revenues and expenses, earnings disaggregation, the information content of expenses, and cost stickiness. Although previous research has extensively explored these areas, there remains an important gap in understanding the predictive ability of individual expense line items for future performance. Addressing this gap is particularly important because expenses constitute the majority of line items in the income statement and play a central role in shaping the financial narrative of a firm's performance and exhibit varying degrees of predictive power (Oh and Penman, 2024; Srivastava, 2023; Fan and Liu, 2017). Thus, our paper focuses on examining the individual information content of each expense item to improve the accuracy of future performance forecasts (Guo and Zhou, 2018).

Expenses are incurred to generate revenues, and any excess of revenues over expenses results in profits. Consequently, expenses contain information that can predict future financial performance and can be categorized into those related to core activities, which have higher information content and predictive value, and those associated with non-core activities (i.e., non-recurring) which typically offer limited information content about future performance (Srivastava, 2014, 2023; Fairfield et al., 1996). Additionally, the varying weights of different expense items reflect their relative importance and potential information content regarding future earnings, and investors appear to recognize these distinctions by treating each line item

differently (Bansal et al., 2023; Donelson et al., 2011; McVay, 2006). For example, in many cases, if a firm reports a loss, the market does not react proportionally to the decline in earnings (Gu et al., 2023; Hayn, 1995).

Since expense items are computed based on different accounting methods, each item has distinct information characteristics with varying predictive power for future earnings. For example, COGS is recognized when inventory is depleted as goods are delivered to customers, reflecting the company's current sales and signaling potential future sales growth because inventory turnover indicates demand. Depreciation reflects firms' long-term capital investments, the depreciation method reflects how firms allocate the cost of their fixed assets over time, thereby influencing future profitability. SGA comprises current-period expenditures related to brand development, employee training, and customer acquisition that are expected to generate future benefits.

Based on the above argument, this paper focuses on disaggregated expense items reported in the income statement to evaluate their role in predicting future sales. By doing so, we can identify which items have stronger or weaker predictive abilities for future performance, thereby improving the assessment of firms' future performance regardless of whether profits or losses are reported. Thus, the paper tests the following main hypothesis:

**H1:** Aggregate expenses contain significant information for predicting future sales.

To further examine the predictive value of individual expense items, the paper also tests the following sub-hypotheses:

**H1a:** COGS contains significant information for predicting future sales.

**H1b:** Selling and Administrative expenses contain significant information for predicting future sales.

**H1c:** Depreciation expenses contain significant information for predicting future sales.

### Sample and Methodology:

The sample for this study is obtained from the Compustat Global database and consists of publicly listed Jordanian firms from 1990 to 2022. To ensure comparability and a homogeneous expense structure, financial firms (SIC 6000–6999) and firms in SIC 8000–9999 are excluded. Additionally, irregular observations (e.g., negative sales values<sup>1</sup>) are dropped from the sample, reducing it to 2,044 firm-year observations spanning 1996 to 2022. The final sample consists of 1,432 firm-year observations after excluding firms with missing sales data for periods  $t+1$  to  $t+4$ . Moreover, when including sales growth as a control variable, the sample size decreases to 1,247 observations after dropping missing observations. However, because sales growth is not a primary variable, a robustness test was conducted by re-estimating the models without sales growth as a control variable, and the results remained relatively similar, indicating that the reduction in sample size does not drive the main findings. Furthermore, when breaking down total expenses into specific expense components (COGS, SGA, and DEP), the sample size is reduced further to 742 observations due to missing values for depreciation expense. Therefore, sales growth and depreciation were included consistently across the regression models, resulting in a reduced sample size due to missing values.

<sup>1</sup> Irregular observations may arise in databases due to accounting adjustments or corrections of overstatements. For example, sales values may be negative due to unusual sales returns or corrections; such observations are dropped because they do not reflect normal operations.

We construct the variables using the following Compustat mnemonics: sales (REVT) in periods t+1 to t+4, cost of goods sold (COGS), selling, general, and administrative expenses (XSGA), and depreciation and amortization (DP). Total expenses are computed as sales (REVT) minus income before extraordinary items (IB). All variables are scaled by total assets (AT) to control for differences in firm size and to reduce heteroscedasticity. Additionally, we include two control variables: return on assets (ROA), measured as income before extraordinary items divided by total assets, and sales growth, calculated as the change in sales from period t to t-1.

We estimate two regression models to examine the predictive power of expenses for future sales. In the first model, we evaluate total expenses in period t to forecast sales in periods t+1 to t+4. We then extend this approach by disaggregating total expenses into cost of goods sold (COGS), selling and administrative expenses (SGA), and depreciation (DEP). In both models, profitability (ROA) and sales growth are included as control variables to account for firm performance and recent changes in sales. The regressions are specified as follows:

Model (1): Aggregated Expenses Model

$$Sales_{t+k} = \beta_0 + \beta_1 Total\ Expenses_t + \beta_2 ROA_t + \beta_3 Sales\ Growth_t + \varepsilon_{t+k}$$

Model (2): Disaggregated Expenses Model

$$Sales_{t+k} = \beta_0 + \beta_1 COGS_t + \beta_2 SGA_t + \beta_3 DEP_t + \beta_4 ROA_t + \beta_5 Sales\ Growth_t + \varepsilon_{t+k}$$

where k = 1, 2, 3, 4 represents the forecast horizon<sup>2</sup>.

## Results:

### Descriptive results:

**Table 1: Descriptive statistics**

| Variable       | No. of observations* | Mean   | Std. dev. | 25 <sup>th</sup> percentile | 75 <sup>th</sup> percentile |
|----------------|----------------------|--------|-----------|-----------------------------|-----------------------------|
| Sales t+1      | 1,432                | 0.623  | 0.593     | 0.263                       | 0.792                       |
| Sales t+2      | 1,432                | 0.673  | 0.744     | 0.246                       | 0.834                       |
| Sales t+3      | 1,432                | 0.721  | 0.879     | 0.235                       | 0.865                       |
| Sales t+4      | 1,432                | 0.767  | 1.093     | 0.214                       | 0.895                       |
| Total Expenses | 1,432                | 0.576  | 0.509     | 0.272                       | 0.725                       |
| COGS           | 1,432                | 0.456  | 0.449     | 0.165                       | 0.602                       |
| SGA            | 1,432                | 0.076  | 0.068     | 0.033                       | 0.102                       |
| DEP            | 742                  | 0.036  | 0.035     | 0.016                       | 0.049                       |
| ROA            | 1,432                | 0.0087 | 0.254     | -0.018                      | 0.064                       |
| Sales Growth   | 1,247                | 0.129  | 2.498     | -0.004                      | 0.009                       |

Sales (t+1, t+2, t+3, t+4): future sales for firm i in period t+1, t+2, t+3, t+4

Total expenses: measured as sales minus net income for firm i in period t.

<sup>2</sup> While we follow prior papers in using pooled OLS (e.g., Anderson et al., 2003; Banker & Chen, 2006), we acknowledge that firm and year fixed effects could be included in robustness tests to control for unobserved heterogeneity. However, we control for such effects by including ROA and sales growth to account for time varying and firm-specific dynamics.

COGS: cost of goods sold for firm *i* in period *t*.

SGA: selling and administrative expenses for firm *i* in period *t*.

DEP: depreciation expenses for firm *i* in period *t*.

ROA: return on assets, measured as net income divided by total assets for firm *i* in period *t*.

Sales Growth: change in sales between two periods for firm *i* in period *t*.

All variables are scaled by total assets in period *t*.

\*Missing values in DEP and Sales growth reduces the number of observations.

As shown in Table 1, future sales (Sales *t*+1 to Sales *t*+4) show a stable increase over time, with the mean value increasing from 0.623 in period *t*+1 to 0.767 in period *t*+4. This suggests a general upward trend in sales growth with greater variability in later periods, as indicated by the increasing standard deviation. Moreover, COGS represents the largest component of expenses with a mean value of 0.456, compared with 0.576 for total expenses. SGA and DEP have lower mean values of 0.076 and 0.036, respectively. This indicates that total expenses are primarily driven by COGS. Additionally, the lower mean value of depreciation expense suggests that many firms in the sample may have relatively low levels of investment in fixed assets, or they are using assets with long useful lives. The high standard deviation in both control variables indicates significant volatility in sales growth and profitability among firms.

#### Results for the aggregate and disaggregated expense models:

**Table 2: Results for aggregated total expenses and future sales**

| Variable             | Sales <i>t</i> +1    | Sales <i>t</i> +2    | Sales <i>t</i> +3    | Sales <i>t</i> +4    |
|----------------------|----------------------|----------------------|----------------------|----------------------|
| Total Expenses       | 0.983<br>(44.86) *** | 0.981<br>(31.16) *** | 0.985<br>(26.30) *** | 0.995<br>(19.30) *** |
| ROA                  | 0.994<br>(21.94) *** | 0.978<br>(15.02) *** | 0.937<br>(12.09) *** | 1.01<br>(9.50) ***   |
| Sales Growth         | 0.03<br>(6.75) ***   | 0.03<br>(5.09) ***   | 0.04<br>(6.11) ***   | 0.04<br>(3.87) ***   |
| Const.               | 0.043<br>(2.55) ***  | 0.079<br>(3.25) ***  | 0.108<br>(3.73) ***  | 0.136<br>(3.42) ***  |
| Adj-R <sup>2</sup>   | 62.75%               | 44.86%               | 37.15%               | 24%                  |
| No. of observations* | 1247                 | 1247                 | 1247                 | 1247                 |

Sales (*t*+1, *t*+2, *t*+3, *t*+4): future sales for firm *i* in periods *t*+1, *t*+2, *t*+3, *t*+4.

Total expenses: measured as sales minus net income for firm *i* in period *t*.

ROA: measured as net income divided by total assets for firm *i* in period *t*.

Sales Growth: change in sales between two periods for firm *i* in period *t*.

All variables are scaled by total assets in period *t*.

*t*-statistics are reported in parentheses.

\*\*\* indicate significance significant at the 1% level.

\*Number of observations are reduced from 1,432 to 1,247 due to missing values in sales growth.

The results shown in Table 2 align with the prediction in H1, indicating that total expenses are highly significant ( $p < .001$ ) in predicting future sales across all four periods from  $t+1$  to  $t+4$ , with estimated coefficients values ranging from 0.983 to 0.995 (approximately 1). These results show that expenses are not merely costs incurred but also contain information about the firm's activities, strategies, and expectations. For example, spending on product development and advertising may contribute to future revenue growth. Additionally, expenditures on production capacity reflects management's expectations about future performance. The results also indicate that expenses remain a critical factor in predicting future sales even though some studies argue that the matching between expenses and revenues has declined over the years (Srivastava, 2023; Dichev & Tang, 2008). Overall, the results are consistent with the findings of Oh and Penman (2024) and Barker and Penman (2020), indicating that total expenses contain valuable information about future growth and profitability and reflecting managers' expectations.

To examine the information content and predictive ability of different expense items, total expenses are disaggregated into cost of goods sold, selling, general, and administrative expenses, and depreciation. The results are shown in the following table.

**Table 3: Results for disaggregated expense items and future sales**

| Variable            | Sales $t+1$         | Sales $t+2$         | Sales $t+3$          | Sales $t+4$          |
|---------------------|---------------------|---------------------|----------------------|----------------------|
| COGS                | 1.03<br>(35.41) *** | 1.03<br>(23.92) *** | 0.962<br>(19.29) *** | 0.926<br>(15.41) *** |
| SGA                 | 0.830<br>(4.15) *** | 0.844<br>(2.85) *** | 1.06<br>(3.08) ***   | 1.23<br>(2.96) ***   |
| DEP                 | 0.789<br>(1.87) *   | 0.666<br>(1.07)     | 2.12<br>(2.93) ***   | 3.14<br>(3.60) ***   |
| ROA                 | 0.719<br>(6.74) *** | 0.495<br>(3.14) *** | 0.355<br>(1.84) *    | 0.547<br>(2.48) **   |
| Sales Growth        | 0.009<br>(2.05) **  | 0.008<br>(1.21)     | 0.02<br>(3.03) ***   | - 0.006<br>(- 0.67)  |
| Const.              | 1.88<br>(0.06)      | 0.081<br>(1.87) *   | 0.048<br>(0.95)      | 0.026<br>(0.43)      |
| Adj-R <sup>2</sup>  | 64.34%              | 44.57%              | 35.37%               | 26.1%                |
| No. of observations | 742                 | 742                 | 742                  | 742                  |

Sales ( $t+1$ ,  $t+2$ ,  $t+3$ ,  $t+4$ ): future sales for firm  $i$  in periods  $t+1$ ,  $t+2$ ,  $t+3$ ,  $t+4$

COGS: cost of goods sold for firm  $i$  in period  $t$ .

SGA: selling and administrative expenses for firm  $i$  in period  $t$ .

DEP: depreciation expenses for firm  $i$  in period  $t$ .

ROA: measured as net income divided by total assets for firm  $i$  in period  $t$ .

Sales Growth: change in sales between two periods for firm  $i$  in period  $t$ .

All variables are scaled by total assets in period  $t$ .

t-statistics are reported in parentheses.

\*\*\*, \*\*, and \* indicate significance at the 1%, 5%, and 10% levels, respectively.

To ensure consistency across all models, missing observations are dropped from the sample.

The results support hypothesis H1a, which posits that Cost of Goods Sold (COGS) contains significant information for predicting future sales due to its nature as a core operating expense. This indicates that because COGS reflects the value of goods delivered to customers during the current period and accounts for inventory build-up, it also serves as a predictor of the volume of goods expected to be delivered in the future, thereby signaling potential future sales (Barker & Penman, 2020). The results also show that SGA is significant in predicting sales in all future periods, suggesting that this expense item represents current investments to increase sales and improve performance in the future, supporting H1b (Anderson et al., 2003; Habib & Costa, 2022). Furthermore, the results show that the increasing coefficients over time suggest the long-term benefits of investments in marketing, branding, and customer acquisition. Moreover, for depreciation expense, the results partially support hypothesis H1c; depreciation is significant (at the 10% significance level) only in t+1 and becomes highly significant in t+3 and t+4 at the 1% significance level. The increasing coefficients from 0.789 in t+1 to 3.14 in t+4 suggest the long-term nature of capital investments and their impact on future sales, which indicates that firms expand their fixed asset base to increase their capacity, potentially leading to higher future sales (Bradshaw et al., 2018). The results on disaggregated expenses are consistent with prior literature (Gou & Zhou, 2018; Fan & Liu, 2017; Banker & Chen, 2006; McVay, 2006), suggesting that disaggregating expenses may reduce noise and increase the information content because each expense item contains significant information about future performance.

#### **Aggregate expenses vs. disaggregated expenses:**

The results in Tables 2 and Table 3 show that the adjusted  $R^2$  value is slightly higher for the disaggregated model in t+1 (64.34%) compared to the total expenses model (62.75%) for the same period, which suggests that disaggregating expenses improves the model's explanatory power in the short term (t+1). However, as the forecasting horizon extends, the predictive power of individual expense items becomes less consistent, leading to fluctuations in the adjusted  $R^2$  values. One possible explanation for this is that individual expense items introduce greater variability and noise over time, thereby reducing their predictive power (Amir et al., 2014).

While this inconsistency in  $R^2$  estimates between the two models across time seems contradictory, it provides additional evidence of the relationship between the expense items and future sales. The results in Table 3 show that although COGS remains significant across all periods, its coefficient declines over time (from 1.03 in t+1 to 0.926 in t+4), indicating that this core operating expense has weaker predictive power over longer forecasting horizons. On the other hand, the results also show that the SGA coefficient increases over time from 0.830 in period t+1 to 1.23 in period t+4, suggesting the potential long-term benefits of investments in marketing, branding, and customer acquisition. Moreover, the results show a similar pattern for depreciation. Taken together, these results suggest that the disaggregated model, which includes SGA and DEP as separate variables may capture these long-term effects better than the aggregated model.

To further examine the differences in the adjusted  $R^2$  values and to assess the predictive performance of the two models, the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values are compared across the four forecasting horizons, with lower AIC and BIC values indicating a better model fit after accounting for model complexity. However, caution is required when comparing AIC or BIC values across models estimated using different sample sizes. (Brooks and Burke, 2003).

**Table 4: Model comparison using AIC and BIC**

| Forecast horizon | Model   | AIC     | BIC     |
|------------------|---------|---------|---------|
| Sales t+1        | Model 1 | 1010.47 | 1030.99 |
|                  | Model 2 | 651.20  | 678.85  |
| Sales t+2        | Model 1 | 1913.62 | 1934.13 |
|                  | Model 2 | 1231.37 | 1259.03 |
| Sales t+3        | Model 1 | 2347.88 | 2368.39 |
|                  | Model 2 | 1454.30 | 1481.95 |
| Sales t+4        | Model 1 | 3144.35 | 3164.86 |
|                  | Model 2 | 1731.96 | 1759.62 |

Model 1: the aggregated expenses model, no. of observations 1247, 4 degrees of freedom.

Model 2: the disaggregated expenses model, no. of observations 742, 6 degrees of freedom.

AIC and BIC: Akaike's information criterion and Bayesian information criterion, lower values indicate better model fit while accounting for complexity.

As shown in Table 4, the results indicate lower AIC and BIC values for the disaggregated expenses model across all forecasting horizons, indicating that breaking down expenses into their individual components improves the model's ability to predict future sales. Thus, despite the adjusted  $R^2$  fluctuations between the two models, the AIC and BIC results indicate that the disaggregated model provides a better fit for forecasting sales across different time horizons and highlight the informational value of individual expense components and their distinct roles in short- and long-term performance prediction (Baksaas and Stenheim, 2019; Guo and Zhou, 2018; Alam and Brown, 2006).

### Examining cost stickiness:

Anderson et al.'s (2003) paper introduced the concept of cost stickiness by explaining the asymmetric behavior of costs; sticky expenses increase more when activity levels rise than they decrease when activity levels decline. This cost sickness is typically attributed to managerial discretion, resource retention, and cost adjustment. For example, managers may retain resources during sales declines to avoid the costs of restarting operations when sales recover (Costa and Habib, 2023; Han et al., 2020). In this paper, we examine the cost stickiness of COGS, SGA and DEP to provide additional evidence on the predictive power of these expenses; if an expense exhibits stickiness, it may indicate managerial expectations of future sales growth. Conversely, nonsticky expenses may indicate a closer link to current activity levels, and therefore have lower predictive power for future performance. To examine cost stickiness, we use the Anderson et al. (2003) model:

$$\Delta \ln(\text{Expense}_{it}) = \alpha_1 + \beta_1 \Delta \ln(\text{Sales}_{it}) + \beta_2 \text{Decrease}_{it} * \Delta \ln(\text{Sales}_{it}) + \varepsilon_{it}$$

$\Delta \ln(\text{Expense}_{it})$  is the log change in the expense (COGS, SGA, or DEP),  $\Delta \ln(\text{Sales}_{it})$  is the log change in sales.  $\text{Decrease}_{it}$  is a dummy variable equal to 1 if sales decrease from the previous period, and 0 otherwise.  $\beta_1$  measures how expenses change when sales increase and is expected to be positive and significant and  $\beta_2$  captures the asymmetric response of the expense to sales decreases. A significant negative  $\beta_2$  indicates cost stickiness, meaning that the expense decreases less when sales fall than it increases when sales rise.

**Table 5: Results for expense item stickiness**

| Variable | $\beta 1$            | $\beta 2$               |
|----------|----------------------|-------------------------|
| COGS     | 0.971<br>(44.52) *** | - 0.171<br>(- 4.66) *** |
| SGA      | 0.232<br>(7.99) ***  | 0.064<br>(1.32)         |
| DEP      | 0.164<br>(2.82) ***  | - 0.233<br>(- 2.38) *** |

Number of observations: 742, missing values are dropped to ensure consistency across all models.

Variables are defined in Table 3.

t-statistics are reported in parentheses, \*\*\* indicate significance at the 1% level.

$\beta 1$  captures the percentage change in the expense for a 1% increase in sales.

$\beta 2$  captures the difference in expense response when sales decrease, if  $\beta 2 < 0$ , expenses decrease less when sales decline, indicating cost stickiness.

The results of the cost stickiness tests in Table 5 reveal significant differences in the behavior of COGS, SGA, and DEP in response to changes in sales. For COGS, the results show an expected strong positive relationship;  $\beta 1 = 0.971$  (p-value = 0.000) which indicates an increase of approximately 0.97% for every 1% increase in sales since COGS is directly related to production levels and sales volume. Moreover, the value for  $\beta 2$  is - 0.171 (p-value = 0.000), indicating that COGS exhibits cost stickiness, decreasing by 0.17% when sales decline. This result suggests that firms do not adjust production costs during sales declines due to the additional costs associated with reducing capacity or to retain these resources for any future growth. Similarly, the results show that DEP also exhibits cost stickiness with a significant negative value for  $\beta 2$  of - 0.171 (p-value = 0.000). A possible explanation for the stickiness of depreciation expense is the fixed and non-discretionary nature of capital costs. Hence, since these expenses are not easily adjusted in response to short-term sales changes, they provide a stable indicator for a firm's future performance. Furthermore, the significant  $\beta 1$  value of 0.164 indicates a weak positive relationship and confirms that depreciation expenses are only marginally associated with sales growth.

On the other hand, the  $\beta 1$  value for SGA indicates that these expenses increase by approximately 0.23% for every 1% increase in sales. This weaker relationship (compared to COGS) suggests that SGA mostly consists of fixed administrative costs and strategic marketing investments (Balakrishnan et al., 2014). However, the results show that the interaction term  $\beta 2$  is positive but not statistically significant, indicating that SGA does not exhibit significant cost stickiness and firms can adjust SGA easily in response to sales fluctuations, especially since they are discretionary and flexible in nature.

Hence, consistent with previous studies (Anderson et al., 2003; He et al., 2020; Han et al., 2020), the cost stickiness results emphasize the dual role of expenses in both short-term cost management and long-term sales prediction; COGS is sticky and highly correlated with production. SGA is flexible and highly informative about future sales, and depreciation is weakly associated with sales growth but remains stable.

### **Conclusion:**

Our paper offers a detailed understanding of the information content of expenses by analyzing the predictive power of disaggregated expenses and their stickiness behavior. Based on a sample of firms listed on the ASE, the results of this paper show that COGS, SGA, and DEP are significant predictors of future sales across all four time horizons, except for depreciation in period  $t+2$ . Furthermore, the coefficient for COGS decreases over longer time horizons, consistent with its role as a short-term operational core expense. Conversely, the coefficients for SGA and DEP increase in later periods, which reflects their long-term effects as well as their discretionary and capital-related nature. Additionally, the cost stickiness tests show that COGS demonstrates sticky behavior and reflects managers' hesitation to adjust production costs during downturns. Similarly, depreciation also shows sticky behavior, which aligns with its increasing predictive ability over time. However, SGA does not show significant stickiness because of its discretionary nature; however, its increasing forecasting ability over time emphasizes its role in capturing strategic investments that yield future benefits. Overall, our findings enhance the understanding of the role of expenses in financial analysis and decision-making by showing not only whether expenses predict sales but also why they do so, especially when considering their structural characteristics. This dual assessment emphasizes the importance of analyzing expense components individually rather than collectively.

Despite the robustness of the findings, the paper is constrained by some limitations. The results are based on firms listed on the Amman Stock Exchange, which is an emerging market with specific institutional and economic characteristics, limiting the generalizability of the findings to other emerging markets. Future research should focus on examining the predictability of aggregated and disaggregated expenses in similar emerging markets. Additionally, the sample size for the disaggregated models becomes significantly smaller due to missing observations (e.g., depreciation values). Moreover, the paper focuses on three major expense items (COGS, SGA, and Dep); future research should extend this analysis to include other expense items such as R&D. Finally, potential endogeneity cannot be entirely ruled out, especially reverse causality; future research should address how managers' expectations might influence discretionary expenses.

### References

- Agarwal, N., “Cost stickiness and stock price delay”, *European Accounting Review*, 33(3), 2024, p 855–879.
- Alam, P., & Brown, C.A., “Disaggregated earnings and the prediction of ROE and stock prices: a case of the banking industry”, *Review of Accounting and Finance*, 5(4), 2006, p 443–463.
- Amir, E., Einhorn, E., & Kama, I., “The role of accounting disaggregation in detecting and mitigating earnings management”, *Review of Accounting Studies*, 19, 2014, p 43–68.
- Anderson, M.C., Banker, R.D., & Janakiraman, S.N., “Are selling, general, and administrative costs sticky?”, *Journal of Accounting Research*, 41(1), 2003, p 47–63.
- Baksaas, K.M., & Stenheim, T., “Proposal for improved financial statements under IFRS”, *Cogent Business & Management*, 6(1), 2019, 1642982.
- Balakrishnan, R., Labro, E., & Soderstrom, N.S., “Cost structure and sticky costs”, *Journal of Management Accounting Research*, 26(2), 2014, p 91–116.
- Banker, R. D., & Chen, L., “ Predicting earnings using a model based on cost variability and cost stickiness”, *The Accounting Review*, 81(2), 2006, p 285–307.
- Bansal, M., Kumar, A., Bhattacharyya, A., & Bashir, H.A., “Predictors of revenue shifting and expense shifting: Evidence from an emerging economy”, *Journal of Contemporary Accounting & Economics*, 19(1), 2023, 100339.
- Barker, R., Penman, S., Linsmeier, T.J., & Cooper, S., “Moving the conceptual framework forward: Accounting for uncertainty”, *Contemporary Accounting Research*, 37(1), 2020, p 322–357.
- Black, D.E., Christensen, T.E., Ciesielski, J.T. & Whipple, B.C., “Non-GAAP earnings: A consistency and comparability crisis?”, *Contemporary Accounting Research*, 38(3), 2021, p1712–1747.
- Bradshaw, M. T., Christensen, T. E., Gee, K. H. & Whipple, B. C., “Analysts’ GAAP earnings forecasts and their implications for accounting research”, *Journal of Accounting and Economics*, 66(1), 2018, p 46–66.
- Brook, C., & Burke, S.P., “Information criteria for GARCH model selection: An application to high frequency data”, *European Journal of Finance*, 9(6), 2003, p 557–580.
- Charitou, A., Floropoulos, N., Karamanou, I. & Loizides, G., “Non-GAAP earnings disclosures on the face of the income statement by UK firms: The effect on market liquidity”, *The International Journal of Accounting*, 53(3), 2018, p 183–202.
- Costa, M.D., & Habib, A., “Cost stickiness and firm value”, *Journal of Management Control*, 34(2), 2023, p 235–273.

- Dichev, I., & Tang, V., “Matching and the changing properties of accounting earnings over the last 40 years”, *The Accounting Review*, 83(6), 2008, p1425–1460.
- Donelson, D.C., Jennings, R., & McInnis, J., “Changes over time in the revenue-expense relation: accounting or economics?”, *The Accounting Review*, 86(3), 2011, p 945–974.
- Doyle, J.T., Lundholm, R.J., & Soliman, M.T., “The predictive value of expenses excluded from pro forma earnings”, *Review of Accounting Studies*, 8, 2003, p 145–174.
- Ertimur, Y., Livnat, J., & Martikainen, M., “Differential market reactions to revenue and expense surprises”, *Review of Accounting Studies*, 8, 2003, p 185–211.
- Fairfield, P., Sweeney, R. & Yohn, T., “Accounting classification and the predictive content of earnings”, *The Accounting Review*, 71(3), 1996, p 337–355.
- Fan, Y., & Liu, X., “Misclassifying core expenses as special items: Cost of goods sold or selling, general, and administrative expenses?”, *Contemporary Accounting Research*, 34(1), 2017, p 400–426.
- Geertsema, P.G., Lont, D.H., & Lu, H., “Real earnings management around CEO turnovers”, *Accounting & Finance*, 60(3), 2020, p 2397–2426.
- Gu, F., Lev, B., & Zhu, C., “All losses are not alike: Real versus accounting-driven reported losses”, *Review of Accounting Studies*, 28(3), 2023, p 1141–1189.
- Gunny, K.A., “The relation between earnings management using real activities manipulation and future performance: Evidence from meeting earnings benchmarks”, *Contemporary Accounting Research*, 27(3), 2010, p 855–888.
- Guo, Y., & Zhou, J., “Experimental tests of the salience theory: Disaggregated income statements under two economic states”, *Asia-Pacific Journal of Accounting & Economics*, 25(1–2), 2018, p 113–127.
- Habib, A., & Costa, M.D., “Cost stickiness and stock price crash risk”, *Accounting & Finance*, 62(4), 2022, p 4247–4278.
- Han, S., Rezaee, Z., & Tuo, L., “Is cost stickiness associated with management earnings forecasts?”, *Asian Review of Accounting*, 28(2), 2020, p 173–211.
- Hayn, C., “The information content of losses”, *Journal of Accounting and Economics*, 20(2), 1995, p 125–153.
- He, J., Tian, X., Yang, H., & Zuo, L., “Asymmetric cost behavior and dividend policy”, *Journal of Accounting Research*, 58(4), 2020, p 989–1021.
- Hensel, T., & Schöndube, J.R., “Big bath accounting and CEO turnover: the interplay between optimal contracts and career concerns”, *Journal of Business Economics*, 92(8), 2022, p 1249–1281.

- Kim, S., Sambharya, R.B., & Yang, J.S., “Do CEOs exercise managerial discretion to save their jobs?”, *Journal of Management & Governance*, 20, 2016, p 179–200.
- Kumari, P., & Mishra, C.S., “Value relevance of aggregated and disaggregated earnings in India: Significance of intangible intensity”, *Journal of International Accounting, Auditing and Taxation*, 39, 2020, 100321.
- Leung, E., & Veenman, D., “Non-GAAP earnings disclosure in loss firms”, *Journal of Accounting Research*, 56(4), 2018, p 1083–1137.
- Li, V., “The effect of real earnings management on the persistence and informativeness of earnings”, *The British Accounting Review*, 51(4), 2019, p 402–423.
- Mashoka, T., “The matching characteristics between revenues and expenses for listed firms in the ASE”, *Mutah Journal of Humanities and Social Sciences*, 32(6), 2017, p 9–28.
- McVay, S.E., “Earnings management using classification shifting: An examination of core earnings and special items”, *The Accounting Review*, 81(3), 2006, p 501–531.
- McVay, S.E., Rodriguez-Vazquez, E.A., & Toynbee, S.M., “Experience with non-GAAP earnings and investors’ pricing of exclusions”, *The Accounting Review*, 99(3), 2024, p 397–427.
- Oh, H.I., & Penman, S., “Income statement mismatching has not reduced the informativeness of earnings over time”, *Journal of Business Finance & Accounting*, 51(3–4), 2024, p 756–782.
- Roychowdhury, S., “Earnings management through real activities manipulation”, *Journal of Accounting and Economics*, 42(3), 2006, p 335–370.
- Srivastava, A., “Trivialization of the bottom line and losing relevance of losses”, *Review of Accounting Studies*, 28(3), 2023, p 1190–1208.
- Srivastava, A., “Why have measures of earnings quality changed over time?”, *Journal of Accounting and Economics*, 57(2–3), 2014, p 196–217.
- Wagener, S., “Accounting for the middle: motivations, extent, and limitations of middle managers’ earnings management”, *Journal of Business Economics*, 94(2), 2024, p 225–277.
- Weiss, D., “Cost behavior and analysts’ earnings forecasts”, *The Accounting Review*, 85(4), 2010, p 1441–1471.
- Wild, J.J., & Wild, J.M., “Explanatory power of earnings for returns: Nonstationarity, disaggregation and timeliness”, *Review of Accounting and Finance*, 21(4), 2022, p 320–340.
- Zang, A.Y., “Evidence on the trade-off between real activities manipulation and accrual-based earnings management”, *The Accounting Review*, 87(2), 2012, p 675–703.