HOW DEFERRED REVENUE CHANGES IMPACT FUTURE FINANCIAL PERFORMANCE

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1. INTRODUCTION

In many industries and business environments, companies engage in contractual sales with customers enabling them to collect cash payments in advance from customers before delivering their obligations stated in the contract. This situation creates an increase in a firm’s current liabilities in the form of a deferred revenue account. Deferred revenue changes may affect profit margins by deferring revenue recognition while recognizing some expenses associated with this transaction. As a result, a firm’s profit margin alone may be a weak forecast of future profit margins and financial performance (Prakash & Sinha, 2012). Prior studies have found a positive relation between deferred revenue changes and the following two years’ sales growth, gross profit margin, profit margin, and return on assets which stipulates that deferred revenue changes are a relevant indicator for future financial performance (Zhong, Wang, & Zhou, 2017). Financial analysts may not fully incorporate the power of the changes in deferred revenues to predict future financial performance due to their complex nature. This study examines the relevance of deferred revenues in the process of evaluating a firm’s future profitability.

Recent changes in regulations have increased the presence of deferred revenues within the liability

This study examines the potential predictive power of changes in deferred revenues on future profitability based on evidence from the region of the Middle East and North Africa (MENA). It examines whether financial analysts should consider deferred revenues as useful information when evaluating a firm’s future profitability. A pooled OLS regression is used to test the relation. The observations of different companies from various periods are combined into a pooled sample of observations consisting of data from the 500 largest companies in the MENA in terms of market share. Aligned with the existing literature, the findings reveal that changes in deferred revenues are a predictive tool for future financial performance as proven by the positive correlation with the growth of future annual sales, gross profit margin, net profit margin, return on asset, and Tobin’s Q. Testing for this impact adds to the literature given various robustness tests under different circumstances and economic conditions.

Abstract

This study examines the potential predictive power of changes in deferred revenues on future profitability based on evidence from the region of the Middle East and North Africa (MENA). It examines whether financial analysts should consider deferred revenues as useful information when evaluating a firm’s future profitability. A pooled OLS regression is used to test the relation. The observations of different companies from various periods are combined into a pooled sample of observations consisting of data from the 500 largest companies in the MENA in terms of market share. Aligned with the existing literature, the findings reveal that changes in deferred revenues are a predictive tool for future financial performance as proven by the positive correlation with the growth of future annual sales, gross profit margin, net profit margin, return on asset, and Tobin’s Q. Testing for this impact adds to the literature given various robustness tests under different circumstances and economic conditions.

Keywords: Financial Performance, Deferred Revenue Changes, MENA, Predictive Tool

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section of a firm’s balance sheet (Marshall, Dimattia, & Amstutz, 2019). Despite the presence of deferred revenues, few studies focus on the actual nature of deferred revenues and little guidance is available on how to classify or manage such deferrals (Sondhi & Taub, 2006). As companies incur deferred revenues, they defer revenue recognition until a future period. However, the costs associated with deferred revenues are not deferred but rather recognized as they are incurred. The costs of deferring revenues, which are recognized in the present, thus impact a firm’s current profit margin. Such costs can be research and development (R&D), advertising, marketing, and other indirect costs that constitute a part of a company’s expenditures, especially those operating in the pharmaceutical, industrial, healthcare, and information technology industries where deferring revenues is most common.

Empirical evidence shows that companies engage in manipulating or managing earnings and revenues (Nelson, Elliott, & Tarpley, 2002). Long-term and short-term deferred revenues should also be examined to detect potential earnings management procedures (Giedt, 2018). One aspect of this manipulation process involves deferred revenues because it relates to revenue recognition (Caylor, 2010).

Two main components qualify the changes in deferred revenues to be useful in predicting a company’s future profitability and thus financial performance. The first component is that sales contracts might be recognized as deferred revenues. Therefore, an increase in deferred revenues may indicate an increase in sales contracts. This situation would enable analysts to forecast an increase in a firm’s future financial performance. The second component relates to the bargaining power over customers. If a firm experiences an increase in deferred revenues, this event may indicate that it exercises greater bargaining power over its customers than in the past. The reason is that the firm can demand and collect cash from its customers before fulfilling the delivery of a product or service and fulfilling the contract requirement even more than it did previously. By contrast, a company with less bargaining power over its customers may experience a decrease in deferred revenues and be obliged to accept slower payments from customers to survive and compete (Porter, 1985).

Conditions and environments change from one market to another. The effect of deferred revenue changes on a company’s future profitability is a new concept that has not been tested in certain markets. This study provides empirical evidence on the impact of deferred revenues changes on future financial performance in the rapidly developing MENA region. The MENA region has several characteristics that make it different from other regions in the world and worth studying independently. For example, based on the Corruption Perception Index (Transparency International, 2010), the MENA region is characterized by pervasive corruption. Although corruption can have a political connotation, it can also affect investments and economic activities (O’Sullivan, Rey, & Mendez, 2011). Corruption hinders transparency in business environments. This trait of pervasive corruption could potentially affect the extent of revenue manipulation in the MENA region and the process of revenue recognition. Therefore, testing the impact of deferred revenue changes in this region contributes to the literature and permits assessing the consistency of the results under different circumstances and macro-economic conditions.

The next section explains the background literature on deferred revenues, official accounting standards for the revenue recognition process, and how companies approach this process. The following section sets forth three testable hypotheses followed by a description of the data sample and criteria for selection. Subsequent sections explain the methodology, research design, and analysis of results followed by a discussion of the findings. The next to last section discusses the study’s potential limitations, future research, and the managerial implications followed by the conclusions.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Revenue and expense matching concept

Firms should periodically match revenues and expenses with their corresponding period of performance to provide a realistic evaluation of their financial reporting (Paton & Littleton, 1940; Blocker, 1949). The American Accounting Association Concepts and Standards Research Study Committee (CSRSC, 1965) has thoroughly assessed the matching rule in guiding the reporting of financial statements. During the late 1970s, the Financial Accounting Standards Board (FASB) adopted the balance sheet approach instead of the income statement approach as the basis for the correct financial reporting, along with its concept of the matching of revenues and expenses.

Many researchers have assessed the matching process of revenues and expenses followed in the United States. They have observed a decline in matching quality and a weakening of earnings management quality measured by the rate of its volatility, resulting from FASB’s paradigm of moving toward adopting a fair value accounting approach. Donelson, Jennings, and McInnis (2011) contend that the decrease in matching quality resulted from the rising appearance of unusual and extraordinary items expenses that arise from the changes in the economic environment. According to Sriyastava (2014), another factor affecting the decline in matching quality is the change within the U.S. economy to mainly focus on industries and segments with much higher period costs requiring more investment and expenditure in R&D activities.

2.2. Revenue recognition process in the software industry

The complexity of contractual arrangements that firms make with customers has increased over time, which makes managing the recognition of their deferred revenues even more challenging. Still, this type of contractual agreement obligates firms to attain certain quality and performance standards over the ensuing period. As a result, firms needed to avoid missing opportunities that would lead to greater sales and increased future revenues. In this type of contract, companies may be able to collect
cash from customers before delivering the good or service leading to an increase in a firm's current liabilities in the form of deferred revenues.

2.3. Revenue manipulation

Identifying the appropriate time to recognize revenues has been a complex issue addressed by both the International Accounting Standards Board (IASB) and FASB. The two main accounts that create controversy in terms of recognizing revenues involve accruals and/or deferrals. Accruals relate to accounts receivable (a current asset), while deferrals relate to deferred revenues (a current liability).

Caylor (2010) examines the existence of manipulation and discretion in the revenue recognition process to accomplish three managerial objectives involving earnings: 1) avoiding a decline in earnings; 2) bypassing unexpected, negative earnings; 3) escaping losses in net income. Both accruals and deferrals offer managers opportunities to achieve these objectives, which can be crucial in achieving their earnings management strategies. Caylor (2010) studies whether managers prefer these accounts. His results show that managers participate in earnings manipulations through accelerating revenues by prematurely recognizing both accounts receivables and deferred revenues when a firm’s earnings benchmark is not met. Moreover, managers tend to exercise their manipulation strategies more on deferred revenues than on accounts receivable to bypass incurring any unexpected negative earnings. Accelerating revenues through account receivables can be riskier because the company has not yet received any cash, unlike deferred revenues where the company collects cash in advance from its customers. The cost of managing accounts receivables is also higher compared with deferred revenues and involves more uncertainty making it a less efficient approach to accelerate or decelerate revenues. Detecting earnings management not only calls for investigating accruals but also long-term and short-term deferred revenues accounts (Giedt, 2018). In fact, Giedt (2018) uses three related accruals for earnings, namely accounts receivables, short-term deferred revenues, and long-term deferred revenues.

2.4. Revenue recognition standards

In May 2014, FASB and IASB collaborated to develop the most recent revenue recognition standards called the Accounting Standards Codification (ASC). These new standards upgrade the old practices based on a one-dimensional understanding of the deferred revenue concepts, industry-specific, transaction-focused standards. The main advantage of adopting these new standards is to unify the revenue recognition principles among all industries and firms and thus to eliminate the recognition of principles discrimination that existed among industries in previous standards. This unification is likely to improve the ability to compare and understand financial reporting without considering the type of industry in which a company operates. However, the main disadvantage of ASC is the difficulty of applying it across all industries (Hepp, 2018).

ASC is characterized by several elements. First, a firm initiates a contract with a customer based on an asset, good, or service to be delivered and performance requirement. Next, satisfying the performance requirements creates revenue. Finally, the firm meets its performance requirement once the control over the goods or services shifts to the end customer. The following steps characterize the revenue recognition process based on ASC (Yrudek, 2014):

1. Customer contract identification.
2. Performance identification obligated within the contract.
3. Transaction price identification.
4. Allocation of the transaction price to the equivalent performance obligation.

Revenue recognition upon satisfying the performance obligation.

2.5. Hypothesis development

A company's current revenues provide useful insights about its profitability and financial performance (Wagenhofer, 2014). Current reported revenues aid market analysts to predict a company’s future performance based on the current and previous performance reported in its financial statements. Deferred revenues also offer insights about future period revenues. As a result, understanding variations in deferred revenues is an overlooked but powerful means of predicting a firm’s financial performance.

Changes in deferred revenues are likely to affect a firm’s future sales growth due to two factors. First, any variation in a company’s deferred revenues over time may indicate either an increase or a decrease in its ability to demand new sales contracts. The former leads to an increase in advance payments that will not be shown in the company’s current reported financial statement as total revenues. According to the ASC, a company must recognize any payment in advance by customers when the payment is built on a customer contract as a deferred payment in the current liabilities section of its balance sheet. The recognition of this form of revenue in total revenues should only occur after the fulfillment of the contract obligation and the product's full delivery. Due to this principle, a large increase (decrease) in the company's customer sales contracts leads to an increase (decrease) in the amount of cash received in advance by customers and ultimately an increase (decrease) in the company's deferred revenues. Thus, an increase in a company’s deferred revenues is likely to contribute to an increase in its revenue growth and improvement in its performance because the firm already recognized the expenses associated with those deferred revenues during the current period of deferred revenues recognition.

Second, variations in the deferred revenue account indicate a company’s bargaining power over its customers. Companies with higher bargaining power over their customers are likely to secure more new sales in the future and to have brighter financial prospects. The firm records deferred revenues as it collects cash from customers before delivering the full product or service. A customer’s willingness to pay in advance for a product to be received over a protracted period signals the customer’s loyalty to the firm and the high demand for its products or
services. Thus, a change in deferred revenues due to new customer contractual agreements suggests that the company has bargaining power over its customers.

Since deferred revenues are expected to be translated and recognized into actual revenues in the future after satisfying the performance criterion in the contract, deferred revenues changes are likely to signal a firm's ability to demand more contract sales, which is expected to be positively associated with its future revenue growth. The bargaining power over customers is part of Porter's five forces model and enables a company to set a suitable price for its products and services (Porter, 1979). Therefore, an increase (decrease) in a company's bargaining power over customers signaled by an increase (decrease) in a change in deferred revenues is expected to show a positive (negative) impact on a company's gross profit margin. As such, a positive association between deferred revenues variations and future gross profit margin is anticipated. Thus, the first hypothesis is as follows:

Hypothesis 1 (H1): Variations in revenue deferrals have a positive relation with both a firm's future gross profit margin and sales growth.

An increase in revenue growth is likely to lead to a higher contribution margin for the company, which should also help the company cover its fixed costs such as for insurance, marketing, and advertising, and R&D. Helping to cover these costs may lead to improving a firm's profit margin and return on assets (ROA). A higher gross profit margin leads to a higher gross profit that enables a company to better cover its operating expenses leading to a higher profit margin and ROA. The second hypothesis tests the relation between a change in deferred revenues and future financial performance.

Hypothesis 2 (H2): Variations in revenue deferrals have a positive relation with both a firm's future profit margin and ROA.

Having a more complete idea of the impact of deferred revenues changes on a firm's future financial performance involves considering both its accounting and capital market performance. Accounting and financial measures offer two different perspectives on a company's financial performance. Tobin's Q provides a way of determining a firm’s performance in the financial market. Demand for a company's stock helps to increase its market capitalization, which is a component used in calculating Tobin's Q. To fully assess a company's financial performance, investors and financial analysts should consider both accounting and market performance. Accordingly, the third hypothesis states:

Hypothesis 3 (H3): Variations in revenue deferrals have a positive relation with future period capital market performance using Tobin's Q.

3. SAMPLE, VARIABLE MEASUREMENT, AND DESCRIPTIVE STATISTICS

3.1. Sample

DataStream Eikon Reuters was the source of the financial data between 2012 and 2017 for the 500 companies with the largest market share in the MENA region based on Forbes ranking (Forbes Middle East, 2014). The sample excluded financials, utilities, and companies with missing data. It included 45 companies with a non-zero deferred revenue during the sample period. The base year for calculating the change in deferred revenues and other independent variables was 2011 resulting in 270 observations.

3.2. Variable measurement

As Table 1 shows, the dependent variables include the following year's sales growth, gross profit margin, profit margin, ROA, and Tobin's Q. The primary dependent variable is deferred revenue change. The change in deferred revenue was adapted to each dependent variable in terms of scale to provide an accurate relation. If the dependent variable is either next year's sales growth, profit margin, or gross profit margin, the change in deferred revenues is scaled by total sales. Using either ROA or Tobin’s Q as the dependent variables requires scaling the change in deferred revenues by total assets (Sloan, 1996; Barth, Cram, & Nelson, 2001). In this study, we opted to use both ROA and Tobin's Q to capture both accounting and market performance.

Table 1. Primary variables

| Variable | Description |
|----------|-------------|
| Deferred revenue change | \( \Delta DR(t) = \frac{\text{Sales}(t) - \text{Sales}(t-1)}{\text{Sales}(t-1)} \) |
| Deferred revenue change* | \( \Delta DR(t) = \frac{\text{Sales}(t) - \text{Sales}(t-1)}{\text{ATA}(t)} \) |
| Sales growth | \( \frac{\text{Sales}(t)}{\text{Sales}(t-1)} \) |
| Gross profit margin | \( \text{GPM}(t) = \frac{\text{Sales}(t) - \text{Cost}(t)}{\text{Sales}(t)} \) |
| Profit margin | \( \text{PM}(t) = \frac{\text{Sales}(t) - \text{Cost}(t)}{\text{Sales}(t)} \) |
| ROA | \( \text{ROA}(t) = \frac{\text{Sales}(t) - \text{Cost}(t)}{\text{ATA}(t)} \) |
| Tobin's Q | \( \text{Tobin's Q}(t) = \frac{\text{Market capitalization}(t)}{\text{Book value of liabilities}(t)} + \frac{\text{Book value of assets}(t)}{\text{Total assets}(t)} \) |

Note: This table shows all the model's primary variables along with their respective descriptions and formulas.

Table 2 includes the control variables used in the study, along with their respective descriptions and formulas. Each control variable is introduced and explained. Furthermore, the formulas used to compute each variable are provided.
### Table 2. Control variables

| Variable | Description |
|----------|-------------|
| Sales growth | SaleGrt - 1; Sales growth at year t - 1, calculated as (Sales(t - 1)/Sales(t - 2) - 1) |
| Gross profit margin | GPMt - 1; Gross profit margin at year t - 1, calculated as (Grt - 1)/Sales(t - 1) |
| Profit margin | PMt - 1; Profit margin at year t - 1, calculated as operating income at year (t)/Sales(t - 1) |
| ROA | ROAt - 1; Return on assets at year t - 1, calculated as operating income at year t - 1/average of the beginning and ending total assets of year t - 1 |
| Tobin's Q | Tobin's Q(t - 1); Tobin’s q(t) at year t - 1, (market capitalization (t - 1) + book value of liabilities (t - 1)/book value of total assets (t - 1) |
| Size | Size(t - 1); Size at year t - 1, calculated as the natural log of the ending year total assets at year t - 1 |
| Cash ratio | Cash(t - 1); Cash ratio at year t - 1, calculated as cash and short-term investment at year t - 1/ending year total assets at year t - 1 |
| Leverage ratio | Levr(t - 1); Leverage ratio at year t - 1, calculated as long-term debt at year t - 1/ending year total assets at year t - 1 |
| Investment ratio | Inv(t - 1); Investment ratio at year t - 1, calculated as capital expenditures at year t - 1/ending year-end total assets at year t - 1 |
| Accruals ratio | ACCR(t - 1)/Sales(t - 1); Accruals ratio, calculated as (income before extraordinary and discontinued operations in year t - 1)/net operating cash flow in year t - 1 + change in deferred revenues in year t - 1/total sales at year t - 1 |
| Accruals ratio | ACCR(t - 1)/ATA(t - 1); Accruals ratio, calculated as (income before extraordinary and discontinued operations in year t - 1)/net operating cash flow in year t - 1 + change in deferred revenues in year t - 1/average of beginning and ending total assets of previous year t - 1 |
| ROE | ROEt - 1; Return on equity at year t - 1, calculated using the ratio of net income to equity at the end of the year t - 1 |
| Industry | Industry; Categorical variable representing the industry in which each firm operates. Data for each industry was collected by using the industry classification of industries in the DataStream Eikon Reuters. Industries vary from i1 to i20. Table 3 shows the number assigned to each industry. |

Note: This table shows the control variables used in the study along with their respective descriptions and formulas.

### Table 3. Dummy variables

#### Panel A: Categorical industry variables in the sample

| Industry | Dummy |
|----------|-------|
| Construction and engineering | i1 |
| IT Services and consulting | i2 |
| Pharmaceuticals | i3 |
| Food processing | i4 |
| Real estate rental, development, and operations | i5 |
| Miscellaneous specialty retailers | i6 |
| Industrial conglomerates | i7 |
| Computer and electronics retailers | i8 |
| Passenger transportation, ground and sea | i9 |
| Iron and steel | i10 |
| Airlines | i11 |
| Courier, postal, air freight and land-based logistics | i12 |
| Shipbuilding | i13 |
| Telecommunications services | i14 |
| Construction supplies and fixtures | i15 |
| Marine freight and logistics | i16 |
| Auto and truck manufacturers | i17 |
| Personal services | i18 |
| Leisure and recreation | i19 |
| Consumer publishing | i20 |

#### Panel B: Categorical year variables in the sample

| Year | Dummy |
|------|-------|
| 2012 | t1 |
| 2013 | t2 |
| 2014 | t3 |
| 2015 | t4 |
| 2016 | t5 |
| 2017 | t6 |

#### Panel C: Categorical country variables in the sample

| Country | Dummy |
|---------|-------|
| Morocco | c1 |
| KSA | c2 |
| UAE | c3 |
| Oman | c4 |
| Qatar | c5 |
| Egypt | c6 |
| Jordan | c7 |
| Kuwait | c8 |
| Bahrain | c9 |

Note: This table shows the dummy variables and includes the categorical industry, year, and country variables used in the study.
3.3. Descriptive statistics

Table 4 lists the descriptive statistics for all variables used in the model. These statistics include the mean, standard error, median, and standard deviation for each variable. Each variable has 270 observations.

| Variables          | Mean   | Standard error | Median | Standard deviation |
|--------------------|--------|----------------|--------|--------------------|
| Tobin Q(t)         | 2.732  | 0.513          | 1.020  | 8.430              |
| Roa(t)             | 0.076  | 0.006          | 0.059  | 0.098              |
| Pmt(t)             | 0.168  | 0.013          | 0.142  | 0.211              |
| Gmp(t)             | 0.317  | 0.014          | 0.275  | 0.229              |
| xgr(t)             | 0.0066 | 0.018          | 0.052  | 0.304              |
| def revt - 1/ata(t - 1) | 0.004  | 0.014          | 0.000  | 0.227              |
| def revt - 1/salesit - 1 | 0.020  | 0.070          | 0.000  | 1.151              |
| Tobin Q(t - 1)     | 3.337  | 0.230          | 1.244  | 11.992             |
| Roa(t - 1)         | 0.085  | 0.005          | 0.061  | 0.086              |
| Pmt(t - 1)         | 0.186  | 0.014          | 0.143  | 0.223              |
| Gpm(t - 1)         | 0.323  | 0.014          | 0.274  | 0.225              |
| Sgr(t - 1)         | 0.112  | 0.030          | 0.074  | 0.487              |
| Accr(t - 1)/atait - 1 | -0.019 | 0.015         | -0.018 | 0.240              |
| Accr(t - 1)/salesit - 1 | 0.005  | 0.056          | -0.036 | 0.920              |
| Sizeit - 1         | 20.021 | 0.100          | 20.105 | 1.636              |
| Leverageit - 1     | 0.175  | 0.010          | 0.133  | 0.164              |
| Investmentratioit - 1 | -0.047 | 0.005         | -0.021 | 0.081              |
| Cashratioit - 1    | 0.111  | 0.006          | 0.078  | 0.101              |

4. METHODOLOGY AND RESULTS ANALYSIS

4.1. Multivariate analysis

A pooled OLS regression is used to test the relation between the independent and dependent variables to search for associations between deferred revenues changes and future financial performance. After pooling the observations of different companies from various periods, an OLS regression was conducted on the pooled sample using Stata software. This approach checks for multicollinearity and adjusts for it by dropping any variables causing multicollinearity in the model.

Since a pooled OLS regression does not control for time and firm effects, the model was strengthened by controlling for both a group and time-specific dummies to make the model more robust. The previous year’s dependent variable was also included among the independent variables in all the equations to control for a time effect. The purpose was to absorb all the effects that are unrelated to the independent variable of interest.

All hypotheses met the assumptions underlying tests for normality, linearity, and homoscedasticity except homoscedasticity for Hypothesis 3 (H3). After testing for endogeneity, the assumption was satisfied since the correlation was not detected between the independent variables and residuals indicating that all the hypotheses in the model are exogenous. Table 6 includes the results of the endogeneity tests (see Appendix).

4.2. Test of Hypothesis 1 (H1)

Hypothesis 1 (H1) predicts a positive relation between the variations in revenue deferrals and both the future period gross profit margin and sales growth. Equation (1) represents the test between future period sales growth and current deferred revenues changes. Equation (2) tests the relation between current deferred revenue changes and future period gross profit margin.

\[
\text{SaleGr}(t) = \alpha + \beta_1 \frac{\Delta DR(t - 1)}{\text{SALE}(t - 1)} + \beta_2 \text{SaleGr}(t - 1) + \beta_3 \text{Size}(t - 1) + \beta_4 \text{Lev}(t - 1) + \beta_5 \text{Inv}(t - 1) + \sum_i \lambda_i \text{Firm Specific Dummies} + \varepsilon
\]

(1)

\[
\text{GPM}(t) = \alpha + \beta_1 \frac{\Delta DR(t - 1)}{\text{SALE}(t - 1)} + \beta_2 \text{GPM}(t - 1) + \beta_3 \text{Size}(t - 1) + \beta_4 \text{Lev}(t - 1) + \beta_5 \text{Inv}(t - 1) + \beta_6 \text{Cash}(t - 1) + \sum_i \lambda_i \text{Firm Specific Dummies} + \varepsilon
\]

(2)

The year, industry, country, and firm-specific dummies are included to control for any potential impact that these differences might have on the dependent variable in both Equations (1) and (2). Also, SaleGr for year \(t - 1\) is included in H1 equations to control for any time series effect between current and future year sales growth. Additionally, size, investment ratio, and leverage are included in both equations of H1 due to the effect that asset size, long-term debt financing, and a firm’s capital expenditure have on its product performance and future sales growth (Chevalier, 1995; Campello, 2006). Studies demonstrate that firms with high cash reserves have a competitive edge in product markets, which ultimately provides future opportunities for high sales growth and consequently high gross profit margins (Fresard, 2010).

This finding led to adding the cash ratio to control for any potential effect related to high cash
reserves. To control for time-series effects, \( GPM \) was included at \( t - 1 \). Since sales growth can also affect a firm’s gross profit margin by empowering the company in its market, it was incorporated in Equation (2) to control for any potential effect. Accruals are considered to have a negative relation with a company’s future profitability making it a mandatory control variable (see Table 2) in Equation (2) to control for its effect on the gross profit margin. Accruals are scaled by total sales making it a convenient control variable to compare with a gross profit margin. Given that deferred revenues change is a component of accruals, the methodology adjusted for accruals to net out any effect of deferred revenue change as shown in the variable measurement section (Sloan, 1996).

Panel A of Table 5 (see Appendix) shows the relation between deferred revenues changes and sales growth as stated in Equation (1) in H1. The model resulted in an \( R^2 \) of 19.2 percent indicating that the independent variables explain 19.2 percent of the variations in the dependent variable. The results show that deferred revenues changes do not significantly affect the firm’s next year’s sales growth. Yet, a significant relation exists at the 0.01 level between sales growth in year \( t - 1 \) and sales growth at \( t \), which indicates the presence of a time series effect. Additionally, another significant relation exists between the computer and electronics retailers’ industry and future sales growth.

Panel B of Table 5 (see Appendix) shows the results from Equation (2) of H1. This hypothesis tests for the association of deferred revenue changes and gross profit margin to determine any potential impact of deferred revenues on bargaining power over customers. The \( R^2 \) indicates that the model’s independent variables explain 93.4 percent of the variations in the future gross profit margin. The results also show that deferred revenues changes and previous year gross profit margins both have a significantly positive relation with the gross profit margin at the 0.01 level with coefficients of 0.334 and 0.281, respectively. On the other hand, accruals show a significantly negative relation with a gross profit margin at the 0.01 level with a coefficient of -0.047.

**4.3. Test of Hypothesis 2 (H2)**

**Hypothesis 2 (H2)** predicts a positive relation between variations in deferred revenues and both future period profit margin and ROA. The following equations represent H2:

\[
PM(t) = \alpha + \beta_1 \frac{DR(t-1)}{SALE(t-1)} + \beta_2 P(t-1) + \beta_3 Size(t-1) + \beta_4 Lev(t-1) + \beta_5 Inv(t-1) + \beta_6 Cash(t-1) + \beta_7 SaleGr(t-1) + \beta_8 ACCR(t-1) + \sum \text{Year Dummies} + \sum \text{Industry Dummies} + \sum \text{Firm Specific Dummies} + \epsilon
\]

\[
ROA(t) = \alpha + \beta_1 \frac{DR(t-1)}{ATA(t-1)} + \beta_2 ROA(t-1) + \beta_3 Size(t-1) + \beta_4 Lev(t-1) + \beta_5 Inv(t-1) + \beta_6 Cash(t-1) + \beta_7 SaleGr(t-1) + \beta_8 ACCR(t-1) + \sum \text{Year Dummies} + \sum \text{Industry Dummies} + \sum \text{Firm Specific Dummies} + \epsilon
\]

Both Equations (3) and (4) include the year, industry, country, and firm-specific dummies to control for any potential impact that such differences might have on the dependent variable. These two equations also include \( PM \) for year \( t - 1 \) and \( ROA \) for year \( t - 1 \) to control for time-series effects. Prior evidence shows that firm size affects operating income performance, which explains its inclusion in both Equations (3) and (4) (Barber & Lyon, 1997; Fama & French, 1992). Consistent with the previous literature on leverage affecting a firm’s profitability, both equations include the leverage ratio to control for the effect of the amount of long-term debt. Prior research also shows that capital investment has a potential effect on future profitability (Titman, Wei, & Xie, 2004). Since cash reserves may affect a firm’s future profitability, the present model also includes cash reserves (Fresard, 2010). Because current period sales growth can influence future profitability, both equations include \( SGR \) at year \( t - 1 \) as a control variable. Previous researchers such as Sloan (1996) find that current accruals negatively affect a firm’s future profitability, which justifies including this variable in Equations (3) and (4). However, in Equation (3) where the dependent variable is the profit margin at year \( t \), accruals are scaled by total sales, while in Equation (4) where \( ROA \) at year \( t \) is the dependent variable, accruals are scaled on the average of the beginning and ending total assets of year \( t - 1 \).

Panel C of Table 5 (see Appendix) shows the results from Equation (3) of H2. The tests examine the impact of deferred revenue changes on future profit margins. The table shows an \( R^2 \) of 82.4 percent, indicating that the model’s independent variables explain 82.4 percent of the variations in the future profit margin (dependent variable). The results also show that deferred revenues changes and profit margin at year \( t - 1 \) both have a significantly positive association with a profit margin at year \( t \) at the 0.01 level. Yet, accruals show a significantly negative relation with a gross profit margin at the 0.01 level.

Panel D of Table 5 (see Appendix) shows the results from Equation (4) of H2, which tests for the relation between deferred revenue changes on future ROA. The table indicates an \( R^2 \) of 71.3 percent, indicating that all the independent variables in the model explain 71.3 percent of the variations in the future ROA (dependent variable). Deferred revenues changes show a positive but not statistically significant relation with ROA. ROA at year \( t - 1 \) represents a significantly positive relation with the following year’s ROA at the 0.01 level, suggesting the presence of a time series effect. The control variable cash ratio also has a significantly positive relation with ROA at year \( t \) at the 0.10 level.
4.4. Test of Hypothesis 3 (H3)

Hypothesis 3 (H3) predicts that the variations in revenue deferrals are positively related to future revenue changes because firms recognize some deferred revenues growth and current deferred revenues before the full delivery of the product or service to avoid showing losses. Another reason behind the lack of statistical significance could be noisy data resulting from a sample size. Having a sample consisting of 45 firms increases the difficulty of achieving a significant relation involving next year's sales growth.

Equation (5) includes the year, industry, country, and firm-specific dummies to control for any potential impact that year, industry, country and firm differences might have on the dependent variable. This equation also includes Tobin's Q at year $t-1$ to control for any potential time-series effects. Size, leverage, and return on equity (ROE) are all controlled for when constructing the model of market performance. The leverage ratio controls for any potential association between capital leverage and market performance. ROE is expected to positively influence market performance (Florio & Leoni, 2017). Current sales growth is included as a control variable because it can affect future sales growth and thus firm performance.

Panel E of Table 5 (see Appendix) shows the results involving H3, which tests the potential relation between deferred revenues changes and their impact on market performance. The results indicate an $R^2$ of 24.8 percent. Deferred revenue changes have a positive relation with Tobin's Q. Tobin's Q at year $t-1$ is also insignificant showing no time series effect.

5. DISCUSSION

5.2. Hypothesis 2 (H2)

Hypothesis 2 (H2) tests two more accounting performance measures to evaluate the consistency of the results and the relation between deferred revenue changes and future financial profitability. Equation (3) shows that a strong positive relation exists between changes in deferred revenues and a firm's future profit margin, which is consistent with Fresard (2010). Accruals have a significantly negative association with the profit margin supporting Sloan's claim (1996). Equation (4) does not show any statistically significant relation between deferred revenues changes and ROA, despite being positive. The reason behind this finding could be the same as that of future sales growth. That is, the sample size is too small to average out statistical noise. Hence, the insignificance of the relation could be overcome by a larger sample.

5.1. Hypothesis 1 (H1)

Testing the impact of deferred revenue changes on future sales growth reveals a positive but not statistically significant relation at normal levels. According to Caylor (2010), firms manipulate the deferred revenues recognition process to avoid reporting losses, which conveys false information about revenues. This view might explain the insignificant but positive relation between future revenues growth and current deferred revenues changes because firms recognize some deferred revenues before the full delivery of the product or service to avoid showing losses. Another reason behind the lack of statistical significance could be noisy data resulting from a sample size. Having a sample consisting of 45 firms increases the difficulty of achieving a significant relation involving next year's sales growth.

Equation (2) tests the impact of deferred revenue changes on bargaining power over customers. Deferred revenues have a strong positive association with future gross profit margins because companies can receive the full cash in advance of delivering the full product or service to their customers, which is consistent with Porter (1985). Thus, deferred revenues changes appear to serve as a predictive indicator of the future bargaining power of the sample companies over their customers. Accruals also have a significantly negative association with the gross profit margin, which is consistent with Sloan (1996).

5.3. Hypothesis 3 (H3)

Hypothesis 3 (H3) tests the implication of deferred revenues changes on future market performance using Tobin's Q as the dependent variable for market evaluation. The regression analysis shows a positive but statistically insignificant relation between changes in deferred revenue and market performance. This finding could reflect the failure of investors to fully incorporate deferred revenues changes in their investment decisions thus showing an under-reaction of market performance to such changes (Prakash & Sinha, 2012).

6. CONCLUSION

6.1. Limitations

The study has several limitations. For example, the findings cannot be generalized to all the companies of the MENA region. Although the initial sample consisted of the 500 companies with the highest market share, the final sample contained only 45 companies with deferred revenues involving 270 observations. Also, the homoscedasticity assumption in the third hypothesis was not satisfied because the sample had some heterogeneous behaviour.

6.2. Managerial implications

Although this study provides some insights into the predictive power of deferred revenues changes on a firm's future financial performance, the results are mixed. It shows a positive association between deferred revenue changes and future financial performance of high market share companies in the
MENA region. Some relations are significantly positive, namely involving the profit margin and gross profit margin, reinforcing the predictive power in the changes in deferred revenues. However, the relation with next year's sales growth, ROAs, and Tobin's Q, while positive, are not statistically significant at normal levels. As previously discussed, these findings could be due to statistical noise involving these variables that could not be averaged out due to the small sample size. Despite mixed results, the study shows relevant relations between deferred revenues changes and profit margin and gross profit margin that remain valuable for managers, analysts, and other stakeholders. Thus, investors and financial analysts may find deferred revenue changes useful in making informed decisions.

6.3. Further research

The relation between deferred revenue changes and future financial performance is a neglected area of research. Future research could examine other areas outside of the MENA region and increase the sample size. Further studies could also investigate whether any significant differences exist between low and high market share companies. Further testing in different environments is likely to add to the robustness of the results. Finally, survey research may reveal whether analysts consider deferred revenue changes into their evaluation process and if so how.

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**APPENDIX**

Table 5 shows how a $\Delta DR$ is related to future sales growth, future gross profit margin, profit margin, future return on asset (ROA), and future Tobin’s $Q$.

Table 5. Relation between $\Delta DR$ and other variables (Part 1)

| Panel A. Relation between a $\Delta DR$ and future sales growth | Independent variables | Dependent variables |
|---------------------------------------------------------------|----------------------|---------------------|
| Defree sales t - 1                                           | 0.025                | f15                 | -0.855*** |
| Sgr t - 1                                                     | -0.136***            | f17                 | -0.363    |
| Size t - 1                                                    | 0.008                | f18                 | -0.316b   |
| Leverage t - 1                                                | 0.346                | f20                 | 0.796a    |
| Investment ratio t - 1                                        | -0.170               | f21                 | 0.447     |
| Cash ratio t - 1                                              | -0.647               | f27                 | -0.391    |
| t                                                   | 0.234                | f28                 | 0.077     |
| t3                                                             | 0.536***             | f29                 | -0.307    |
| t4                                                             | 0.640**              | f31                 | -0.247    |
| t5                                                             | 0.642**              | f32                 | -0.207    |
| t6                                                             | 0.837***             | f33                 | 0.683***  |
| t7                                                             | 0.615***             | f40                 | 0.714     |
| t8                                                             | 0.894***             | f42                 | 0.362     |
| t9                                                             | 0.871***             | f43                 | 0.070     |
| t10                                                            | 0.777**              | f1                  | -0.001    |
| t11                                                            | 0.179                | t2                  | -0.038    |
| t12                                                            | 0.283                | t3                  | -0.018    |
| t13                                                            | 0.188                | t4                  | -0.050    |
| t15                                                            | 0.903**              | t6                  | -0.030    |
| t16                                                            | 0.650***             | Constant             | -0.187    |
| t17                                                            | 0.273                |                      |           |
| t19                                                            | 1.087***             |                      |           |
| t20                                                            | 1.009***             | Observations         | 270       |
| c1                                                             | -0.224               | R**                 | 0.192     |
| c2                                                             | -0.709**             |                      |           |
| c3                                                             | -0.035               |                      |           |
| c4                                                             | -0.779***            |                      |           |
| c5                                                             | -0.361               |                      |           |
| c6                                                             | -0.133               |                      |           |
| c8                                                             | -0.342               |                      |           |
| c9                                                             | -0.399               |                      |           |
| f1                                                             | 0.236                |                      |           |
| f6                                                             | 0.201                |                      |           |
| f9                                                             | 0.266                |                      |           |
| f13                                                            | -0.462               |                      |           |

| Panel B. Relation between a $\Delta DR$ and the future gross profit margin |
|---------------------------------|-------------------|
| GPM t                           | 0.034***          | f17                 | 0.394*** |
| Gpm t - 1                       | 0.281***          | f18                 | 0.403*** |
| Sgr t - 1                       | -0.011             | f22                 | 0.452*** |
| Size t - 1                      | -0.005             | f25                 | 0.577*** |
| Leverage t - 1                  | 0.019              | f27                 | 0.621*** |
| Investment ratio t - 1          | 0.086              | f28                 | -0.341***|
| Cash ratio t - 1                | 0.105              | f29                 | 0.187*** |
| Accrual t - 1                   | -0.004***          | f31                 | 0.095*** |
| t1                              | 0.071              | f32                 | 0.620*** |
| t3                              | 0.134***           | f33                 | -0.201***|
| t4                              | -0.309***          | f34                 | -0.442***|
| t5                              | -0.692***          | f37                 | 0.540*** |
| t7                              | -0.290***          | f39                 | -0.700***|
| t8                              | -0.329***          | f40                 | 0.284*** |
| t9                              | -0.293***          | f42                 | 0.138*** |
| t10                             | -0.150***          | f43                 | -0.759***|
| t11                             | -0.458***          | f45                 | 1.511*** |
| t12                             | -0.191***          | t1                  | 0.016    |
| t13                             | -0.402***          | t2                  | 0.012    |
| t14                             | 0.600***           | t3                  | 0.000    |
| t15                             | 0.324***           | t4                  | 0.006    |
| t17                             | -0.250***          | t                   | -0.022   |
| t19                             | -0.499***          | Constant             | -0.167   |
| c1                              | 0.395***           |                      |           |
| c2                              | 0.704***           |                      |           |
| c3                              | 0.832***           |                      |           |
| c4                              | 0.821***           |                      |           |
| c5                              | 0.733***           |                      |           |
| c6                              | 0.587***           |                      |           |
| c8                              | 0.867***           |                      |           |
| f1                              | 0.035              |                      |           |
| f6                              | 0.510***           |                      |           |
| f7                              | -0.137***          |                      |           |
| f9                              | 0.827***           |                      |           |
### Table 5. Relation between ∆DR and other variables (Part 2)

#### Panel C. Relation between ∆DR and future profit margin

| Independent variables | Dependent variables | Independent variables | Dependent variables |
|-----------------------|---------------------|-----------------------|---------------------|
| PMT                   | F9                  | F13                   | −0.444***           |
| Defrevsales           | 0.084***            | F13                   | −0.444***           |
| Pmt t − 1             | 0.286***            | F15                   | −0.362***           |
| Sgr t − 1             | −0.016              | F17                   | 0.087               |
| Size                  | 0.006               | F18                   | 0.136               |
| Leverage              | 0.015               | F21                   | −0.146              |
| Investmentratio       | 0.171               | F25                   | −0.018              |
| Cashratio             | 0.192               | F28                   | −0.206***           |
| Accsales              | −0.110***           | F29                   | 0.093               |
| T1                    | 0.162***            | F31                   | 0.111*              |
| T3                    | 0.194***            | F32                   | −0.025              |
| T4                    | −0.024              | F34                   | −0.334***           |
| T5                    | 0.099               | F37                   | 0.345***            |
| T6                    | 0.107               | F39                   | −0.114              |
| T7                    | 0.043               | F40                   | 0.033               |
| T8                    | 0.044               | F42                   | −0.296***           |
| T9                    | 0.125               | F43                   | −0.114              |
| T10                   | 0.056               | F45                   | 0.532***            |
| T11                   | −0.031              | T1                    | 0.023               |
| T13                   | −0.031              | T2                    | 0.021               |
| T14                   | 0.159               | T3                    | 0.018               |
| T15                   | 0.130               | T4                    | 0.003               |
| T17                   | 0.013               | T6                    | −0.062***           |
| T19                   | 0.064               | Constant              | −0.253              |
| T20                   | 0.051               |                       |                     |
| C1                    | 0.050               |                       |                     |
| C2                    | 0.124               |                       |                     |
| C3                    | 0.187               |                       |                     |
| C4                    | 0.126**             |                       |                     |
| C5                    | 0.240*              |                       |                     |
| C6                    | 0.158               |                       |                     |
| C8                    | 0.260*              |                       |                     |
| F3                    | 0.036               |                       |                     |
| F5                    | 0.063               |                       |                     |
| F6                    | 0.092               |                       |                     |

#### Panel D. Relation between ∆DR and future return on asset (ROA)

| ROAT                  | ROAT                |
|-----------------------|---------------------|
| Defrevava t − 1       | 0.069               | F27                   | 0.111               |
| ROA t − 1             | 0.233***            | F28                   | 0.126***            |
| Sgr t − 1             | −0.006              | F29                   | 0.002               |
| Size                  | 0                   | F31                   | 0.033               |
| Leverage              | −0.005              | F33                   | 0.227***            |
| Investmentratio       | 0.071               | F38                   | 0.161               |
| Cashratio             | 0.142*              | F40                   | 0.124               |
| Accravat              | −0.068              | F42                   | 0.087               |
| T1                    | −0.028              | F43                   | 0.006               |
| T3                    | 0.006               | F44                   | 0.161               |
| T4                    | 0.157***            | F45                   | −0.066              |
| T5                    | 0.029               | C1                    | −0.005              |
| T6                    | 0.283***            | C2                    | −0.188***           |
| T7                    | 0.146**             | C3                    | −0.047              |
| T9                    | 0.202**             | C4                    | −0.160*             |
| T10                   | 0.135**             | C5                    | −0.096              |
| T11                   | −0.008              | C6                    | −0.189***           |
| T12                   | 0.028               | C8                    | −0.183*             |
| T14                   | −0.071              | Constant              | 0.040               |
| T15                   | 0.146*              |                       |                     |
| T16                   | 0.040               |                       |                     |
| T17                   | 0.119*              |                       |                     |
| T19                   | 0.158               |                       |                     |
| T21                   | 0.021               |                       |                     |
| T22                   | 0.028**             | Observations          | 270                 |
| T3                    | 0.022**             | R                     | 0.713               |
| T4                    | 0.001               |                       |                     |
| T6                    | −0.005              |                       |                     |
| F1                    | 0.023               |                       |                     |
| F6                    | 0.103*              |                       |                     |
| F9                    | 0.119*              |                       |                     |
| F10                   | 0.167**             |                       |                     |
| F13                   | −0.024              |                       |                     |
| F15                   | −0.037              |                       |                     |
| F17                   | −0.046              |                       |                     |
| F18                   | −0.027              |                       |                     |
| F20                   | 0.213**             |                       |                     |
| F21                   | 0.126*              |                       |                     |
Table 5. Relation between ∆DR and other variables (Part 3)

| Panel E. Relation between a ∆DR and future Tobin’s Q | Independent variables | Dependent variables | Independent variables | Dependent variables |
|-----------------------------------------------------|-----------------------|--------------------|-----------------------|--------------------|
| Tobin Qt                                            | f21                   | T25                | 16.651**              |                    |
| Defrevat                                            | 0.436                 | f28                | -4.649                |                    |
| Tobin Qt - 1                                        | 0.001                 | f29                | -30.709***            |                    |
| Roe                                                 | -0.224                | f31                | -26.942**             |                    |
| leverage                                            | -1.004                | f32                | 4.520                 |                    |
| i1                                                  | -21.483***            | f33                | 0.083                 |                    |
| i3                                                  | -17.046***            | f35                | -28.356**             |                    |
| i4                                                  | 8.064                 | f38                | -21.911*              |                    |
| i5                                                  | -29.213***            | f39                | -31.275**             |                    |
| i6                                                  | 16.486*               | f40                | -0.785                |                    |
| i7                                                  | 9.994                 | f43                | -30.987*              |                    |
| i8                                                  | 14.067*               | t2                 | 2.286                 |                    |
| i9                                                  | 1.154                 | t3                 | -0.129                |                    |
| i10                                                 | 17.771**              | t4                 | -0.488                |                    |
| i11                                                 | -3.055                | t5                 | 0.672                 |                    |
| i12                                                 | -0.468                | t6                 | -0.411                |                    |
| i14                                                 | -4.583                | Constant           | -31.899               |                    |
| i15                                                 | 0.479                 |                    |                       |                    |
| i16                                                 | 8.572                 |                    |                       |                    |
| i17                                                 | -25.108***            | Observations       | 270                   |                    |
| i18                                                 | -25.614**             | R²                 | 0.248                 |                    |
| i20                                                 | -23.919**             |                    |                       |                    |
| i21                                                 | 17.974***             |                    |                       |                    |
| i22                                                 | -15.999**             |                    |                       |                    |
| i23                                                 | -3.934                |                    |                       |                    |
| i24                                                 | -0.796                |                    |                       |                    |
| i25                                                 | -16.913*              |                    |                       |                    |
| i26                                                 | 21.432**              |                    |                       |                    |
| Tobin Qt                                            |                       |                    |                       |                    |
| i8                                                  | 25.712**              |                    |                       |                    |
| i9                                                  | 38.094***             |                    |                       |                    |
| i10                                                 | 2.411                 |                    |                       |                    |
| f6                                                  | 36.121***             |                    |                       |                    |
| f9                                                  | 40.365***             |                    |                       |                    |
| f13                                                 | 23.643**              |                    |                       |                    |
| f15                                                 | 26.344**              |                    |                       |                    |
| f17                                                 | 26.608**              |                    |                       |                    |
| f18                                                 | 26.659**              |                    |                       |                    |

Note: *, **, *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.
Table 6 shows the correlation between residuals and independent variables for the different equations of the hypotheses: Equation (1) for \( H1 \), Equation (2) for \( H1 \), Equation (3) for \( H2 \), Equation (4) for \( H2 \), and Equation (5) of \( H3 \).

### Table 6. Endogeneity tests

**Panel A. Correlation between the residuals and independent variables for Equation (1) for H1**

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      | Res  |      |      |      |      |      |      |      |      |      |      |
| Res  | 1.0000 |      |      |      |      |      |      |      |      |      |      |
| Defrevsales | -0.0240 |      |      |      |      |      |      |      |      |      |      |
| Gpmt  | 0.0010  |      |      |      |      |      |      |      |      |      |      |
| Sqrt  | -0.0137 |      |      |      |      |      |      |      |      |      |      |
| Size  | 0.0035  |      |      |      |      |      |      |      |      |      |      |
| Leverage | 0.0001  |      |      |      |      |      |      |      |      |      |      |
| Investment | 0.0035  |      |      |      |      |      |      |      |      |      |      |
| Cashratio | -0.0090 |      |      |      |      |      |      |      |      |      |      |

**Panel B. Correlation between residuals and independent variables for Equation (2) for H1**

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |      |      |      |      |      |      |      |
| Res  | 1.0000 |      |      |      |      |      |      |      |      |      |      |
| defrevsales | -0.0137 |      |      |      |      |      |      |      |      |      |      |
| Gpmt  | -0.0031 |      |      |      |      |      |      |      |      |      |      |
| Sqrt  | 0.0007  |      |      |      |      |      |      |      |      |      |      |
| Size  | 0.0005  |      |      |      |      |      |      |      |      |      |      |
| Leverage | -0.0013 |      |      |      |      |      |      |      |      |      |      |
| investment | 0.0005  |      |      |      |      |      |      |      |      |      |      |
| Cashratio | -0.0014 |      |      |      |      |      |      |      |      |      |      |
| Accrsales | -0.0128 |      |      |      |      |      |      |      |      |      |      |

**Panel C. Correlation between residuals and independent variables for Equation (3) for H2**

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |      |      |      |      |      |      |      |
| Res  | 1.0000 |      |      |      |      |      |      |      |      |      |      |
| Defrevsales | -0.0195 |      |      |      |      |      |      |      |      |      |      |
| Sqrt  | -0.0018 |      |      |      |      |      |      |      |      |      |      |
| Size  | 0.0037  |      |      |      |      |      |      |      |      |      |      |
| Leverage | 0.0035  |      |      |      |      |      |      |      |      |      |      |
| Investment | -0.0013 |      |      |      |      |      |      |      |      |      |      |
| Cashratio | 0.0018  |      |      |      |      |      |      |      |      |      |      |
| Accrsales | -0.0193 |      |      |      |      |      |      |      |      |      |      |

**Panel D. Correlation between residuals and independent variables for Equation (4) for H2**

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |      |      |      |      |      |      |      |
| Res  | 1.0000 |      |      |      |      |      |      |      |      |      |      |
| Defravat | 0.0049  |      |      |      |      |      |      |      |      |      |      |
| Roat  | 0.0062  |      |      |      |      |      |      |      |      |      |      |
| Sqrt  | 0.0018  |      |      |      |      |      |      |      |      |      |      |
| Size  | 0.0023  |      |      |      |      |      |      |      |      |      |      |
| Leverage | 0.0033  |      |      |      |      |      |      |      |      |      |      |
| Investment | -0.0026 |      |      |      |      |      |      |      |      |      |      |
| Cashratio | 0.0033  |      |      |      |      |      |      |      |      |      |      |
| 0.0065  |      |      |      |      |      |      |      |      |      |      |      |

**Panel E. Correlation between residuals and independent variables for Equation (5) for H3**

|      |      |      |      |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|------|------|------|
|      |      |      |      |      |      |      |      |      |      |      |      |
| Res  | 1.0000 |      |      |      |      |      |      |      |      |      |      |
| Defrevavat | -0.0045 |      |      |      |      |      |      |      |      |      |      |
| Tobinq | 0.0046  |      |      |      |      |      |      |      |      |      |      |
| Roe   | -0.0111 |      |      |      |      |      |      |      |      |      |      |
| Size  | -0.0142 |      |      |      |      |      |      |      |      |      |      |
| Leverage | 0.0150  |      |      |      |      |      |      |      |      |      |      |
| Investment | 0.0007  |      |      |      |      |      |      |      |      |      |      |
| Cashratio | -0.0150 |      |      |      |      |      |      |      |      |      |      |
| Accravat | 0.0014  |      |      |      |      |      |      |      |      |      |      |