Earnings Management During the Oil Price Crisis

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Abstract

This paper investigates the impacts of oil price crisis on earnings management behaviour in Gulf Cooperation Council (GCC) countries. Starting in mid-2014, oil prices began to fall drastically, hereafter this is referred to as the oil price crisis. Earnings management is measured in terms of accrual based earning management (AEM) and real activity based earnings management (REM). The modified Jones model is adopted to estimate AEM, and three models from Roychowdhury (2006) are used to estimate REM. The results reveal that companies have tended to use downward REM during the oil price crisis, engaging less with AEM. Control variables covering firm characteristics, including ROA, leverage, growth and OCF exhibit significant relationships with EM. The present study examines EM during the oil price crisis, considering both accrual and real activity earnings management. In contrast to most previous research in this domain which has only considered upward REM, a non-directional approach is used herein whereby the absolute (unsigned) term is applied to capture this metric.

Keywords: earnings management; discretionary accruals; real earnings management; gulf cooperation council.

JEL Classification: M41; G34; O16; D53.

Introduction

The oil price crisis which began in mid-2014 has had varying effects on different nations. Although countries consuming oil have tended to benefit from declining prices, economies whose incomes rely on the production and selling of oil were impcted negatively (Besso and Feubi 2017). GCC countries (Bahrain, Kuwait, Oman, Saudi Arabia, Qatar, and the United Arab Emirates) rely heavily on oil income, which accounts for about 80% of their revenues and more than 50% of GDP. This region contributes more than 25% to global oil production and contains about 30% of the world's crude oil reserves. Changes in oil prices impact significantly on GCC economic activites because these activities are dependent on government spending, which in turn is dependent on income from oil (Colacelli *et al.* 2016).

Firms´ profits are strongly affected by economic crises and economic slowdowns. This may lead managers to resort to earnings management (EM) to meet pre-determined targets and the expectations of market participants (Chia *et al.* 2007). In addition, large fluctuations in profits increase companies´ financing costs. Managers may aim to control earnings to eliminate large declines in profits, or to avoid reporting losses (Goel and Thakor 2003). However, managers may decide to push profits downwards to take a "big bath" by saving profits for a future period or to obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high due to the lower asset market value of the firm (Shleifer and Vishny 1992). However, some studies have found that these periods coincide with higher scrutiny by auditors and market regulators, which may constrain managers from attempting to manipulate earnings (Rohde 2011, Xu *et al.* 2013, Pisedtasalasai and Rujiratpichathorn 2017).

The main objective of this paper is to examine the earnings management practices of companies in GCC countries in response to the oil price crisis.

There is a rich literature examining managerial decisions related to accrual earnings management (AEM) behaviors during the Asian financial crisis and the global financial crisis. For example, prior research has revealed that companies tended to decrease AEM during the global financial crisis to restore investors' confidence and moderate the undesirable impacts of the crisis on companies. Also, companies audited by the Big-4 auditing firms reported lower AEM compared to those audited by other firms (Arthur *et al.* 2015, Cimini 2014, Dimitras *et al.* 2015). In addition, according to Saleh and Ahmed (2005) distressed companies that violated their debt covenants and re-negotiated debt contracts during the Asian financial crisis engaged in upward AEM in the two to three years preceding the crisis and downward AEM during financial difficulties.

The dramatic decline in oil prices has affected the fiscal incomes of GCC countries; the average surplus of 9.2% of GDP in 2013 had fallen to a deficit of 10.4% of GDP in 2016 (Khan *et al*. 2017). As a result, the governments of these countries established coordinated initiatives to diversify their incomes. The removal of fossil fuel subsidies (FFSs) is key in this respect, as annual spending on FFSs in GCC countries is around $160 billion, which accounts for more than 11% of their GDP (Guzansky and Feldman 2015). Removing energy subsidies not only decreases the burden on GCC governments' budgets, but also plays to the global agenda vis-à-vis "getting the price right" (Lahn 2016). Rentschler and Kornejew (2016) suggest that local firms´ loss of competitiveness is one of the main challenges faced by governments that have implemented energy reforms in the past, and it is also a proximate concern for policymakers in GCC countries. Therefore, GCC governments have established step-by-step plans to remove FFSs, and the impact of doing so on all salient stakeholders will be closely monitored (Rodriguez *et al*. 2015).

This study argues that the suggested energy price reforms may create an incentive for firms to manage earnings downward for two possible reasons. First, reporting lower profits may increase the possibility of obtaining political advantage (Makhtaruddin *et al.* 2018), as GCC governments carefully observe the impact of each stage of the reforms in the private sector, and their assessment most likely will be largely measured based on accounting data. In doing so, companies aim to delay the phasing out of energy subsidies. Second, poor performance is largely anticipated by market participants, and managers are less likely to receive bonuses during the oil crisis (Filip and Raffournier 2013). Therefore, companies are incentivized to strategically report lower profits during this period.

This paper uses data for a sample of listed companies in GCC countries for the period between 2007 and 2016. Results suggest that companies engaged more in downward REM during the oil price crisis whilst the magnitude of AEM decreased. The findings of this study support the view that companies preferentially use REM during periods of high scrutiny. Downward REM implies that companies incentivized to lower the reported profits to gain political advantage.

This study offers a number of contributions to the accounting literature. First, despite the large impact of the sharp decline in oil prices on oil producing countries, there is no up-to-date study examining EM behavior during this period. This period is unlike the earlier global financial crisis and the Asian financial crisis, which were associated with the loss of investors' confidence (Bukalska and Krol 2020), the failure of financial institutions and large corporations, and substantial government interventions (Statman 1999, Choi *et al.* 2011, Arthur *et al.* 2015). Bukalska and Krol (2020) showed that there was a sharp decline in the confidence during the financial crisis and the provision for loan-losses increased dramatically.

The oil price crisis is a unique event because it is associated with energy price reforms. The gradual removal of subsidies may encourage managers to exaggerate the impact of subsidy cuts on firms´ performance. Second, most previous studies concerned with EM quality during the crisis have focused on accrual earnings management. This paper extends the scope of prior literature by considering both accrual and real activity earnings management. If the use of AEM declines, it may not be the case that EM behaviors have declined overall; instead it may be that one type of EM has been substituted by another type to avoid scrutiny (Cohen *et al.* 2008). Third, this paper uses the absolute (unsigned) term to capture AEM and REM, rather than pre-empting their direction[1]. Fourth, there is only a limited amount of extant research investigating earnings management in GCC countries, most of which was

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[1] It is common practice in the EM literature to use the absolute value of discretionary accrual ABS_DA as a proxy for accrual quality (AEM). The rationale is that this discretionary accrual reverses over time, and it can be employed for income increasing and decreasing EM. Most existing research related to real earnings management has considered income increasing REM. However, Francis *et al.* (2016b) found evidence that companies use downward earnings management around different corporate events. There is a growing interest in the use of the absolute value of REM as a measure of deviation of real operations (*e.g.* Francis *et al*. 2016a, Mao and Renneboog 2015, Ascioglu *et al*. 2012).

carried out in national settings. This study explores the regional context using panel data and is thus more comprehensive and amenable to generalization.

The remainder of the paper is structured as follows. The next section reviews the relevant literature and develops the study's hypotheses. The methodology is then delineated and described before a presentation of descriptive inferential results. Finally, conclusions are offered including a discussion of the study´s limitations.

1. Literature Review and Hypotheses

1.1. Accrual Earnings Management

The evidence concerning EM behaviors is mixed. Studies have found that managers are encouraged to manipulate earnings downwards during a crisis. This may allow companies that fail to repay debts to obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high, due to the lower asset market value of the firm (Shleifer and Vishny 1992). In addition, during crisis periods, governments are more likely to offer support to financially distressed companies. For example, during the Asian financial crisis, the Malaysian government played a role in facilitating debt repayments (Ahmed *et al.* 2008). However, companies may be incentivized to use upward EM to increase reported profits to avoid breaching a debt covenant (Dichev and Skinner 2002), to avoid a large decline in stock price (Charitou *et al.* 2007).

In contrast, some studies have suggested that, during the global financial crisis, the vigilance of investors and auditors, along with market panic, created an incentive for managers to maintain reporting quality and lower AEM. Filip and Raffournier (2013) studied the impact of the global financial crisis on the EM behavior of European firms. They found that EM and income smoothing are affected by national economic conditions: earnings quality improved and income smoothing decreased during the crisis compared to the pre-crisis period. However, the level of income smoothing differs widely from country to country, depending on the nature and extent of relevant legislation and corporate governance practices. Consistent with this, Dimitras *et al.* (2015) focused on a sample of distressed European firms that were audited by one of the Big-4 firms using discretionary accruals as a proxy for EM. They found that companies tended to reduce the use of AEM during periods of recession.

Further, Arthur *et al.* (2015) examined accrual quality in 14 European countries during the global financial crisis. They found that during the crisis, earnings quality represented by accruals was higher compared to that in the pre-crisis period. The authors attributed higher earnings quality to the need to obtain investors' confidence, which was greatly affected by the crisis. Moreover, during the crisis, auditors' business risks increased because it became difficult to assess the actual economic situations of businesses, and they faced pressure from regulating bodies. Tano (2014) examined the impact of the financial crisis on accruals and audit quality in the Swedish market. They found that audit quality was higher both during and after the global financial crisis, compared to before it. Whilst Xu *et al.* (2013) found that "ongoing concern opinions" by auditors increased during the crisis period compared to before it. They attributed this to increased pressure from regulatory bodies and the increased risk of reputational damage incurred through giving inaccurate opinions. One strategy employed by auditors in response to this was boosting audit efforts.

In addition, a number of studies have found that the implementation of international financial reporting standards (IFRS), considered high quality standards, leads to lower AEM (Adibah Wan *et al.* 2013). However, Gideon *et al.* (2018) didn't find any difference between IFRS and rules-based standards.

1.2. Real Earnings Management

Whilst the foregoing literature has focused on accrual-based earnings management, other studies have posited that companies may use real earnings management. For instance, Graham *et al.* (2005) found that managers have an incentive to increase their reported income by employing REM. More specifically, 80% of respondents reported that they reduce spending on research and development (R&D), advertising, and maintenance to increase profits; whilst 55% reported that they would delay new projects, even if the consequences of the delay required a small sacrifice. Hsiao *et al.* (2017) found that managers use their discretion over R&D investments to meet targets. Further, there is evidence to suggest that during periods of high scrutiny, managers employ REM more than AEM. For example, Cohen *et al.* (2008) investigated implementation of the Sarbanes-Oxley (SOX) Act on the use of AEM and REM in the US market. The study found that while firms tended to use AEM more before the SOX Act was implemented, REM was increasingly used after the Act's passage. In other words, firms were more inclined to use REM after the increase in corporate governance requirements and directors' responsibilities. Ho *et al.* (2015) found that after the adoption of the new accounting standards related to auditing and disclosure requirements, companies tended to reduce their reliance on AEM and shift to REM.

There are a few existing studies which have examined REM in crisis contexts. Xu and Ji (2016) examined AEM and REM during the global financial crisis for leading sectors in the Chinese market. They found that companies use both AEM and REM although there were systematic sectoral trends in terms of which type of EM predominates. The recent significant decline in oil prices has impacted fiscal incomes in GCC countries. As a result, GCC governments took initiatives to incrementally remove FFSs and thus decrease budgetary pressures. Companies may conceivably influence governments' decisions at any stage via reporting poor performance and exaggerating the impact of FFS cuts on their competitiveness, or even their survivability. When assessing the impact of the reforms on the private sector, governments will depend, at least partly, on information concerning companies' financial performance.

1.3. Hypotheses

Despite FFS cuts possibly creating an incentive for firms' to manage earnings downward, AEM is more likely to be constrained during periods of significant economic slowdown due to careful monitoring by regulating bodies, auditors, and investors (Chia *et al.* 2007, Cohen *et al.* 2008, Tano 2014). Therefore, if managers have an incentive to manage earnings, they may shift from AEM to REM as the latter is more difficult to detect. Accordingly, we posit two hypotheses to be subjected to inferential testing:

H1: Companies in GCC markets have tended to engage less in accrual-based earnings management during the oil price crisis.

H2: Companies in GCC markets have tended to engage more in real-activity earnings management during the oil price crisis.

2. Data and Research Design

2.1. Sample

To test the hypotheses, financial data are collected from Data Stream, companies' annual financial reports, and the official website for GCC financial markets. Specifically, a sample is constructed for companies listed in six GCC markets for the period from 2007 to 2016. Financial institutions such as banks and insurance companies are excluded from the sample because they have different financial disclosure requirements (Rusmin 2010).

As market regulation may vary from country to country, the sample includes only companies that follow international financial reporting standards (IFRS) in preparing their financial statements. Therefore, companies listed in Saudi Arabia were excluded as the first financial reports following IFRS in that country were not released until January 2017. Industries with fewer than 15 observations for each industry-year are also excluded. The final sample consists of 2,149 firm-year observations from five countries during the period 2007 to 2016. As shown in Table 1, the largest number of firm-year observations stems from Kuwait (737 firm-year observations) followed by Oman (714 firm-year observations). There are 424 observations for the United Arab Emirates and 166 from Qatar. Bahrain only constitutes 5% of the total sample, with 108 firm year observations. The observations pertain to six different industries: Consumer Discretionary, Consumer Staples, Industry, Materials, Real Estate, and Utilities.

Table 1. Variable definitions

Variable	Definition
DACC	Discretionary accruals earnings management measured using the modified Jones model.
ABS_DA	Absolute value of accrual earnings management
DA_P	Positive value of accrual earnings management
DA_N	Absolute value of negative value of accrual earnings management
An_OCF	Abnormal cash flow estimated using the Roychowdhury (2006) model. This measure is
An_PrCost	Abnormal production costs estimated using the Roychowdhury (2006) model.
An_Expn	Abnormal discretionary expenses estimated using the Roychowdhury (2006) model This
RMBS2	Sum of the absolute values of An_Expn and An_OCF.
RMBS3	Sum of the absolute values of An_PrCost and An_Expn.
RMBS	Sum of the absolute values of An_Expn, An_OCF, and An_PrCost.
RM	Sum of three signed proxies of real earnings management: An_Expn, An_OCF, and
RM_N	Absolute value of negative value of real earnings management.
RM_P	Positive value of real earnings management.

2.2 Measuring Accrual-based Earnings Management

This study uses a cross-sectional version of the modified Jones model developed by Dechow *et al.* (1996) to estimate AEM for each industry-year (Equation 1).

$$TAccr_{i,t} = \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{\Delta Rev_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad (1)$$

where: TAccr is total accruals calculated as the difference between operating cash flow (OCF) and net income; ΔRev is the change in revenue from the previous year; ΔAR is the change in accounts receivable from the previous year; PPE is the net amount of property, plant and equipment.

The discretionary accrual is the estimated residual from Equation 1, and the absolute value of the discretionary accrual is our proxy for AEM. In addition, we split the discretionary accrual into two groups: positive accruals (DA_P) and negative accruals (DA_N). The absolute value of negative accruals is used, so the higher value indicates higher negative AEM. All variables are summarized and defined in Table 2.

Table 2. Variable definitions for Equations 7 and 8

Variable	Definition
REM	Different measures of real earnings management: RMBS2, RMBS3, RM, RM_P, and RM_N, estimated using the Roychowdhury (2006) model.
AEM	Different measures of accrual earnings management, ABS_DA, DA_P, and DA_N, estimated using the modified Jones model.
Oil_Cri	Dummy variable that equals 1 if year coincides with the period of sharply declining oil prices (2014, 2015, and 2016), else 0.
ROA	Net income divided by lagged total assets of the firm.
Size	Firm value measured as the natural logarithm of the firm's total assets.
Growth	Change in assets from the preceding year.
Leverage	Total liabilities divided by assets.
OCF	Operating cash flow divided by lag total assets.
$Year$	Dummies for each year from 2007 to 2013. We exclude 2014 to 2016 to avoid multicollinearity with the oil price crisis period.

2.3. Measuring real earnings management

Three models from Roychowdhury (2006) are used to measure REM as a function of abnormal cash flow, abnormal production costs, and abnormal discretionary expenses. Abnormal operating cash flow occurs as a result of management's implementation of lenient credit policy. It is worth noting that this measure is vague because it is directly influenced by other REM measures (Roychowdhury 2006). For instance, increases in operating cash flow may occur as a result of decreasing discretionary expenses. On the other hand, reductions in operating cash flow may occur because of overproduction.

Normal operating cash flow for each industry and year is expressed as a function of sales and changes in sales (Equation 2).

$$\frac{OCF_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad (2)$$

OCF is the operating cash flow. Sales represent the firm's revenue, and ΔSales is the change in revenue from the previous period to the current period. The predicted coefficient on normal cash flow is then deducted from actual operating cash flow and the residual is the abnormal operating cash flow.

The second measure of real earnings management is production costs. The normal level of production costs is calculated as the sum of the cost of goods sold (Equation 3) and the change in the level of inventory (Equation 4).

$$\frac{COSG_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad (3)$$

$$\frac{\Delta Inve_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \qquad (4)$$

COGS in Equation 3 represents the cost of goods sold and ΔInve in Equation 4 refers to the change in inventory. The normal level of production is estimated as per Equation 5.

$$\frac{Production_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \qquad (5)$$

Discretionary expenses include selling, general and administrative expenses (SG&A) as well as advertising and R&D expenses[2].

Following the literature, discretionary expenses are estimated as a function of lagged sales instead of current sales. This is because if firms use sales increases to manipulate earnings, the reported residual will be significantly lower (Cohen *et al.* 2008).

$$\frac{Discr\_Expen_{i,t}}{Assets_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \tag{6}$$

The residuals in Equations 2, 5, and 6, are estimated for each industry-year with a minimum of 15 observations. REM is measured as the difference between actual and estimated values. This process creates the three initial measures of REM which are required: abnormal cash flow (An_OCF), abnormal discretionary expenses (An_Expn), and abnormal production costs (An_PrCost). An_OCF and An_Expn are multiplied by -1 so that higher values indicate higher EM.

Following earlier literature (Cohen and Zarowin 2010, Zang 2012, Francis *et al.* 2016a), these three measures are combined into two proxies that capture the aggregate effects of REM. The first proxy is RMBS2, which is the sum of the absolute values of An_Expn and An_OCF. The second proxy is RMBS3, which is the sum of the absolute values of An_Expn and An_PrCost. To explore the robustness of salient results, we generate a third measure, RMBS, which is the sum of the three measures of REM: An_OCF, An_Expn, and An_PrCost. Th absolute value of REM is used herein because REM could occur in either direction. The absolute value captures reversals over time (Francis *et al.* 2016a). Further, we report the signed residuals which include the sum of the three REM measures; we denote this as RM and split it into positive (RM_P) and negative (RM_N) groups for comparison. The absolute value of negative group is used in the analysis, so the higher value indicates higher negative REM.

2.4. Regression Models

Equations 7 and 8 are estimated to test the relationship between earnings management measures and the oil price crisis in GCC countries. Hausman tests are employed to determine if random effects or fixed effect models are preferred (Baltagi *et al.* 2003). Three generalized least squares (GLS) regression models are estimated to test Hypothesis H1 (Equation 7, variable definitions in Table 3).

$$AEM_{i,t} = \beta_0 + \beta_1 OilCri_{i,t} + +\beta_2 ROA_{i,t} + \beta_3 Leverage_{i,t} + \beta_4 Growth_{i,t} + \beta_5 Size_{i,t} + + \beta_6 OCF_{i,t} + \beta_7 Year + \varepsilon_{i,t} \tag{7}$$

Accrual earnings management (AEM) is the dependent variable. Companies may use income increasing or income decreasing approaches during the period of economic slowdown. Therefore, we use three proxies for AEM as dependent variables: the absolute value (ABS_DA) of the estimated residual from the modified Jones model, positive accrual (DA_P), and negative accrual (DA_N).

The oil price crisis (Oil_Cri) is a dummy independent variable, which takes the value 1 if the observation falls between 2014 and 2016, inclusive, else 0. Hypothesis H1 anticipates a negative sign for Oil_Cri with ABS_DA. Several control variables that relate to EM are also included.

Next, Equation 8 is used to test H2.

$$REM_{i,t} = \beta_0 + \beta_1 Oil_{Cri_{i,t}} + \beta_2 ROA_{i,t} + \beta_3 Size_{i,t} + \beta_4 Leverage_{i,t} + \beta_5 Growth_{i,t} + +\beta_6 OCF_{i,t} + \beta_7 DACC_{i,t} + \beta_8 Year_{i,t} + \varepsilon_{i,t} \tag{8}$$

The dependent variable is real earnings management. Recent studies suggest that REM may occur in either direction, upwards and downwards (Francis *et al.* 2016b, Kim and Sohn 2013). Therefore, the absolute values of REM proxies are used as dependent variables, RMBS2 and RMBS3. Also, the estimated residual RM (signed) and subgroups RM_P, and RM_N are reported. The subgroups explain whether the direction of RMBS2 and RMBS3 is derived by increases are decreases in income.

Hypothesis 2 anticipates a positive sign for Oil_Cri with RMBS2 and RMBS3. The model includes several control variables that are related to EM.

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[2] These three items are included under selling, general and administrative expenses (SG&A) in the Datastream database.

Table 3. Sample summary

Country	N	% of total	Consumer Discretionary	Consumer Staples	Industry	Material	Real Estate	Utility
Bahrain	108	5%	51	18	20	12	7	0
Kuwait	737	34%	102	56	276	39	254	10
Oman	714	33%	142	197	195	79	0	101
Qatar	166	7.7%	20	29	74	0	33	10
UAE	424	20%	61	96	187	0	61	19
Total	2,149	100%	376	396	752	130	355	140
%Total			17.5%	18.4%	35%	6%	16.5%	6.5%

2.5. Control Variables

Several control variables are used in Equations 7 and 8. Return on assets is included, measured as net income to lagged total assets, to control for firm performance. Previous research has found that profitability has a negative impact on earnings management (Kothari *et al.* 2005). Firm size is also included as a control Variable, as the level of monitoring in small firms is lower. Thomas and Ahmed (2018) found that large companies tend to disclose more financial information compared to small firms. Following prior research, assets growth is also added as a control variable: high growth firms have a greater incentive to manage earnings (Skinner and Sloan 2002).

Prior research provides mixed evidence concerning the impact of leverage on earnings management. Alsharairi and Salama (2012) found that firms with higher leverage exhibit a lower propensity to manage earnings, due to higher scrutiny by lenders. However, Muradoglu and Sivaprasad (2012) documented a positive relation between abnormal earnings and leverage. Anagnostopoulou and Tsekrekos (2017) revealed a positive relation between leverage and real earnings management, but not accrual earnings management. Siregar (2018) documented positive relationship between leverage and earnings management. Therefore, leverage is added as a control variable. Also, we control for firms operating cash flow (OCF). Prior literatures find a relationship between EM and OCF (Becker *et al.* 1998).

3. Results

3.1. Descriptive Statistics

Table 4 presents descriptive statistics for the variables.The magnitudes of the absolute terms of REM proxies are higher than those for the AEM proxies for the mean, median, 25th and 75th percentile. In addtion, the values of positve and negative subgroups of REM proxies are higher than the AEM proxies which supports the hypotheses of this study, as companies employ more REM during the crisis than AEM.

Table 4. Descriptive statistics

Variable	Mean	Median	SD	25th percentile	75th percentile
Firm characteristics					
ROA	0.06	0.05	0.09	0.02	0.10
Size	12.1	12.12	1.77	10.83	13.3
Leverage	0.41	0.38	0.24	0.21	0.58
Growth	.07	0.02	0.22	-0.04	0.11
OCF	0.07	0.06	0.09	0.018	0.12
Estimated (signed) earnings management proxies					
DiAc	0.00	0.00	0.08	-0.04	0.04
REM	0.00	0.01	0.20	-0.10	0.11
Absolute (unsigned) value of estimated earnings management proxies					
ABS_DA	0.06	0.04	0.06	0.02	0.08
RMBS	0.18	0.14	0.15	0.08	0.23
RMBS2	0.11	0.09	0.10	0.05	0.14
RMBS3	0.12	0.08	0.12	0.04	0.16
Sub-groups of REM and AEM proxies					
DA_P	0.06	0.04	0.06	0.02	0.07
DA_N	0.06	0.04	0.07	0.08	0.02
RM_P	0.13	0.10	0.13	0.04	0.16
RM_N	0.16	0.11	0.16	0.04	0.24

Note: All variables are winsorized at 1% and 99% percentiles.

3.2. Bivariate Correlations

Table 5 is a correlation matrix between the vairables. There is no indication of strong correlations between the regression independent variables. The contol variables exhibit negative relation with ABS_DA, except firm growth and, leverage. The EM proxies, RMBS2 and RMBS3, show a negative relation with firm size, but positive relation with growth , ROA, and OCF.The relationship between ABS_DA and the oil price crisis is negative and significant which support H1. However, there is negative relation between the REM proxies and the oil price crisis. Since firm characteristics have an impact on EM and correlation results are not interpretable in *ceteris paribus* terms, we rely on the results from mutivariate analysis.

Table 5. Correlation matrix between variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Abs_DACC	1.000										
(2) RM	0.134	1.000									
(3) RMBS	0.310	-0.178	1.000								
(4) RMBS2	0.367	-0.194	0.894	1.000							
(5) RMBS3	0.151	-0.212	0.888	0.655	1.000						
(6) Oil_Cris	-0.093	-0.011	-0.030	-0.027	-0.005	1.000					
(7) ROA	-0.048	-0.367	0.206	0.184	0.163	-0.053	1.000				
(8) size	-0.090	0.059	-0.257	-0.256	-0.256	0.071	0.020	1.000			
(9) Growth	0.141	-0.108	0.158	0.186	0.069	-0.149	0.434	0.078	1.000		
(10) leverage	0.099	0.143	-0.004	0.040	-0.031	-0.055	-0.333	0.124	0.037	1.000	
(11) OCF	-0.102	-0.542	0.131	0.108	0.139	0.034	0.511	-0.062	-0.011	-0.227	1.00

Hypothesis H1 tests the relationship between discretionary accrual and the oil price crisis. The dependent variable in the first regression is absolute discretionary accrual ABS_DA, which is a proxy for accrual earnings management. The higher is the absolute value of discretionary accrual, the higher the earnings management. The independent variable of interest is the identifier of the oil price crisis, which occurred between 2014 and 2016. The first hypothesis predicts a negative coefficient for the oil price crisis.

Table 6 presents the regression results. The oil price crisis coefficient is significantly negative in the ABS_DA regression (-0.03, $p<0.01$). This supports the view that companies reduce accrual earnings management during periods of low economic activity because of the higher scrutiny environment during such times (Cohen *et al.* 2008, Arthur *et al.* 2015).

AEM is further divided into two groups: positive accrual (DA_P) and negative accrual (DA_N). When negative accrual is the dependent variable, the oil price crisis has a negative and significant effect, which means that the period of sharply declining oil prices can be characterized by lower income decreasing EM. The positive group also exhibits a negative, but insignificant relation with the crisis. The analysis of ABS_DA along with subgroups indicates that lower ABS_DA is driven by a decrease in negative accruals during the oil price crisis. This result is in line with the view that during periods of economic slowdown, companies engage less in AEM (Filip and Raffournier 2013, Dimitras *et al.* 2015, Arthur *et al.*2015, Tano 2014, Xu *et al.* 2013).

Table 6. Regression results for AEM

	ABS_DA	Positive DA	Negative DA
	RE	FE	RE
Oil_Cri	-0.03***	-0.01	-0.031***
ROA	-0.09***	0.60***	-0.71***
Leverage	0.05***	-0.02*	0.01
Size	-0.01	0.01*	0.00
Growth	0.07***	-0.01	0.08***
OCF	0.02	-0.75***	0.67***
Intercept	0.15***	-0.05	0.03***
Year	Yes	Yes	Yes
R^2	0.08	0.66	0.60
F / Wald chi2	35.29***	107.20***	24.74***

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Fixed-effects panel models $R2$

3.3. Regression results: Hypothesis 2

Estimation results related to H2 are summarized in Table 7. The dependent variables are different proxies of REM, including RMBS2, RMBS3, RM, and subgroups: positive REM (RM_P), and negative REM (RM_N). In support of H2, the oil price crisis coefficient is positive and statistically significant in the analyses using the absolute value of REM measures, RMBS2 and RMBS3 (0.01, p<0.05; 0.02, p<0.05, respectively). This implies that managers rely more on deviations from real business activity to decrease or increase the effects of the crisis on profits.

Oil price crisis exhibits a negative and statistically significant relationship with RM_P (-0.04, p<0.01), but a positive and significant relationship with RM_N (0.05, p<0.01). This implies that the positive effect of the crisis on RMBS2 and RMBS3 is driven largely by the negative REM group, and companies tend to employ downward real earnings management in response to proposed economic reforms, which occurred during the oil price crisis. This supports the findings of earlier studies (*e.g.* Peltzman 1976, Jones 1991, Ahmed *et al*. 2008, Makhtaruddin *et a*l. 2018) which suggest that companies employ downward EM to gain political advantage. In doing so, companies seek to signal to governments that some elements of the energy price reforms may deleteriously affect competitiveness in the private sector. The "big bath" hypothesis is another possible explanation where during periods of inferior performance, managers tend to conduct income-decreasing EM (because this poor performance is anticipated by investors during the crisis) to save profits for future periods (Yoon and Miller 2002).

Table 7. Regression results for REM

	RMBS2 RE	RMBS3 FE	RMBS FE	RM RE	RM_N RE	RM_P FE
Oil_Cri	0.01** (1.76)	0.02 ** (2.39)	0.01* (1.68)	-0.048*** (-4.59)	0.05*** (2.90)	-0.04*** (-3.65)
ROA	0.20 *** (4.39)	0.09 *** (2.89)	0.26*** (4.04)	-0.33*** (-7.16)	0.85*** (9.46)	-0.48*** (-5.67)
Leverage	0.06 *** (4.64)	0.09*** (5.54)	0.10 *** (4.34)	-0.06** (-2.40)	0.12*** (3.84)	0.08*** (2.90)
Size	-0.02*** (-7.73)	-0.01 (-1.27)	0.01 * (-1.70)	0.02 (0.23)	-0.02*** (-3.46)	-0.02 (-1.55)
Growth	0.07*** (6.20)	0.03*** (2.46)	0.07*** (4.60)	-0.07*** (-3.96)	0.04** (2.17)	0.02 (0.91)
OCF	0.05** (2.18)	0.05** (2.20)	-0.05 (-0.77)	-0.98*** (-27.33)	0.36*** (4.38)	-0.32*** (-3.86)
DACC	-.08* (-1.80)	-0.01 (-10)	-0.11** (-1.95)		-0.42*** (-5.29)	0.44*** (5.86)
Intercept	0.26*** (7.56)	0.16** (2.23)	0.19 (7.17)	0.15 (1.39)	-0.01 (-0.03)	0.42*** (3.00)
Year	Yes	Yes		Yes	Yes	Yes
R^2	0.08	0.04		0.42	0.34	0.31
F/ Wald chi2	218.28***	4.41***	544.94***	91.44***	30.24***	28.76***

*Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels respectively. Fixed-effects panel models are used in all regressions based on the results of Hausman tests. t-statistics are in parentheses. within-R^2 values are reported.*

There is a negative and significant association between DACC and both RMB2 and RMBS3, which suggests that when manipulating profits, companies need to substitute AEM with REM, to reduce the cost associated with EM.

Firm size exhibits a negative and statistically significant relationship with REM RMBS2, RMBS3, and RM_N proxies which support the view that larger firms have less ability to manage earnings (Bamber 1987, Swastika 2013, Thomas and Ahmed 2018). In addition, ROA is significant and positive, which supports the idea that over performing firms are stimulated to conduct EM to maintain good performance (Pincus and Rajgopal 2002). Leverage also has a positive and significant effect on earnings management; this is in line with the view that the higher the leverage, the greater the incentive to report EM to gain political advantage (Muradoglu and Sivaprasad 2012, Anagnostopoulou and Tsekrekos 2017, Makhtaruddin *et al.* 2018, Siregar 2018). For example, during economic slowdown companies can obtain concessions from banks and lenders. The probability of banks accepting such concessions during crisis periods is high due to the lower asset market value of the firm (Shleifer and Vishny 1992).

The coefficient for OCF is positive and significant of REM proxies, RMBS2, RMBS3, and RM_N; but insignificant with ABS_DA. Although during the recent oil price crisis companies have incentive to exaggerate the impact of the crisis on their performance, only companies with high OCF afford to use downward REM.

The coefficient of the AEM proxy is negative and significant, which indicates companies rely more on REM and reduce their reliance on AEM during periods of economic slowdown.

3.4. Robustness Testing

Several tests have been conducted to explore the robustness of our findings. First, the analysis is repeated using the Jones (1991) model and the modified Jones model with current return on assets. Secondly, as an extra control for heteroscedasticity, an intercept is added to the Jones model (Kothari *et al.* 2005). Also, a third proxy for REM is employed, which includes the sum of the absolute values of all absolute value of REM measures, An_OCF, An_PrCost, and An_Expn. Results did not change substantively in any of these cases. Further, since the data used herein pertain to different markets, and the impact of the crisis may vary from one to another, the analysis is repeated using ordinary least squares regression (OLS) with year and country fixed effects. The OLS results support the main findings of the study.

Conclusion

This paper has explored AEM and REM in GCC countries, which include some of the largest oil exporting nations in the world. The study investigated whether the sharp decline in oil prices between 2014 and 2016 affected managerial decisions. Results indicate that AEM decreased during the crisis. Although REM tends to be more expensive for companies to adopt (Graham *et al.* 2005), there is evidence that companies used income decreasing real earnings management during the crisis. This behavior may have occurred because of governments´ intentions to impose taxes and reduce subsidies on energy prices in the region, and it also supports the view that companies take "a big bath" by reducing earnings in periods of economic slowdown for future periods. Various control variables were used in this analysis. There is a positive and significant relationship between ROA, leverage, growth, OCF and EM. However, firm size is negatively related to EM. In addition, there is a negative and significant association between real earnings management and accrual earnings management, which suggests that companies use these management methods as a substitute

In common with applied research more generally, there are a number of limitations to this study which should be considered. First, managerial decisions to deviate from normal business activity may be a rational response to the oil price crisis (Roychowdhury 2006). Therefore, caution must be exercised when attributing the deviation from normal activity to opportunistic behavior. Second, earnings management metrics are subject to inherent measurement errors, which may affect the validity of the findings. In addition to this, despite the fact that the data cover most GCC countries, the impact of the oil price crisis varies from country to country, depending on the proportion of total income derived from oil sales. Two thirds of the sample observations (67%) pertain to two countries (Kuwait and Oman) with zero observations for Saudi Arabia. As such, the findings reported herein should be interpreted with reference to distortions in terms of sample coverage. Finally, future research may wish to consider investigating the impact of earnings management on post-crisis operating performance.

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