The Moderating Effect of Audit Quality on the Links between Stock Market Segmentations, Surplus Free Cash Flow, and Income-increasing Discretionary Accruals

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The objective of this paper is to examine the impacts of stock market segmentations (SMS) and surplus free cash flow (SFCF) on income-increasing discretionary accruals. The study also provides the initial evidence regarding the influence of audit quality (AQ) as a moderating variable on those relationships. A sample of non-financial firms was taken from the list of Amman Stock Exchange over the period 2013-2019. Using Huber-White's sandwich estimator for pooled OLS regression, the current research presents empirical evidence harmonious with the prediction in all hypotheses. Further, the findings document that a Big 4 auditor weakens the SMS-DAC and SFCF-DAC associations, which suggests that the role of Big 4 audit firms is effective in mitigating management's opportunistic behaviour. However, the reported results provide beneficial information to investors, regulators, external auditors, policymakers, shareholders, and other countries with similar institutional environment.

Keywords: Audit quality, Jordan, Discretionary accruals, Earnings management, Surplus free cash flow.

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1. Introduction

The earnings management (EM) phenomenon remains controversial and has grown over the last two decades (Hashim et al., 2013). Corporate collapses that shocked the business world like; Arthur Anderson, WorldCom, Satyam, Tyco, HIH Insurance and Enron have strongly indicated that many of today's corporations are engaging in EM. Not only abroad, but EM cases have also occurred in Jordan, such as the Shamayleh Gate scandal.

The number of listed firms on the Amman Stock Exchange (ASE) at the end of 2019 was 191 compared with 240 companies in 2013. This drop was attributable to the delisting of 40 non-financial firms by virtue of the listing securities directives (ASE, 2020). According to JSC (2020), 31 of these delisted companies had violated the Securities Law provisions concerning financial reporting practices. Accordingly, the series of violations from 2013-2019 point out the inability of the listed companies to present accurate financial reports to their stockholders. Thus, this articulates that EM is an issue of concern in Jordan.

Previous research suggests the need to examine EM behaviour from two perspectives, incentive or monitoring perspectives. This article examines EM from both points of views. From the incentive perspective, the objective of this research is twofold. First, as of October 1, 2012, the board of directors of ASE issued decision number (33/2012), which stated that the price thresholds of the traded stocks increased to ±7.5% instead of ±5% of the last traded price, and this advantage only applied to companies listed in the first market. The price threshold for the companies listed in the second and third market remained at ±5% of the last traded price (ASE, 2017). With that being said, the article provides a new and different insight on the listing requirements in Jordan by observing the consequences of the recent regulation of ASE. From this vantage point, this study strives to identify the impact of the stock market segmentations (SMS) on income-increasing discretionary accruals (DAC).

Second, based on the tenets of agency theory (Barkhordar & Tehrani, 2016; Fakhroni et al., 2018; Nouri & Gilaninia, 2017; Nurdiana, 2021), there is a possibility that managers are stimulated to exploit free cash flow in non-wealth-maximising investments for their personal gains and then resort to manipulating reported earnings to camouflage the consequences of their poor investments. The relationship between EM and surplus free cash flow (SFCF) has been examined in developed countries, with little attention paid to developing countries (see Cardoso et al., 2014; Sari et al., 2021; Toumeh et al., 2020a; Toumeh et al., 2020b). Also, Jordanian companies hold a large amount of cash (Al-Amarneh, 2015; Alnawaiseh & Alomari, 2017), creating a good impetus for the present research to investigate income-increasing DAC in the situation of SFCF in Jordan.

From a monitoring perspective, agency theory proposed that monitoring mechanisms would produce control over the process of financial reporting and deterred EM practices (Kazemian & Sanusi, 2015; Toumeh & Yahya, 2019). A high-quality audit minimises the information asymmetry that occurs between managers and stockholders (Alzoubi, 2018). In this vein, audit quality (AQ) may boost the value relevance of earnings and increase the usefulness of accounting figures in the decision-making process (Alfraih, 2016). Thus, the present research assumes that AQ would weaken the associations among SMS, SFCF, and income-increasing DAC. However,

this is the initial empirical study to examine the moderating role of AQ on the nature of the relationship between SMS and income-increasing EM.

In methodological terms, the major studies that have examined the impact of SFCF on EM have utilised pure cross-section or pure time-series data, especially in developing countries (e.g., Bukit & Iskandar, 2009, Astami et al., 2017, Bhundia, 2012). Baltagi (2008) stated that panel data could better recognise and measure impacts that are not detectable in purely cross-section or time-series data. Therefore, this paper employed panel data analysis to derive conclusions.

The remainder of this research is structured as follows. The next section reviews the most pertinent literature and hypotheses development. Next, the research method, including the sample and data collection, operational definitions of the variables, and the empirical model equations, are provided. The penultimate section articulates the findings and their interpretations. Concluding remarks, implications, and avenues for future research are then discussed in the final section.

2. Literature Review and Hypotheses Development

2.1 SMS and Income-increasing Discretionary Accruals

The secondary market of ASE is divided into three sub-markets: the first, second, and third market. On an international level, this division is similar to many other countries that have sectioned their stock market via different listing requirements like USA, UK, Japan, and China (see Honjo & Nagaoka, 2018; Khurshed et al., 2018; Sarkar, 2016; Ward et al., 2018).

Chen and Yuan (2004) indicated that listed companies on China Securities Regulatory Commission (CSRC) are required to reach a minimum of 10% return on equity to issue additional shares. They documented that the managers of Chinese companies have used income-increasing EM to achieve the accounting threshold value.

Haw et al. (2005) found that Chinese listed firms have engaged in income-increasing DAC practices to meet regulatory requirements of stock rights issues. They concluded that firms that failed to attain regulatory permission for stock rights issue used EM practices more than firms that have successfully received the permission. Yu et al. (2006), Yang (2015), and Lento and Yeung (2017) have reported comparable findings. In the same context, numerous research, including Cheng et al. (2010) and Zhang et al. (2012), found that loss-makers are induced to manipulate their reported earnings using DAC to preserve their listing status.

In Taiwan, Jaggi et al. (2006) stated that the Taiwan Securities and Futures Exchange Commission (TSFEC) mandated IPO companies to report annual earnings forecasts for two successive years before stock rights offerings with a 20% forecast error threshold. The findings revealed that Taiwanese regulatory requirements promote EM practices in Taiwan because the management of IPO companies manage reported earnings, so they do not deviate from the projected earnings. Likewise, Cormier and Martinez (2006) found comparable findings in France, while Ismail and Weetman (2008) found comparable findings in Malaysia.

In Jordan, the listing requirements of ASE differ depending on its market segmentations, and listed companies are confronted with specific listing criteria. Under the provisions of "Article (72) of the

Securities Law No. 76 of 2002" and the provisions of "Article (24.B.1) of the Internal Bylaw of the ASE of 2004," the requirements of the first market in terms of earnings are the following. The listing of the company's shares is transferred to the first market if a company has net profits before tax for a minimum of two years of the three years before the transfer of listing, provided the company's average net pre-tax profit for the latest three years are at least 5% of the company's paid-in capital. According to decision number 33/2012 of Amman Stock Exchange`s board of directors; companies listed in the first market have the privilege of being allowed more flexible stock price thresholds, which is ±7.5% of the last traded price, while other listed companies are allowed with only ±5% of the last traded price (ASE, 2017).

Using institutional theory, Makhaiel and Sherer (2017) highlighted that meeting a particular level of net income that other companies have published exerted mimetic pressure on firms whose profits below that level to manipulate their earnings to create the desired financial image and present financial results comparable to that of their peers. They also argued that the regulatory agent in the Egyptian Exchange (EGX) applies coercive pressures on listed firms to comply with its regulatory requirements. One of these rules is that companies must earn a particular level of earnings, which may push management to manage the reported earnings upwardly and publish favourable financial reports in an attempt to be viewed as more legitimate and reputable. Furthermore, Makhaiel and Sherer (2017) indicated that the application of institutional theory proposes that EM is a technique that managers resort in order to comply with external pressures such as listing requirements.

Against the above argument, this article assumes that a firm listed in the other markets is motivated to reach the 5% average net pre-tax profit to boost their ranking to the first market, which, in turn, may lead to incentivising firms that are listed on the ASE to use positive DAC. Therefore, the following hypothesis is posited:

> **Hypothesis 1**: Firms that are listed in the other markets are more likely to use income-increasing DAC than otherwise.

2.2 SFCF and Income-increasing Discretionary Accruals

Agency theory explains the relationship between SFCF and EM. It posits that if managers and shareholders goals are not aligned, management is more apt either to waste free cash flow on organisation inefficiencies or to invest free cash flow in negative NPV projects that only maximise the wealth of managers while ignoring the interests of shareholders (Jensen, 1986). Fakhroni et al. (2018), Wang et al. (2015), and Yaari et al. (2016), among others, professed that if free cash flow is not employed to boost the shareholders` interest, then an agency problem exists.

The free cash flow problem is allied to low growth opportunities (Jensen, 1986; Lehn & Poulsen, 1989). Jaggi and Gul (2005) concluded that managers of low growth firms with high free cash flow engaged in income-boosting DAC to conceal the results of their non-value maximising investments. Using a sample of companies listed in the United States, Chung et al. (2005) found that management used positive DAC to cover the impact of marginal NPV investments on the reported earnings. Previous studies by Bhundia (2012) (for India), Barkhordar and Tehrani (2016) (for Iran), Cardoso et al. (2014) (for Brazil), Bukit and Nasution (2015) (for Indonesia) have also

determined that companies with SFCF situation tended to employ accounting procedures and accounting discretion that increase their earnings.

In a situation in which a firm has a combination of low growth opportunities and a high free cash flow; management might make inefficient investment decisions for their interests, and thus they may be involved in income-increasing DAC to demonstrate the superior performance of a firm (Bukit & Iskandar, 2009). That leads to the following hypothesis:

> **Hypothesis 2:** Firms with SFCF are more likely to use income-increasing DAC than otherwise.

2.3 The Moderating Effect of AQ

An important role of the external auditors is to reveal whether a company`s income statement and balance sheet are presented fairly. Thus, improving the quality of an audit service assists provide users of financial statements with reasonable assurance that reported accruals are accurate and then certifies the quality of the reported earnings (Al-Thuneibat et al., 2011). Agency theory suggests that management needs high-quality monitoring to diminish agency problems and assure the transparency of the financial results (Miko & Kamardin, 2015). AQ is considered an effective governance mechanism that detects material misstatements and minimises EM practices (Astami et al., 2017; Alzoubi, 2016).

AQ can be determined based on features that are identified in the International Standards on Auditing (ISA), such as independence, the exercise of due professional care, and competence (Lin & Hwang, 2010). These features will help determine complex transactions, which should probably be present in Big 4 auditors (Habbash & Alghamdi, 2017). Big 4 auditors provide higher assurance that financial reports faithfully reflect the real picture of a company (Alfraih, 2016). Further, Big 4 audit firms possess huge client bases and would tarnish their reputations if they perform poor quality audit service (Jordan et al., 2010). Finally, Big 4 auditors have considerable expertise in conducting integrated audits for publicly listed companies to effectively recognise and test the clients' internal controls (Brown et al., 2016).

Prior researchers have investigated the influence of AQ on EM. For example, based on a sample of 10,379 Big 6 and 2,179 non-Big 6 firms, Becker et al. (1998) found that companies audited by non-Big Six 6 audit firms had higher reported DAC accruals than those that Big Six 6 audit firms audited. Utilising a sample of all private companies in Belgium, Finland, United Kingdom, Netherlands, Spain, and France during the period 1998-2002, Van Tendeloo and Vanstraelen (2008) indicated that the reputational concerns of Big 4 audit firms led to the effective monitoring of the moral risk in the companies. They added that AQ was effective in reducing earnings manipulation practices. In the Jordanian context, using a sample of listed firms on ASE, Alzoubi (2016) determined that AQ was associated negatively with EM. He found that companies that used Big 4 audit firms had significantly lower EM levels than companies that hired non- Big 4 audit firms. Likewise, Waweru and Prot (2018) documented comparable results

Along this line of argument, Chung et al. (2005) provided evidence suggesting that the usage of a Big 6 auditor played a significant role in limiting DAC manipulation, specifically in SFCF situation. They justified this result by highlighting that Big 6 auditors are more cautious when

agency costs are severe in their clients to avoid litigation risks. So, the role of AQ in constraining EM is strong when the firms have high levels of SFCF. Thus, the research promotes the following hypothesis:

Hypothesis 3a: High-quality auditors weaken the positive relationship of SFCF and income-increasing DAC.

Under institutional theory (Meyer & Rowan, 1977; DiMaggio & Powell, 1983), hiring high-quality auditors can be considered a coercive isomorphism derived from formal or informal pressures exerted on a firm. AQ could also be a mimetic isomorphism. Doluwarawaththa and Gooneratne (2017) said that companies attempt to improve their legitimacy in their field through mimicry of the practices of successful companies. Kalbers and Fogarty (1998) stressed that normative persuasion is conveyed among professional accountants and auditors, wherein a higher level of practices can be obtained. Therefore, the following hypothesis is proposed:

Hypothesis 3b: High-quality auditors weaken the positive relationship of SMS and income-increasing DAC.

3 Research Method

3.1 Sample and Data Collection

The initial sample comprises all firms listed on the ASE (194 listed firms) during 7 years from 2013 to 2019. From this sample, all listed companies in the financial sector are excluded because they have different working capital structure (Abed et al., 2012), unique financial statements that contain different components (Soliman & Ragab, 2014), and different regulatory requirements (Noor et al., 2015). Thus, the sample includes all non-financial listed firms drawn from two industries (services and industrial), and the financial reports of the selected firms must be available and cover all the period from 2013 to 2019. Outliers were intentionally not excluded because observations with extreme values of DAC are suggestive of management discretion. Removing either the highest positive or negative observations might lead to the exclusion of EM cases that are the focus of this particular study (Alzoubi, 2018). The final sample size is 644 firm-year observations about 92 firms for 2013-2019. Data on selected firms were hand-collected from the annual reports of the non-financial listed firms and the ASE website at https://www.ase.com.jo/en.

3.2 Operational Definitions

3.2.1 Dependent Variable: Earnings Management

DAC are measured cross-sectionally for each year and each industry through the modified Jones model (Dechow et al.,1995) as defined below:

$$\frac{TAC_t}{TA_{t-1}} = \alpha_0 + \alpha_1 \frac{1}{TA_{t-1}} + \alpha_2 \frac{(\Delta REV_t - \Delta REC_t)}{TA_{t-1}} + \alpha_3 \frac{PP\&E_t}{TA_{t-1}} + \varepsilon_t \tag{1}$$

Where α_0 is the constant; $\alpha_1 \alpha_2$ and α_3 are the alphas; TAC_t is the total accruals in year t; ΔREV_t the change in revenue among year t−1 and t; ΔREC_t the change in receivables in year t; $PP\&E_t$ the gross property, plant, and in year t; TA_{t-1} the lagged total assets; and ε_t the residuals.

This study minimises the problem of heteroscedasticity by deflating each variable included in the model by the book value of total assets from the previous year.

Total accruals (TAC) is calculated based on the balance sheet approach as below:

$$TAC = \Delta CA - \Delta Cash - \Delta CL + \Delta DCL - DEP \qquad (2)$$

Where TAC the total accruals; ΔCA the change in current assets; $\Delta Cash$ the change in cash and cash equivalents; ΔCL the change in current liabilities; ΔDCL the change in short term debt included in current liabilities; DEP the depreciation and amortisation expense.

TAC is assumed to be the sum of two components: non-discretionary and discretionary accruals. Non-discretionary accruals occur from the normal business operations and are beyond management control, while discretionary accruals arise from the choices made by the firm's management (Dechow et al., 1995). Therefore, DAC is calculated as below:

$$DAC_t = TAC_t - NDAC_t \qquad (3)$$

Where $NDAC_t$ denotes the non-discretionary accruals divided by the lagged total assets.

The fitted values from equation (1) represent the NDAC, while the residual term ε_t (difference between TAC and NDAC) is used to capture EM.

3.2.2 Independent Variable: Stock Market Segmentations

SMS is a dummy variable set equal to 1 if a firm is listed in the other markets (second and third market), and 0 if a company is listed in the first market. The second and third markets are included as other markets because both markets have no regulatory requirements regarding the reported earnings, and both markets have the same stock price movements in their daily share prices (±5%).

3.2.3 Independent Variable: Surplus Free Cash Flow

Following Cardoso et al. (2014), Bukit and Iskandar (2009), Bhundia (2012), the FCF is measured using the model of Lehn and Poulsen (1989), where FCF for every company and every year is calculated by operating income before depreciation minus expenses like interest expense, tax expense, and dividends, scaled by dividing it with total assets as below:

$$FCF_{it} = \frac{(INC_{it} - TAX_{it} - INTEXP_{it} - PSDIV_{it} - CSDIV_{it})}{TA_{it-1}}$$

Where FCF_{it} is the free cash flow; INC_{it} is the operating income before depreciation; TAX_{it} is the total income taxes; $INTEXP_{it}$ is the interest expense; $PSDIV_{it}$ is the preferred stock dividends; $CSDIV_{it}$ is the ordinary stock dividends; and TA_{it-1} is the total lagged assets.

SFCF situation is estimated using two proxies, the FCF and the growth prospects of a firm. Growth opportunities are determined by the price to book ratio. Then, SFCF is is a binary variable coded

1 if the FCF of a firm is above the median for the year and the price to book ratio is below the median for the year, otherwise SFCF is coded 0.

3.2.4 Moderator Variable: Audit Quality

In current practice, the audit firm size could be a convenient proxy for AQ (Habbash & Alghamdi, 2017, Lopes, 2018). Therefore, this study measures AQ as a dummy variable utilising the audit firm size. AQ is scored 1 if a Big 4 audit firm audits a company, otherwise AQ is scored 0.

3.2.5 Control Variables

The recent growing literature has articulated that larger firms are less apt to use positive DAC (Nekhili et al., 2016). Company size (CSIZE) is calculated by the natural logarithm of total assets (Fakhroni et al., 2018). Agency theory confirmed the role of dividend in reducing the agency problem of free cash flow (Jensen, 1986). Dividend yield (DIYD) is measured by the ratio of dividend to the share market value (Noor et al., 2015). Companies with large debt face a high level of risk, and thus management may choose income-increasing EM to meet the debt covenants (Abbadi et al., 2016). The debt ratio (DEBT) is calculated as the ratio of total debt (long-term and short-term) to the total assets of a company (Alhadab, 2018). Previous studies have found a negative relationship between total accruals and DAC (Becker et al., 1998). The absolute value of total accruals (ATAC) is measured by the absolute value of total accruals divided by lagged total assets (Bukit & Iskandar, 2009). Abed et al. (2012) documented that companies listed on the ASE under the service sector are more likely to manage their earnings than those under the industrial sector. Industry type (IDUS) is a binary variable taking the value of 1 if a company is under the industrial sector and 0 if otherwise.

3.3   Empirical Model Equations

Four pooled ordinary least squares (OLS) regressions were applied to test the hypotheses. The pooled OLS models with company (i) and time (t) subscripts are defined below:

Model 1:
$$DAC_{it} = \beta_1 + \beta_2\ SMS_{it} + \beta_3\ SFCF_{it} + \beta_4\ CSIZE_{it} + \beta_5\ DIYD_{it} + \beta_6\ DEBT_{it} + \beta_7\ ATAC_{it} + \beta_8\ IDUS_{it} + u_{it}$$

Model 2:
$$DAC_{it} = \beta_1 + \beta_2\ SMS_{it} + \beta_3\ SFCF_{it} + \beta_4\ AQ_{it} + \beta_5\ CSIZE_{it} + \beta_6\ DIYD_{it} + \beta_7\ DEBT_{it} + \beta_8\ ATAC_{it} + \beta_9\ IDUS_{it} + u_{it}$$

Model 3:
$$DAC_{it} = \beta_1 + \beta_2\ SMS_{it} + \beta_3\ SFCF_{it} + \beta_4\ AQ_{it} + \beta_5\ SMS * AQ_{it} + \beta_6\ CSIZE_{it} + \beta_7\ DIYD_{it} + \beta_8\ DEBT_{it} + \beta_9\ ATAC_{it} + \beta_{10}\ IDUS_{it} + u_{it}$$

Model 4:
$$DAC_{it} = \beta_1 + \beta_2\ SMS_{it} + \beta_3\ SFCF_{it} + \beta_4\ AQ_{it} + \beta_5\ SFCF * AQ_{it} + \beta_6\ CSIZE_{it} + \beta_7\ DIYD_{it} + \beta_8\ DEBT_{it} + \beta_9\ ATAC_{it} + \beta_{10}\ IDUS_{it} + u_{it}$$

Where DAC is the signed value of discretionary accruals derived from the modified Jones model (Dechow et al.,1995). The rest of the variables have already been summarised above.

4. Analysis and Discussion

4.1 Descriptive Statistics

Table 1 reports summary statistics for the study's dependent, independent and control variables. The average of DAC is -0.016 varies from -0.579 to 0.577. This finding aligns with prior research in Jordan (Alhadab, 2018, Azzoz et al., 2016). CSIZE, on average, is 17.250 of the company sample and ranges from 13.626 to 21.310. This result is similar to the Jordanian research of Abbadi et al. (2016), who documented a mean CSIZE of 17.034 with a minimum value of 13.060 and a maximum value of 21.292. The mean of DIYD is 2.607, which is in line with Al-Amarneh (2015), who found an average of DIYD of 2.900 in Jordan. Table 1 shows that the sample average DIBT is 0.345 with a minimum and maximum value of 0.000 and 1.073, respectively. This finding harmonious with Siam et al. (2018) who published an average of DIBT of 0.383 among manufacturing Jordanian firms. The study documents a mean of ATAC to be about 0.087.

Concerning the dichotomous variables, Table 1 specifies that 40.06% of the sampled firms were listed in the first market, and 59.94% were from firms listed in the other markets. About 20% of the firms had an SFCF situation suggesting a potential agency problem. This number is similar to other related research (Astami et al., 2017). Data on AQ reports that, on average, 39.91% of the observations (257) were audited by Big 4 audit firms, compared to 60.09% (387) audited by non-Big 4 auditors. This aligns with the latest Jordanian study of Alhababsah (2019), who found that 37% of the listed firms were audited by a Big 4 auditor. Finally, 51.09% of the sample were categorised under the industrial sector, and 48.91% were categorised under the service sector.

Table 1 Descriptive Statistics

Variable	Observations	Mean	Median	Std. Dev.	Minimum	Maximum
Continuous variables						
DAC	644	-0.016	-0.137	0.110	-0.579	0.577
CSIZE	644	17.250	17.210	1.430	13.626	21.310
DIYD	644	2.607	0.000	3.150	0.000	11.627
DIBT	644	0.345	0.299	0.243	0.000	1.073
ATAC	644	0.087	0.060	0.146	0.000	2.750
Dichotomous Variables						
	Observations	**0**			**1**	
SMS	644	258 (40.06 %)			386 (59.94 %)	
SFCF	644	514 (79.81 %)			130 (20.19 %)	
AQ	644	387 (60.09 %)			257 (39.91 %)	
IDUS	644	315 (48.91 %)			329 (51.09%)	

4.2 Correlation Analysis

Table 2 provides the variables` correlation matrix tested in this study. None of the bivariate correlation coefficients among the independent variables were significantly highly correlated ($\geq$ 0.80), which means that multicollinearity was not a major problem in interpreting the regression coefficients. The highest correlation between the variables was -0.489 (SMS and DIYD). The magnitude of the correlations between independent variables under study varied from -0.489 to 0.433. SMS, SFCF, and AQ were significantly correlated with DAC at 1% significance levels.

Table 2 Pearson Correlation

Variable	DAC	SMS	SFCF	AQ	CSIZE	DIYD	DIBT	ATAC	IDUS
DAC	1								
SMS	0.127***	1							
SFCF	0.132***	0.103***	1						
AQ	-0.240***	-0.110***	-0.038	1					
CSIZE	-0.156***	-0.390***	0.020	0.433***	1				
DIYD	-0.014	-0.489***	0.113***	0.120***	0.208***	1			
DIBT	-0.054	0.043	0.041	0.097**	-0.009	0.016	1		
ATAC	0.016	-0.035	-0.046	-0.072*	-0.048	0.044	0.009	1	
IDUS	-0.025	0.130***	0.020	-0.154***	-0.176***	-0.097**	0.000	0.013	1

Note: *, **, and * denote the significance level at 0.1, .05, and 0.01 respectively.**

4.3 Univariate Analysis

Table 3 shows the findings for differences in DAC cross sub-samples formed on the basis of SMS, SFCF, and AQ. As shown in panel A of Table 3, observations listed in the other markets had higher DAC than those listed in the first market. The differences were highly significant at a 0.01 level. This result indicates that firms under the other markets tend to manage their earnings upwardly to meet the earnings criteria of the first market that ASE has set. The results support the first hypothesis. Panel B illustrates that the mean of DAC of companies with high SFCF was significantly higher than those companies with low SFCF at p = 0.000. This finding is consistent with the second hypothesis, which implies that firms with high SFCF were more apt to choose income-increasing DAC to show better performance. In Panel C, the mean of DAC in companies that hired Big 4 audit firms was lower than those companies that used non-Big 4 auditors at the 0.01 significance level. This evidence suggests that Big 4 audit firms constrain management from engaging in income-increasing EM. Panel C shows that observations with Big 4 audit firms have significantly lower DAC at 0.01 level. This evidence implies that Big 4 auditors mitigate the positive DAC.

Panel D displays the mean of DAC of combinations between different levels of SMS and AQ. The mean of DAC for firms listed in other markets and that used the services of Big 4 audit firms was

lower at p = 0.000 than those firms listed in the other markets that non-Big 4 auditors had audited. Likewise, firms listed in the first market that Big 4 audit firms audited had a significantly lower DAC than firms from the same category that non-Big 4 auditors had audited. The evidence aligns with Panels A and C. Panel E shows the four-way partitioning of DAC based on both SFCF and AQ. Findings suggest that firms with high SFCF and that used Big 4 auditors had a significantly lower mean of DAC at the 0.01 level than those firms with high SFCF that had non-Big 4 auditors had audited. Similarly, the mean of DAC for the observations low SFCF and Big 4 audit firms had a significantly lower DAC at the 0.01 significance level than those observations with low SFCF and non-Big 4 audit firms. The finding is consistent with Panels B and C.

Table 3 Univariate Test Differences in DAC between Sub-samples

Panel A: SMS Sub-Samples – First Market (SMS = 0) and Other Markets (SMS = 1)

	First Market (SMS = 0)	*Other Markets (SMS = 1)*	*Mean Difference*	*t*	*p*
Mean of DAC	-0.033	-0.004	-0.029	-2.254	0.001
Observations	258	386			

Panel B: SFCF Sub-Samples – Low SFCF (SFCF = 0) and High SFCF (SFCF = 1)

	Low SFCF (SFCF = 0)	*High SFCF (SFCF = 1)*	*Mean Difference*	*t*	*p*
Mean of DAC	-0.023	0.013	-0.036	-3.374	0.000
Observations	514	130			

Panel C: AQ Sub-Samples – Non-Big 4 (AQ = 0) and Big 4 (AQ = 1)

	Non-Big 4 (AQ = 0)	*Big 4 (AQ = 1)*	*Mean Difference*	*t*	*p*
Mean of DAC	0.006	-0.048	0.054	6.264	0.000
Observations	387	257			

Panel D: Four-Way Partitioning of DAC for SMS and AQ Sub-Samples

		Non-Big 4	*Big 4*	*t*	*p*
First Market (SMS = 0)	Mean of DAC Observations	-0.084 138	-0.049 120	2.156	0.032
Other Markets (SMS = 1)	Mean of DAC Observations	0.019 249	-0.047 137	6.293	0.000
t		-3.249	-0.233		
p		0.001	0.816		

Panel E: Four-Way Partitioning of DAC for SFCF and AQ Sub-Samples

		Non-Big 4	*Big 4*	*t*	*p*
Low SFCF ***(SFCF = 0)***	Mean of DAC Observations	-0.005 304	-0.049 210	4.665	0.000
High SFCF ***(SFCF = 1)***	Mean of DAC Observations	0.043 83	-0.041 47	4.727	0.000
t		-3.6180	-0.530		
p		0.000	0.597		

4.4 Multivariate Analysis and Method Selection

Following Gujarati and Porter (2009), the study used the Breusch-Pagan Lagrangian Multiplier (LM), Wald analysis of testing the time-fixed effects, and Hausman tests to verify the assumptions of the most appropriate model for the dataset. The results of Table 4 indicate that the most suitable estimation method to be applied was the pooled OLS regression model.

Table 4 Lagrange Multiplier (LM), Wald Analysis, and the Hausman Tests

Test	*P-value*
Lagrangian Multiplier (LM) test	1.000
Wald Test	0.142
Hausman test	0.389

After selecting the appropriate estimation method, diagnostic tests of panel data assumptions become essential before performing regression analysis. These tests include multicollinearity, heteroscedasticity, and autocorrelation tests. The variance inflation factor and tolerance are employed as a second indicator to detect a multicollinearity problem. The White`s test and the modified Wald test for group-wise heteroscedasticity are used for heteroscedasticity (Stockemer, 2018). Finally, the Wooldridge test for autocorrelation in panel data is applied to judge whether the data under investigation is free from an autocorrelation problem (Field, 2013).

Table 5 Tolerance and Variance Inflation Factor

Variable	*Variance Inflation Factor (VIF)*	*Tolerance Value (1/VIF)*
SMS	2.15	0.465
SFCF	1.69	0.593
AQ	2.99	0.334
CSIZE	1.47	0.681
DIYD	1.43	0.701
DIBT	1.03	0.972
ATAC	1.02	0.984

IDUS	1.05	0.953
Mean VIF	1.78	

Table 6 Heteroscedasticity and Autocorrelation Tests

	White`s Test	Modified Wald Test	Wooldridge Test
Chi-Square(2) value / F-value	98.31	3383.91	1.790
df	51	92	1,91
p-value	0.000	0.000	0.184

The results as in Table 5 prove that the multicollinearity problem did not exist because the maximum VIF was 2.99, which is less than 10. The minimum value of the tolerance was 0.334, which is more than the cut-off value of 0.10. As illustrated in Table 6, the findings of the White`s test and the modified Wald test show that the data suffer from a heteroscedasticity issue. Further, the outcome of the Wooldridge test reports that the error terms were uncorrelated and independently distributed, which means that the data is free from first-order autocorrelation.

Given that the results of White`s test and the modified Wald still indicates evidence of heteroscedasticity, the robust standard error method (Huber-White's sandwich estimator) is utilised as a reliable solution to diagnose this issue (Froot, 1989, Wooldridge, 2010).

Table 7 presents the findings of the robust standard errors for pooled OLS regression models (Model 1-4) on associations between SMS, SFCF, and DAC, including the moderating effects of AQ on those relationships. As shown in Table 7, the results of every model are all statistically significant at the 0.01 level. A consistent result across all the models is that SMS had a positive and significant association with DAC. This result means that companies listed in the other markets were more likely to use income-increasing EM than those listed in the first market. This result is in line with the first hypothesis. Here, the increase in the reported earnings may lead these firms to meet the earnings condition of the first market such that they can more easily transfer their shares to that market. The SFCF variable had a positive sign in all model specifications and is statistically significant at the 0.01 level. This result supports the prediction of hypothesis 2 that firms with high SFCF were more apt to engage in income-increasing DAC to camouflage the results of their non-value-maximising investments. The evidence corroborates the univariate outcome reported in Table 3 as well as in prior studies (Bhundia, 2012; Bukit & Iskandar, 2009 Nekhili et al., 2016).

Before examining the moderator role of AQ, it was included as an independent variable and had a consistently negative and significant relationship with earnings management measure (DAC) in all the models. This suggests that firms that Big 4 audit firms audited had reported lower DAC than firms that used the services of non-Big 4 audit firms. One interpretation of this finding is that big four auditors coerce client firms to deter the use of positive DAC. Previous research, which shows consistent results of AQ and income-increasing DAC, include Alzoubi (2016), Miko and Kamardin (2015), Van Tendeloo and Vanstraelen (2008), and Waweru and Prot (2018).

Model 3 looks at the moderating role of AQ on the relationship between SMS and DAC. The regression finding reveals the interaction term coefficient, AQ*SMS, was negative and significant at the 0.05 level and supported hypothesis 3b. Thus, Big 4 auditors act to reduce income-increasing DAC activities, and they are especially influential in firms listed in the other markets. Similarly, the beta coefficient of the moderating effects of AQ*SFCF in model 4 had the anticipated negative sign, and the coefficient was significant at the .05 level. This result means that in firms with high SFCF situation, Big 4 auditors were more vigilant in constraining income-increasing EM. This evidence aligns with hypothesis 3a, in which AQ was posited to weaken the positive association between income-increasing DAC and SFCF. The results are directionally consistent with Astami et al. (2017), Rusmin et al. (2014), and Chung et al. (2005), who stressed that Big 4 audit firms could mitigate the positive DAC in SFCF situation.

Table 7 Huber-White's Sandwich Estimator for Pooled OLS Regression

Variable	Model 1	Model 2	Model 3	Model 4
Intercept	0.164 (2.63)***	0.050 (0.78)	0.045 (0.69)	0.045 (0.71)
SMS	0.020 (1.91)*	0.025 (2.54)**	0.039 (2.99)***	0.027 (2.62)***
SFCF	0.034 (3.31)***	0.029 (3.05)***	0.033 (3.32)***	0.046 (3.38)***
AQ		-0.048 (-5.37)***	-0.026 (-1.81)*	-0.040 (-3.92)***
AQ*SMS			-0.038 (-2.08)**	
AQ*SFCF				-0.043 (-2.33)**
CSIZE	-0.011 (-3.10)***	-0.003 (-0.92)	-0.004 (-0.98)	-0.003 (-0.90)
DIYD	0.001 (0.93)	0.002 (1.38)	0.002 (1.01)	0.002 (1.15)
DIBT	0.000 (-1.65)	0.000 (-1.11)	0.000 (-1.33)	0.000 (-1.11)
ATAC	0.013 (0.31)	0.004 (0.11)	0.008 (0.19)	0.005 (0.12)
IDUS	-0.013 (-1.54)	-0.017 (-2.00)**	-0.016 (-1.92)*	-0.017 (-2.04)**
R-squared	0.055	0.092	0.099	0.098
F-statistic (p-value)	4.52***	7.67***	7.94***	7.81***
Observations	644	644	644	644

Note: *, **, and * denote the significance level at 0.1, .05, and 0.01 respectively.**

The analysis of the control variables, including CSIZE, DIYD, DIBT, ATAC, and IDUS, is shown in Table 7. From the table, it can be seen that CSIZE was negatively and significantly associated with DAC at the 0.01 level. This result corroborates the study of El Moslemany and Nathan (2019). It means that the level of positive DAC was lower in large companies, as they under pressure from their shareholders. Nevertheless, CSIZE was not significantly associated with DAC when AQ and the interaction terms of AQ were included in the regression, indicating that CSIZE influences management's opportunistic behaviour, but this relationship was affected by Big 4 auditors. IDUS had a negative sign in all models and was statistically significant in most of them. This result suggests that firms listed under the service sector had a higher positive DAC than those under the industrial sector, consistent with Abed et al. (2012). Finally, DIYD, DIBT, and ATAC variables were not significantly related to DAC. These results contradict prior research in other contexts (see Noor et al., 2015; Nekhili et al., 2016; Nouri & Gilaninia, 2017).

4.5   Additional Sensitivity and Robustness Checks

This research performed two additional analyses to examine the robustness of the findings. The first reveals the direction and size of the bivariate correlations among the variables using the non-parametric analogue to Pearson correlation, namely, the Spearman correlation test, and the second is the two-sample Wilcoxon rank-sum (Mann-Whitney) test which is a non-parametric statistic alternative for an independent sample t-test.

Table 8 Spearman Correlation Matrix

Variables	DAC	SMS	SFCF	AQ	CSIZE	DIYD	DEBT	ATAC	INDUS
DAC	1								
SMS	0.112***	1							
SFCF	0.125***	0.103***	1						
AQ	-0.311***	-0.110***	-0.038	1					
CSIZE	-0.112***	-0.401***	0.003	0.422***	1				
DIYD	-0.032	-0.517***	0.083**	0.146***	0.240***	1			
DEBT	-0.052	0.102***	0.040	0.128***	0.025	-0.026	1		
ATAC	-0.111***	0.089**	-0.085**	0.003	-0.038	0.034	-0.020	1	
IDUS	-0.047	0.126***	0.020	-0.154***	-0.202***	-0.101***	-0.000	0.105***	1

Note: *, **, and *** denote the significance level at 0.1, .05, and 0.01 respectively.

As shown in Table 8, the explanatory variables SMS and SFCF were positively and significantly correlated with DAC at 0.01 level. Additionally, the Spearman correlation coefficient between AQ and DAC was -0.311 at 0.01 significance level. These findings lead to the conclusion that Spearman correlation test results were comparable with the results of Pearson correlation test conducted earlier.

Table 9 Two-sample Wilcoxon Rank-sum (Mann-Whitney) Test

Panel A: SMS Sub-Samples – First Market (SMS = 0) and Other Markets (SMS = 1)

	First Market (SMS = 0)	Other Markets (SMS = 1)	z	p
Rank Sum	76631	131059	-2.841	0.004
Observations	258	386		

Panel B: SFCF Sub-Samples – Low SFCF (SFCF = 0) and High SFCF (SFCF = 1)

	Low SFCF (SFCF = 0)	High SFCF (SFCF = 1)	z	p
Rank Sum	159778	47912	-3.159	0.002
Observations	514	130		

Panel C: AQ Sub-Samples – Non-Big 4 (AQ = 0) and Big 4 (AQ = 1)

	Non-Big 4 (AQ = 0)	Big 4 (AQ = 1)	z	p
Rank Sum	143048	64642	7.889	0.000
Observations	387	257		

The results in Table 9 shows that the p-values of the variables SMS, SFCF, and AQ were statistically significant at the 0.01 level, which means that no differences exist between the chief tests implementing the non-parametric analysis and the parametric analysis for the findings. The outcome of the Wilcoxon-Mann-Whitney test was in line with the results reported for the t-test of the independent sample in Table 3. Eventually, the results of this research could be deemed robust when different pertinent statistical techniques were implemented.

5   Conclusion

The proxy for the earnings management phenomenon, discretionary accruals, provides various management mechanisms to adjust the reported profit towards some preferred levels. A growing body of literature has investigated managers' incentives for using DAC and has utilised these incentives to predict EM. The current article extends this line of research by examining the association between SMS, SFCF, and DAC and the direct and moderating effect of AQ. First, this article argues that firms listed in the other markets were incentivised to choose the upward manipulation of DAC to fulfil the earnings-based criteria of the first market so that they can transfer their shares to that market. As a result, firms would preserve their competitiveness with their peers, and stockholders would view them as more reputable and favourably. Also, those firms will be differentiated in the allowed stock price threshold in their daily share prices. The empirical findings using data from 2013 to 209 confirm the hypothesis of a positive association between SMS and DAC. In a surplus free cash flow situation, management makes self-serving investments that do not maximise the shareholders` wealth and employs accounting discretion to inflate earnings. The present study provides support for the hypothesis suggesting a positive relationship

between SFCF and DAC. On the other hand, the study offers conclusive evidence that Big 4 auditors in Jordan force management to reduce income-increasing DAC due to their independence and desire to steer clear of litigation risk. This behaviour is particularly strong in two situations; when firms are listed in the other markets and low growth firms have a high free cash flow.

Based on these findings, the article raises probable implications for economic reformers and regulators about managerial behaviour related to the segmented stock markets of ASE. The findings provide beneficial information about how both earnings-based condition and the advantages of being listed in the first market influence the quality of financial reports. Further, the association of SFCF and income-increasing EM choice is applicable in Jordan. Therefore, the results also provide new insights to stockholders and investors concerning EM activities that the SFCF situation could impact. Indeed, the study will help them fully picture the potential negative side when their firms hold a high SFCF. Moreover, the Big 4 auditors have a crucial role in mitigating the behaviour of management in selecting the income-increasing DAC, especially for those firms that wish to transfer their shares into the first market. Thus, the ASE may first pay more attention to firms applying for the transfer, and second, require that Big 4 audit firms audit the financial reports of listed firms to ensure that the earnings-based criteria of the first market have not led to choose positive DAC.

This study adopted the traditional classification of Big 4 audit firms as a proxy for audit quality; thus, future research could explore a better measure of this variable to enrich the framework of this study. Also, future research may conduct a comparative study of Jordan with different countries that have distinct environments to highlight the impact of other institutional settings and to increase generalisability. Finally, early in the year 2020, the pandemic of COVID-19 has exerted varied effects on many firms' financial performance, and one of these impacts is earnings shortfalls. These decreases in the published earnings may be an influential driver leading management to employ accounting procedures that boost their earnings. Therefore, future research might be directed towards examining EM practices in the context of the ongoing outbreak.

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