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Does Mandatory Adoption of XBRL Improve the Quality of Reported Earnings? Evidence from the Saudi Stock Exchange

Abstract

Purpose: The eXtensible Business Reporting Language (XBRL) has been heralded as a tool for improving the quality of characteristics associated with business reporting, which include relevance, credibility, reliability, comparability, consistency, materiality, and understandability, providing significant benefits to all parties involved in the reporting supply chain. Specifically, this study empirically investigates whether XBRL-based financial reports improve the quality of reported earnings, thereby enhancing the credibility of financial reports.

Design/methodology/approach: Using a sample of XBRL-based financial reports for companies listed on the Saudi Stock Exchange between 2019 and 2021, the study examined whether XBRL adoption improves the quality of reported earnings.

Findings: The results show that the mandatory adoption of XBRL in the Saudi Stock Exchange did not reduce the earnings management, nor did it improve the quality of reported earnings in the financial reports between 2019 and 2021. In addition, the managers engaged in real activities-based earnings management measured by abnormal cash flows, as well as accrual-based earnings management in the post-XBRL phase. Earnings management practices increased significantly in 2021. The findings raise

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questions about audit quality, concerns about a lack of effective oversight, and require an examination of the factors that explain this high level of earnings management practices after the mandatory adoption of XBRL.

Research limitations: The XBRL reports available on the Saudi Stock Exchange website were in Microsoft Excel format. Financial information in Microsoft Excel format is no different from that in actual XBRL reports. Therefore, it is expected that the results will not be different whether the actual XBRL reports or the financial reports in Microsoft Excel format are used.

Originality/value: Since the adoption of XBRL in the Arab region is still considered to be in the initial period, there is an urgent need to study the consequences of mandatory adoption of XBRL; the results of this research provide evidence on whether XBRL plays an important role in improving the credibility of financial reporting.

Keywords: XBRL, Earnings quality, Earnings Management, Discretionary accruals, Modified Jones Model.

هل يؤدي التطبيق الإلزامي لـ XBRL إلى تحسين جودة الأرباح المبلغ عنها؟ دراسة تطبيقية على الشركات المدرجة في سوق الأوراق المالية السعودية

ملخص البحث

تم تقديم لغة تقارير الأعمال القابلة للتوسيع (XBRL) كأداة لتحسين جودة الخصائص النوعية الأساسية والثانوية المرتبطة بتقارير الأعمال، كالملاءمة والمصداقية والموثوقية والقابلية للمقارنة والقابلية للفهم، وغير ذلك من الفوائد المتوقع أن يستفيد منها جميع الأطراف المشاركة في سلسلة توريد التقارير المالية The Reporting Supply Chain. ونظرًا لأن تطبيق XBRL في المنطقة العربية لا يزال في مراحله الأولية؛ ويتطلب دراسة العواقب والتأثيرات الاقتصادية لهذا التطبيق، فإن الدراسة تبحث بشكل تجريبي فيما إذا كانت التقارير المالية المستندة إلى XBRL تحسن جودة الأرباح المبلغ عنها، وبالتالي تعزز مصداقية التقارير المالية. ولقد أجريت الدراسة التطبيقية على عينة من الشركات المدرجة في سوق الأوراق المالية السعودية يبلغ عددها (92) شركة والتقارير المالية المستندة إلى XBRL والمنشورة بين عامي2019 و2021. استخدمت الدراسة ثلاثة مقاييس هي القيمة المطلقة للاستحقاقات الاختيارية من نموذج Jones المعدل، والقيمة المطلقة للتدفقات النقدية غير الطبيعية لقياس إدارة الأرباح القائمة على الأنشطة الحقيقة، والانحراف المعياري لصافي الدخل مقسومًا على الانحراف المعياري للتدفقات النقدية التشغيلية لقياس أنشطة تمهيد الدخل. تُظهر النتائج أن التطبيق الإلزامي لـ XBRL في سوق الأوراق المالية السعودية لم يقلل من إدارة الأرباح، ولم يحسن جودة الأرباح المبلغ عنها في التقارير المالية المنشورة في 2019 و2020 و2021. بل على العكس؛ زادت ممارسات إدارة الأرباح بشكل كبير في التقارير المالية المنشورة في عامي 2020 و2021، حيث شارك المديرون في إدارة الأرباح القائمة على الأنشطة الحقيقية، وكذلك إدارة الأرباح على أساس الاستحقاق في مرحلة ما بعد تطبيق XBRL، كما وجدت الدراسة دليلاً تجريبيًا على انخراط المديرين في أنشطة تمهيد الدخل. تثير النتائج العديد من التساؤلات حول مدى فعالية أدوات الرقابة المالية في سوق الأوراق المالية، والعوامل التي تفسر هذا المستوى من ممارسات إدارة الأرباح بعد التطبيق الإلزامي لـ XBRL.

الكلمات المفتاحية: لغة تقارير الأعمال القابلة للتوسيع؛ جودة الأرباح؛ إدارة الأرباح؛ الاستحقاقات الاختيارية؛ نموذج Jones المعدل.

1. Introduction

Financial reports are the main tool used to provide valuable and useful information about the financial position and operational performance of entities. It is an important source for creating investor confidence in the markets, because disclosure of financial information reduces information asymmetry between managers and other stakeholders.

However, the quality of financial information is always the primary concern of its users, including customers, investors, financial analysts, regulators, and others (Yang et al. 2018; Alsharayri & Al-Arabiat, 2021). Because high-quality disclosure is important to ensuring that markets are fair and efficient, and that investors are well informed (Wang, 2015). The quality of financial information lies in the presence of a set of qualitative characteristics that add significant value for financial information.

Moreover, disclosure of financial information needs consistent reporting structures that positively enhance the quality of financial reports (Alsharayri & Al-Arabiat, 2021), and ensure that all useful financial information is communicated effectively. Therefore, companies need modern technologies in preparing financial reports, to ensure rapid delivery to beneficiaries, and to provide a higher level of high-quality financial information compared to the technologies used at present.

Information technology systems are nowadays considered one of the most influencing factors on business activities, as they improve the speed of obtaining data related to decision-making. eXtensible Business Reporting Language (XBRL) appeared in order to reduce difficulties and make financial information easier to communicate.

In addition, XBRL improves the transparency, credibility and reliability of financial information for make decisions through three main factors. First, computer-readable XBRL reduces human errors during financial reporting. Second, XBRL improves the quality of financial reporting through enhancing three main attributes of financial reporting: (1) relevance through search facilitation technology; (2) understandability through providing definitions of accounting concepts; (3) and comparability through a single, universally accepted format (Birt et al., 2017). Third, XBRL reduces costs that investors need due to its higher reporting quality and lower errors (Tohang & Lusiana, 2022; Lestari et al., 2021).

As a result, XBRL is a tool used to improve the quality of characteristics associated with financial reports, which include relevance, credibility, reliability, comparability, consistency, material value, cost, and understandability. In addition, XBRL provides a low-cost method for preparing financial reports. This helps to increase transparency and compliance with the regulatory requirements. By providing clear, accurate and comprehensive financial information on the company's business, and the high quality of financial reports, it will reduce information asymmetry that indirectly affects the capital efficiency (Tzu-Yi et al., 2016).

The objective of this paper can be summarized in the following research question: what is the role of the mandatory adoption of XBRL in the Saudi Stock Exchange in improving the quality of reported earnings in the financial reports? This paper fills an important research gap by providing empirical evidence for regulators, auditors, investors and other financial statement users to better understand the impact of the mandatory adoption of XBRL on the credibility of reported earnings. It also provides additional insights into the consequences of mandatory adoption of XBRL on the reporting strategies chosen by the preparers. Finally, this paper provides further evidence on whether managers consider differences in disclosure forms when making choices.

This paper proceeds as follows; the next section presents the importance of XBRL to the quality of financial information, followed by the literature and research hypotheses, and then methodology. Finally, analyses, discussion, conclusions, limitations, and suggestions for further research are presented respectively.

2. XBRL (eXtensible Business Reporting Language) and Taxonomy

eXtensible Business Reporting Language (XBRL) is an interactive web-based form for financial reporting. XBRL is a tool for transmitting information in electronic form to regulators, investors, analysts and others for automated inclusion in their analytics and models. In this way, XBRL addresses the current distortion in the financial reporting supply chain, which occurs when information passes through the information intermediaries, improving the reporting process.

XBRL is a product of XBRL International, a non-profit consortium. Initiated in 1998 by Charles Hoffman, It is supported worldwide by more than 100 regulators in more than 60 countries, and used by a growing number of companies to facilitate the reporting of structured data (www.xbrl.org).

There are two basic specifications in the technical definitions given by XBRL International; XBRL FR (Financial Reporting) and XBRL GL (Global Ledger). XBRL FR standardizes reporting in the financial reporting system and enables data analysis, transmission, and data comparison. XBRL GL is the taxonomy to be followed in the general journal and ledger preparation within the scope of electronic ledger application (İŞBİL et al., 2021).

This electronic language allows for the automated acquisition of information and its representation in financial reports (Cormier et al., 2019). Moreover, XBRL is a search facilitating technology that identifies text data with tags. Tags are used to uniquely identify each piece of business information and can be processed by a variety of software (Yang et al. 2018). Tags are used to uniquely identify each piece of business information and can be processed by a variety of software (Cormier et al., 2019). In XBRL, each item in the financial data is treated separately, each item is given a specific code that a computer can read, and the items are saved in a glossary, named, the XBRL Taxonomy.

Since 2010, XBRL has been widely adopted around the world, and due to the flexible characteristics of XBRL technology, XBRL is gradually expanding globally (Birt et al. 2017). It is currently mandatory in many countries and voluntary in others. In addition, XBRL is constantly progressing, and the number of XBRL-based projects is growing rapidly (Tawiah & Borgi, 2022).

XBRL provides real-time data by eliminating the need for data re-entry, thus improving the speed of data acquisition (Cormier et al., 2019; Cahan et al., 2022). XBRL can disaggregate and reformat data for each specific user (Cormier et al., 2019). The information presented in XBRL reports is computer-readable and easily accessible for analysis. It allows users to conduct a variety of tasks, from viewing to analyzing data.

These features allow users to easily compare a firm's performance over time, allowing for better decision-making (Baldwin & Trinkle, 2011). It also allows the retrieval of information on a timely manner. These features, in particular, tagged features present in XBRL reporting format, are absent in traditional format of reporting (Birt et al. 2017).

In addition, analysts, investors, institutions and regulators can receive and analyze data quickly and efficiently when the data is in XBRL format, because XBRL speeds financial data reporting and reduces the risk of error by automatically verifying information (Baldwin & Trinkle, 2011; Cormier et al., 2019; İŞBİL et al., 2021). Furthermore, XBRL helps to automatically extract or exchange a part of the financial data (Sassi et al., 2021; Cahan et al., 2022). Therefore, it is expected to facilitate the creation, exchange, and comparison of information, which in turn improves the quality of financial reporting (Yang et al. 2018).

Finally, XBRL arguably automates the data collection process and provides faster access to reported financial statement for more detailed and robust analysis with multiple companies in a shorter period and at a much more affordable cost than traditional datasets.

3. Literature Review

Previous research on the impact and effectiveness of XBRL adoption has documented several important findings, and several studies provide evidence that XBRL plays an important role in improving the quality of financial information (Baldwin & Trinkle, 2011; Salehi & Torabi, 2012; Wang, 2015; Faboyede, Mukoro, Lyoha, & Odafen, 2017; Birt, Muthusamy, & Bir, 2017; Benbouali & Berberi, 2018; Yang, Liu, & Zhu, 2018; Ashoka & Abhishek, 2018; Kim, Kim, & Lim, 2019; Alsharayri & Al-Arabiat, 2021; Cahan, Chang, Siqueira, & Tam, 2022; Burd, 2022). For example, Baldwin and Trinkle (2011) argued that the effects of adopting XBRL include increasing access to financial reports, facilitating regulatory compliance, enhancing the availability of financial reports, as well as helping users and beneficiaries of financial reports to make decisions quickly, accurately and flexibly. Benbouali, and Berberi (2018) also argued that XBRL enhances various characteristics of financial information, thus improving the quality of decisions taken. However, Salehi and Torabi (2012) who indicated that the use of XBRL reduces the reliability of financial information due to the security of online information and reports.

Yang, Liu, and, Zhu (2018) study showed the positive effect of XBRL on improving the comparability of financial information. This is in line with Wang (2015) who found that contextual quality and accessibility of financial reports improved after using the XBRL format.

Ashoka and Abhishek (2018) found that the adoption of the XBRL improves the quality of the financial reports. The XBRL ensures the homogeneity of financial reports, facilitates comparison, and ensures the relevance, reliability, and transparency of financial information. They also found that XBRL allows companies to implement an integrated reporting system to meet regulatory authorities' requirements for environmental disclosure in their annual reports. This is consistent with Birt, Muthusamy, and Bir (2017) who found that the XBRL provides more relevant, understandable and comparable information in decision-making and profit forecasting. They also found that users can easily learn and use the XBRL in the decision-making process.

Cahan, Chang, Siqueira, and Tam (2022) argued that the interactive display of XBRL enhances the usefulness of financial information presented to users, increasing the user's ability to classify, characterize and understand financial reports. Burd (2022) argued that increased access to detailed information via XBRL helps analysts make predictions. This contrasts with Wang (2015) who argued that Investors face several issues related to XBRL-reported financial information, such as accuracy and interpretability, as well as potential risks with respect to this new format of financial reporting.

XBRL adoption has several advantages over traditional reporting formats such as PDF or HTML; reduced information asymmetry (Tzu-Yi, Fengyi, Shih-Hsuan, & Kwo-Liang, 2016; Kim, Kim, & Lim, 2019), enhances the reliability and accuracy of financial information (Alsharayri & Al-Arabiat, 2021; Lestari, Putri, & Devi, 2021), present both financial and non-financial information under a single financial report (Ashoka & Abhishek, 2018), and improve consistency, relevance, reliability, and transparency in financial reporting (Wang, 2015; Ashoka & Abhishek, 2018; Kim, Kim, & Lim, 2019).

Some examined the role of XBRL adoption in the development of stock markets (Faboyede, Mukoro, Lyoha, & Odafen, 2017; Suriakumari, 2018; Sassi, Ben Othman, & Hussainey, 2021). For example, Faboyede, Mukoro, Lyoha, and Odafen (2017) found that the environmental factors, as well as operational, regulatory and technical challenges influence the application of XBRL on the Nigerian Stock Exchange. This finding is consistent with Suriakumari (2018) who found that internal factors such as management characteristics, organizational characteristic along with the external environmental factor influence the timeline for XBRL adoption. While Sassi, Ben Othman, and Hussainey (2021) found opposite results, they found that mandatory adoption of XBRL had a negative impact on the stock markets development.

Early empirical evidence has documented mixed results regarding the impact of XBRL adoption on the stock market. Some studies suggest that mandatory XBRL broadens the investor base or ownership (Kim, Kim, & Lim, 2019; Lestari, Putri, & Devi, 2021), boosts investor confidence and revitalizes the stock market, and ensures access to efficient and competitive capital market (Benbouali & Berberi, 2018), improves forecast quality (Burd, 2022), and reduces cost of equity (Tohang & Lusiana, 2022).

Although the literature on XBRL is vast, to the best of our knowledge not much attention has been paid to investigating the effect of XBRL adoption on earnings management. Chen, Guo, Liu, and Tong (2021) found that real earnings management (REM) increases after the implementation of XBRL in China. This contrasts with studies that have so far agreed that XBRL can lead to a decrease in accrual-based earnings management (Peng, Shon, & Tan, 2011; Kim, Kim, & Lim, 2019; Cormier, Dufour, Luu, Teller, & Teller, 2019; Mayapada, Afdhal, & Syafitri, 2020). For example, Peng, Shon, and Tan (2011) found that adoption of XBRL encourage companies to engage less in earnings manipulations; Kim, Kim, and Lim (2019) found that absolute discretionary accruals decrease significantly from the pre-XBRL period to the post-XBRL period, indicating that adoption of XBRL restricts earnings management and significantly reduces the levels of discretionary accruals; Mayapada, Afdhal, and Syafitri

(2020) found that adoption of XBRL reduces the level of earnings management, and thus reduces opportunistic behavior of management in financial reporting. Furthermore, Hsieh, Wang, & Abdolmohammadi (2019) found that the implementation of XBRL is positively related to earnings release efficiency of companies with good news. Moreover, the DMS implementation strategy is positively associated with real activities-based earnings management, but negatively associated with accruals-based earnings management.

As such, this paper fills an important research gap by providing empirical evidence on whether the mandatory adoption of XBRL improves reported earnings quality as an important dimension of disclosure quality.

4. Research Hypothesis

Based on the above research, it can be concluded that XBRL plays an important role in improving the quality of financial information in terms of relevance, transparency, reliability…etc., ensuring the homogeneity of financial reports and facilitating comparison. Furthermore, adopting XBRL reduces information asymmetry; increases the accuracy of analyst forecasts, and increases the ability of detect earnings management. All of this suggests that adopting XBRL can be positively associated with good governance, and can lead to companies engaging less in earnings manipulations and improving the quality of financial statements. Based on the above discussion, the study examines the following hypothesis:

H: *Mandatory adoption of the XBRL positively improves the quality of reported earnings.*

5. Methodology

5.1 Sample Selection

In 2015, the Saudi Stock Exchange (Tadawul) upgraded its disclosure system to comply with IFRS standards, including the IFRS taxonomy, which allows publishing of financial statements in the XBRL format (www.xbrl.org). The Saudi Stock Exchange, in cooperation with the Saudi Business Center (SBC) has begun to take steps to implement the electronic disclosure system project using XBRL. This project constitutes a quantum leap in the method of disclosing financial and non-financial data, and it is expected to raise the level of disclosure and transparency in the market and increases the speed of obtaining information (https://qawaem.bc.gov.sa).

Using a sample of mandated XBRL filings of 92 companies listed on the Saudi Stock Exchange between 2019 and 2021, the researcher examined whether adopting of XBRL reduces earnings management, smoothing earnings, and thus improves earnings quality.

As shown in Table 1 below; the study included companies in 11 sectors, which are Materials, Capital Goods, Transportation, Consumer Durables Apparel, Consumer Services, Retailing, Food & Staples Retailing, Food & Beverages, Health Care Equipment & Services, Diversified Financials, and Real Estate Management & Development.

Tab 1: Distribution of the Sample by Industry

Industry classification	***N***	***%***
Materials	25	27.2%
Capital Goods	10	10.9%
Transportation	6	6.5%
Consumer Durables Apparel	6	6.5%
Consumer Services	6	6.5%
Retailing	8	8.8%
Food & Staples Retailing	6	6.5%
Food & Beverages	7	7.6%
Health Care Equipment & Services	6	6.5%
Diversified Financials	6	6.5%
Real Estate Management & Development	6	6.5%
Total	92	100%

Although it is mandatory for all companies listed on the Saudi Stock Exchange to submit reports in PDF, excel and XBRL formats, it is worth noting that there are companies whose reports are not available. Hence, the researcher excluded the companies that did not submit the XBRL reports during the period. In addition, the banking, insurance and utilities sectors are excluded because these industries are subject to specific regulations.

5.2 Data Collection and Methodology

The analyses focused on three main financial statements, which are the balance sheets, income statements and cash flow statements. The study covered a three-year period, from 2019 to 2021; but it is also important to note that companies should have their 2018 XBRL reports along with their 2019-2021 reports. As for the data source, the official website of the Saudi Stock Exchange at www.saudiexchange.sa was used to collect the data. Only companies that meet the selection criteria are selected, and then variables data were collected manually from the annual reports.

The study uses three proxies to measure the Earnings Quality (*EQ*); the Discretionary Accruals (*DA*), also known as Abnormal Accruals, the Abnormal Cash Flows (CFO) as a proxy for real earnings management, and Earnings Smoothing (*SMO*).

One common approach researchers have used to detect earnings management is to calculate discretionary accruals (*DA*) using the modified Jones model, a widely used model for estimating discretionary accruals (Mayapada et al. 2020; Hickman et al., 2021). *DA* is calculated based on Modified Jones Model in three steps as follows:

Step 1: Total accruals (*TA*) are calculated by subtracting Cash Flows from Operating Activities (*CFO*) form Profit before Zakat and Income Tax (*NI*) as defined below:

$$TA_{i,t} = NI_{i,t} - CFO_{i,t} \qquad (1)$$

Step 2: The coefficient parameters under each industry and each year are calculated separately by regression of Equation 2 as defined below:

$$\frac{TA_{i,t}}{A_{i,t-1}} = \alpha + \beta_1\left(\frac{1}{A_{i,t-1}}\right) + \beta_2\left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \beta_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t} \qquad (2)$$

Where: $A_{i,\,t\text{-}1}$ is lagged total assets, $\Delta REV_{i,t}$ is the annual change in revenues, $\Delta REC_{i,t}$ is the annual change in receivables, and $PPE_{i,t}$ is the book value of property plant and equipment. The coefficients estimated from Equation 2 are used in Equation 3 to calculate DA, again estimated for each industry and each year.

Step 3: DA is calculated by subtracting the non-discretionary accruals (NDA) from total accruals (TA) as defined in Equation 3. Next, the absolute value of the discretionary accruals, which is a measure of earnings management, is obtained in this research, because the researchers only focus on earnings management in general, and they do not consider whether earnings management is done to increase or decrease earnings (Hickman et al., 2021).

$$\left| DA_{i,t} = \frac{TA_{i,t}}{A_{i,t-1}} - \left[\hat{\beta}_1\left(\frac{1}{A_{i,t-1}}\right) + \hat{\beta}_2\left(\frac{\Delta REV_{i,t} - \Delta REC_{i,t}}{A_{i,t-1}}\right) + \hat{\beta}_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right)\right]\right| \qquad (3)$$

Second, to capture the manipulation of real activities, the absolute values of Abnormal Cash Flows from Operations (Abs_CFO) are used. The expected Cash Flows from Operations ($\widehat{CFO}$) is estimated based on sales and the change in sales as defined in Equation 4. Then, abnormal cash flows from operations (*Abs_CFO*) is calculated by subtracting $\widehat{CFO}$ from the reported cash flows from operations (scaled by lagged assets), and take the absolute value form final measure (*Abs_CFO*), following Kim et al. (2017).

$$\left|\frac{CFO_{i,t}}{A_{i,t-1}} = \alpha + \beta_1\left(\frac{1}{A_{i,t-1}}\right) + \beta_2\left(\frac{Sales_{i,t}}{A_{i,t-1}}\right) + \beta_3\left(\frac{\Delta Sales_{i,t}}{A_{i,t-1}}\right) + \varepsilon_{i,t}\right| \qquad (4)$$

Third, to measure the earnings quality (*EQ*), the study relies on income smoothing as a proxy. Smoothing is a technique often used by managers to artificially reduce the natural volatility of earnings. In some authors' opinions, income smoothing is a desirable attribute, and this is derived from the view that managers use their private information to smooth out transitory volatility of earnings to present numbers that are more representative and useful to investors (Takacs et al., 2020). However, the researcher rather accepts another view that considers smoothing a tool for earnings management, with the aim of presenting desirable financial statements to mislead shareholders about the company's performance and financial position (Vishnani et al., 2019; Agustia et al., 2020). Therefore, high *SMO* values indicate high earnings quality in our concept. In this study, income smoothing is measured by dividing the standard deviation of net income by the standard deviation of operating cash flows as defined by Equation 5, where high values of the *SMO* variable indicate that companies practice little income smoothing and thus indicate high earnings quality.

$$SMO_{i,t} = \frac{\sigma(NI_{i,t})}{\sigma(CFO_{i,t})} \quad (5)$$

All equations and regression are estimated for each industry and each year, and the results are reported in the next section.

6. Analyses and Discussion

6.1 Descriptive Analysis

Table 2 below presents summary statistics on the earnings management practices of the selected companies between 2019 and 2021 categorized by industry, as measured by the absolute value of Discretionary Accruals (*Abs_DA*) and the absolute value of Abnormal Cash Flows from Operations (*Abs_CFO*), respectively. In Panel A, the statistics of companies that practiced earnings management measured by *Abs_DA* are shown. The companies that practiced earnings management in 2019 are significantly lower than those in 2020 and 2021, by 28.3%, 38% and 56.6%, respectively.

This is consistent with the results presented in Panel B of Table 2, which shows the statistics of companies that practiced earnings management measured in *Abs_CFO*, where earnings management practices increased from 34.8% in 2019 to 60.9% in 2021. As is evident, there is a steady increase in earnings management practices between 2019 and 2021 in the selected sample. Additionally, the *Abs_CFO* was better at revealing earnings management practices than the *Abs_DA*, as the *Abs_CFO* revealed more companies over the years (34.8% vs. 28.3% in 2019; 41.3% vs. 38% in 2020 and 60.9% vs. 57.6% in 2021).

Tab. 2: Earnings Management by Year and Industry

		2019		2020		2021	
Industry classification	***N***	***N***	***%***	***N***	***%***	***N***	***%***
Panel A: measured by Abs_DA							
Materials	25	3	12%	1	4%	18	72%
Capital Goods	10	7	70%	2	20%	4	40%
Transportation	6	6	100%	0	0%	2	33.3%
Consumer Durables Apparel	6	0	0%	6	100%	2	33.3%
Consumer Services	6	0	0%	6	100%	2	33.3%
Retailing	8	2	25%	3	37.5%	6	75%
Food & Staples Retailing	6	2	33.3%	4	66.7%	2	33.3%
Food & Beverages	7	4	57%	1	14.3%	6	85.7%
Health Care Equipment & Services	6	0	0%	6	100%	3	50%
Diversified Financials	6	0	0%	2	33.3%	5	83.3%
Real Estate Management & Development	6	2	33.3%	4	66.7%	3	50%
Total	92	26	28.3%	35	38%	53	57.6%
Panel B: measured by Abs_CFO							
Materials	25	7	28%	11	44%	20	80%
Capital Goods	10	4	40%	4	40%	6	60%
Transportation	6	5	83.3%	3	50%	2	33.3%
Consumer Durables Apparel	6	0	0%	3	50%	5	83.3%
Consumer Services	6	2	33.3%	0	0%	1	16.7%
Retailing	8	1	12.5%	3	37.5%	5	62.5%
Food & Staples Retailing	6	3	50%	3	50%	2	33.3%
Food & Beverages	7	3	42.9%	4	57.1%	3	42.9%
Health Care Equipment & Services	6	3	50%	4	66.7%	2	33.3%
Diversified Financials	6	0	0%	3	50%	4	66.7%
Real Estate Management & Development	6	4	66.7%	0	0%	6	100%
Total	92	32	34.8%	38	41.3%	56	60.9%

Furthermore, *Abs_DA* and *Abs_CFO* measures indicate that companies practiced earnings management between 2019 and 2021, which is consistent with the expectation that managers sometimes use multiple methods of earnings management. However, the *Abs_CFO* revealed better earnings management practices than the *Abs_DA*.

Looking at the results, Consumer Durables Apparel, Consumer Services, Health Care Equipment & Services and Diversified Financials appear to have the lowest percentage of companies that practicing earnings management. However, these differences between industries may be due to differences in the ability to manipulate earnings or differences in the perceived benefits of earnings manipulation. In Table 3, the statistics of the companies that practiced income smoothing (*SMO*) are shown (figures are for the entire period). Interestingly, the results confirm what is presented in Table 2 above. The percentage of companies that smoothed income over the entire period was 58.7%.

Tab. 3: Earnings Smoothing by Industry

		SMO (2019–2021)	
Industry classification	***N***	***N***	***%***
Materials	25	15	60%
Capital Goods	10	7	70%
Transportation	6	4	66.7%
Consumer Durables Apparel	6	3	50%
Consumer Services	6	1	16.7%
Retailing	8	7	87.5%
Food & Staples Retailing	6	3	50%
Food & Beverages	7	3	42.9%
Health Care Equipment & Services	6	6	100%
Diversified Financials	6	3	50%
Real Estate Management & Development	6	2	33.3%
Total	92	54	58.7%

Table 4 below presents the correlation for the relationship between *Abs_DA*, *Abs_CFO* and *SMO* as proxies for earnings quality and several variables representing financial characteristics of the selected sample. For brevity, there are significant correlations with most of the variables at the level of 0.01 and 0.05. Moreover, the three proxies for earnings quality are significantly related to each other. *Abs_Da* (accruals-based earnings management activities) is negatively associated with *Abs_CFO* (real activities-based earnings management), positively associated with *SMO* (income smoothing), while *Abs_CFO* associates negatively with *SMO*. In general, the correlations are singed as expected.

Tab. 4: Correlation Matrix

Variables	*Abs_DA*	*Abs_CFO*	*SMO*	*NI*	*CFO*	*TA*	Δ*REC*	Δ*REV*
Abs_DA	1							
Abs_CFO	-.333**	1						
SMO	.152*	-.119*	1					
NI	-0.048	.221**	-0.030	1				
CFO	-.159**	.263**	-0.072	.777**	1			
TA	.195**	-.155**	0.080	-0.043	-.662**	1		
Δ*REC*	-0.035	-0.005	0.027	.650**	.567**	-.126*	1	
Δ*REV*	0.099	0.057	-0.026	.639**	.652**	-.274**	.766**	1

** and * denote significance at 1% and 5% level (2-tailed), respectively.

In summary, the selected sample appears to have practiced the earnings management and income smoothing during the entire period. In addition, the study provides evidence that managers engage in real activities-based earnings management measured by abnormal cash flows, as well as accrual-based earnings management in the post-XBRL adoption phase, which again indicates that managers are likely to manipulate earnings not only through accruals but also through real activities.

6.2 Test of Hypothesis

The research hypothesis posits that mandatory adoption of XBRL positively improves the quality of reported earnings. Under the research hypothesis, we expect the quality of reported earnings will improve between 2019 and 2020 for the selected sample after mandatory adoption of XBRL by the Saudi Stock Exchange.

As mentioned earlier, increases in discretionary accruals and abnormal cash flows indicate opportunistic earnings management, and thus indicate lower earnings quality. Overall, the existence of accruals-based earnings management activities, real activities-based earnings management and income smoothing practices are negatively related to earnings quality.

Table 5 below presents the results of the ANOVA test for the earnings management proxies; discretionary accruals (*Abs_DA*) and the manipulation of real activities (*Abs_CFO*) of the selected sample after the mandatory adoption of XBRL by the Saudi Stock Exchange.

Tab. 5: ANOVA Test Results for Significance of Differences

	2019		***2020***		***2021***		***ANOVA Test***	
Variables	***Mean***	***SD***	***Mean***	***SD***	***Mean***	***SD***	***F-value***	***Sig.***
Abs_DA	0.283	0.453	0.380	0.488	0.576	0.497	8.930	0.000**
Abs_CFO	0.348	0.479	0.413	0.495	0.609	0.491	7.112	0.001**

** denote significance at 5% level.

According to the above results, there is a significant difference between 2019, 2020 and 2021 in *Abs_DA*, and the mean of *Abs_DA* in 2021 is higher than in 2020 and 2019 (0.576 vs. 0.380 and 0.283, respectively). The accruals-based earnings management activities increased from 28.3% in 2019 to 56.6% in 2021 (see Table 4, Panel A). In addition, there is a significant difference between 2019, 2020 and 2021 in Abs_CFO, and the mean of Abs_CFO in 2021 is higher than in 2020 and 2019 (0.609 vs. 0.413 and 0.348, respectively). The real activities-based earnings management measured by abnormal cash flows increased from 34.8% in 2019 to 60.9% in 2021 (see Table 4, Panel B).

Furthermore, an independent samples t-test is used for comparison every two years in *Abs_DA* and *Abs_CFO* as shown in the Table 6 below. The results indicate that there is a significant difference in *Abs_DA* and *Abs_CFO* between 2019 and 2021, as well as 2020 and 2021. The differences in the mean values are significant. While the results indicate that there is no significant difference in *Abs_DA* and *Abs_CFO* between 2019 and 2020, the differences in the mean values were insignificant.

Tab. 6: T-test Results to Confirm Significance of the Differences

Variables	*Mean*	*SD*	*Mean*	*SD*	*T-value*	*Sig.*
Panel A:	***2019***		***2020***			
Abs_DA	0.283	0.453	0.380	0.488	-1.409	0.160
Abs_CFO	0.348	0.479	0.413	0.495	-0.908	0.365
Panel B:	***2019***		***2021***			
Abs_DA	0.283	0.453	0.576	0.497	-4.188	0.000**
Abs_CFO	0.348	0.479	0.609	0.491	-3.649	0.000**
Panel C:	***2020***		***2021***			
Abs_DA	0.380	0.488	0.576	0.497	-2.694	0.008**
Abs_CFO	0.413	0.495	0.609	0.491	-2.692	0.008**

** denote significance at 5% level.

The results are consistent with Chen, Guo, Liu, and Tong (2021) who found that earnings management increased after the implementation of XBRL in China, and contrasts with Peng, Shon, and Tan (2011) who found that adoption of XBRL encourages companies to engage less in earnings manipulations, as the level of total accruals decreased after the implementation of XBRL.

This study documents evidence that managers engaged in earnings management activities. Therefore, the mandatory adoption of XBRL in the Saudi Stock Exchange as a financial reporting medium did not reduce the earnings management, nor did it improve the credibility of financial reports. This finding is consistent with Salehi and

Torabi (2012) who argue that the use of XBRL reduces the reliability of financial information. However, this contrasts with Cormier, Dufour, Luu, Teller, and Teller (2019) who found that XBRL was positively associated with good governance, and Shan and Troshani (2014) who argued that XBRL could enhance the credibility and reliability of financial reporting.

If this is the case, the results in general do not support the hypothesis that the mandatory adoption of the XBRL positively improves the quality of reported earnings. One possible explanation for this result is given by Faboyede et al. (2017) who argue that: "Voluntary filing should first be encouraged to give companies time to prepare, train employees, establish appropriate infrastructure and policies within the system and develop an XBRL-based financial reporting, as well as XBRL training for all preparers of financial report should be undertaken to ensure smooth transition to XBRL-based financial reporting". This result can also attributed to the learning curve associated with the adoption of a new technology, which is one of the main reasons found in the early adoption phase of XBRL.

Compared to traditional paper reporting, XBRL-based financial reports provided similar terminology and format for all companies, however, the XBRL reports provided were merely an exact copy of the printed financial reports. This limits their usefulness as an effective means of providing users with interactive data. This may be one of the possible reasons why mandatory adoption of XBRL in the Saudi Stock Exchange does not have a positive effect in improving the quality of reported earnings.

In addition, the results indicate that XBRL improves the ability to detect earnings management. This is in line with previous literature (Peng, Shon, & Tan, 2011; Faboyede et al., 2017) showing that XBRL reduces information processing, increases monitoring, and thus makes earnings management easier to detect.

Finally, the results are not entirely consistent with the benefits of the XBRL implementation. One possible explanation for this finding is that the effects of XBRL adoption in developed countries may be differ from those in developing countries due to a lower level of institutional quality. This is in line with Tawiah and Borgi (2022) who found that the effect of XBRL adoption on the quality of financial reporting differs between developed and developing countries.

7. Concluding Remarks

To date, adopters, regulators and researchers are still exploring more about the impact and benefits of using the XBRL. Specifically, this study contributes to the existing literature by providing empirical evidence of the non-obvious effect of the XBRL adoption on the quality of reported earnings, and thus the credibility of financial reporting. The study concluded that the mandatory adoption of XBRL in the Saudi Stock Exchange did not reduce the earnings management, nor did it improve the quality of reported earnings in the financial reports between 2019 and 2021. Therefore, the credibility of the financial reporting did not improve. In addition, the study provided evidence that managers engage in real activities-based earnings management measured by abnormal cash flows, as well as accrual-based earnings management in the post-XBRL adoption phase, and they do not consider differences in disclosure forms when making choices.

A possible explanation for these results may be that managers who are perform poorly in the current period and expect to perform well in the next period have an incentive to increase income on a discretionary accruals basis, and vice versa. In this case, current earnings are "saved" for possible future use. This is in line with COVED-19 and its impacts on companies' performance during the period from 2019 to 2021, and the managers in these companies are predicted to increase income on a discretionary accruals basis to reduce the risk of dismissal due to poor performance in the current period.

The findings contribute to the literature by demonstrating the impact of XBRL implementation strategies on earnings management practices and reporting quality. Thus, the findings help regulators looking for evidence to evaluate the effectiveness of mandatory XBRL adoption to take further steps towards enhancing the credibility of XBRL-based financial reporting.

This study has some limitations. First, the XBRL reports available on the Saudi Stock Exchange website were in Microsoft Excel format. The results are not expected to be different whether actual XBRL reports or the financial reports in Microsoft Excel format are used, because financial information does not differ in both reports. Second, the Jones model may result in biased estimates of the discretionary accruals for companies with extreme values of net income and operating cash flows. With these caveats in mind, care must be taken when interpreting the results.

While the results are suggestive, they are not conclusive. Therefore, potentially fruitful areas for future research include examination of explanatory factors for earnings quality after XBRL adoption in developing countries, the impact of XBRL learning curve on earnings quality at different stages of implementation, and the effect of convergence between good corporate governance practices and IFRS, mandatory adoption of XBRL in the matter of earnings management.

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