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Article

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The impact of corporate social responsibility on operating cash flow opacity: the moderating role of tax avoidance

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ABSTRACT

This study examines the association between corporate social responsibility (CSR) and operating cash flow opacity (OCFOP). The current study also aims to examine the moderating effect of corporate tax avoidance on the relationship between CSR and OCFOP. The sample used in this research incorporates non-financial companies listed on the EGX from 2012 to 2021. The final sample comprised of 52 companies with 520 observations. Statistical analysis was performed using pooled OLS and random effects regression analysis. The current research indicates that there is a significant positive relationship between companies engaging in CSR practices and having a higher level of OCFOP. Further, corporate tax avoidance is found to have a positive moderating role as it strengthens the relationship between CSR and OCFOP. The current research findings have several implications for Egyptian and emerging market regulators, investors and shareholders in the Egyptian market, including the fact that CSR practices are not always an indicator of ethical behavior, as they may be used to conceal unethically underneath. To the best of our knowledge, this study represents an initial endeavor to elucidate the moderating impact of corporate tax avoidance on the correlation between CSR and OCFOP in an emerging market context. This contribution expands upon the existing literature on CSR and opacity by presenting novel empirical findings from an emerging market, thereby illuminating the moderating function of tax avoidance. Early investigations primarily concentrated on the direct link between CSR and OCFOP.

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1. Introduction

Corporate Social Responsibility (CSR) constitutes a globally pertinent subject of scholarly investigation, particularly within enterprises that exhibit a proclivity for comprehensive reporting of their CSR endeavors (Alatawi et al., 2023). The emphasis lies in scrutinizing the efficacy with which these entities fulfil their dedication to furnishing candid revelations pertaining to both pecuniary and non-monetary facets (Joubert, 2019a). Previous research in less developed countries (LDCs) connected CSR practices to legitimizing corporate actions (El-Bassiouny & Letmathe, 2018), earning quality (Bozzolan et al., 2015; Mohamed et al., 2019), earning management (Abdelfattah & Elfeky, 2021; Liu & Lee, 2019; Sial et al., 2018), firm value (Aboud & Diab, 2018), firm performance (Elmghaamez et al., 2023; Sial et al., 2018), employees creativity (Abdelmotalieb et al., 2018), social and political problems that led to different practices (Diab & Metwally, 2020), cost reduction as it was found that CSR disclosure is used as a rhetoric to cover cost reduction (Metwally et al., 2022), firm opacity (Agnes Cheng et al., 2020; Kim & Yoo, 2022; You & Chen, 2022) and tax incentive and avoidance (Du & Li, 2023; Kacem & Brahim Omri, 2021; Van & Ly, 2021).

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The diverse themes in studying CSR stem from the aim to link its practices to ethics and optimal approaches. CSR practices serve as markers for companies that broadly adopt ethical and eco-conscious strategies while fostering sustainable community development (Alnaim & Metwally, 2024; Buhaya & Metwally, 2024; Prior et al., 2008; Rakia et al., 2023). However, opportunistic behavior managers may attempt to hide their poor transparency in financial reporting by disclosing their CSR practices (Abdelfattah & Elfeky, 2021; Rahman & Zheng, 2022).

This article aims to extend CSR, opacity and tax avoidance literature (Abdelfattah & Aboud, 2020; Abid & Dammak, 2021; Agnes Cheng et al., 2020; Chouaibi et al., 2021; Du & Li, 2023; Gaviious et al., 2022; Hoi et al., 2013; Jiang et al., 2022; Kacem & Brahim Omri, 2021; Kim & Yoo, 2022; Liu & Lee, 2019; Rakia et al., 2023; You & Chen, 2022) through shedding light on a blind spot in the CSR and opacity literature. Thus, corporate tax avoidance has a moderating effect on the relationship between CSR and Operating Cash Flow Opacity (OCFOP). Early studies concentrated on the firm opacity theory and the relationship between CSR and opacity, the relationship between CSR and tax avoidance (Abdelfattah & Aboud, 2020; Abid & Dammak, 2021; Chouaibi et al., 2021; Du & Li, 2023; Gaviious et al., 2022; Hoi et al., 2013; Jiang et al., 2022; Kacem & Brahim Omri, 2021; Liu & Lee, 2019; Rakia et al., 2023), and the relationship between tax avoidance and opacity (Arman & Mira, 2021; Lastiati, 2020; Lee & Bose, 2021; Sá & Alves, 2022). Despite an extensive search, no prior studies have specifically addressed the moderating influence of tax avoidance on the relationship between CSR and OCFOP. This notable absence underscores a significant research gap in the literature, particularly concerning the nuanced role of tax avoidance in shaping OCFOP levels within the context of CSR practices.

The Egyptian market is an intriguing area for exploration because of its distinctive features. These distinctive attributes encompass a series of regulatory and structural transformations that can impact CSR on OCFOP and the moderating effect. Since the 1990s, Egypt has undergone a significant shift in its economic framework, transitioning from a centrally planned model under government control to embracing economic reform initiatives, privatization and open-market principles (Ali et al., 2024; Mohamed et al., 2019). This period also witnessed developments in accounting systems aimed at augmenting the quality of financial reporting within the stock exchange in the late 1990s (Metwally, 2022; Metwally et al., 2021). However, it is important to note that, in contrast to more developed markets such as the United States and the UK, as well as the expectations associated with recent development efforts, the Egyptian market still grapples with government interventions and constraints that impede the full adoption of international standards (Abdelazim et al., 2023; Diab et al., 2023; Diab & Metwally, 2020).

Egypt is characterized by a low regulatory enforcement regime, and its accounting systems are heavily influenced by political factors (Abdelazim et al., 2023; Ball et al., 2000; Metwally, 2022). Consequently, this environment often leads to deficiencies in disclosure and effective governance mechanisms, a situation akin to many other emerging markets (Bremer & Elias, 2007; Desoky & Mousa, 2012; Metwally, 2022; Ntim & Soobaroyen, 2013; Rahman & Zheng, 2022). Having said this, it is imperative to investigate CSR and OCFOP within the unique institutional context of Egypt, which differs from the well-established and stable markets. This study aims to determine whether recent economic, governance, regulatory and accounting advancements have been sufficient to improve the OCFOP in Egypt. That is, the current study aims to answer two allied questions to realize the moderating impact of tax avoidance in the Egyptian context: (1) What is the influence of CSR on operating cash flow opacity? (2) Does TA moderate the association between CSR and OCFOP? Our results reveal a positive significant relationship between companies engaging in CSR practices and having a higher level of OCFOP. Further, corporate tax avoidance is found to have a positive moderating role as it strengthens the effect of CSR on OCFOP. Consequently, this study offers evidence that tax avoidance is one of the factors that affect OCFOP.

This study contributes to the literature in various ways. First, most of the earlier research was conducted in developed countries, which are different from the business environment in developing countries such as Egypt. In addition, Egypt is the leading emerging market in Africa, one of the most important financial markets in the Middle East and North Africa (MENA) region (Metwally, 2022; Metwally et al., 2021), sharing unique settings with some countries in the Middle East and North Africa (MENA region, especially after the 2011 and 2013 liberal revolution and Arab spring revolutions (Abdelazim et al., 2023)). Second, we examine the moderating effect of corporate tax avoidance on the relationship between CSR practices and OCFOP in this emerging market. Third, the current research aims to provide several

recommendations and implications from the results to potential investors, shareholders and regulators in emerging markets that share similar economic, political and social aspects as in Egypt. Finally, this study distinguishes itself from earlier research by employing opacity and agency theories as robust theoretical frameworks for the formulation of testable hypotheses and the elucidation of the study's outcomes. These findings contribute to the refutation of assertions made in prior studies that primarily focused on stewardship and stakeholder theories.

The remainder of this article is organized as follows. [Section 2](#) presents the context of the Egyptian Exchange (EGX). [Section 3](#) explains the theoretical framework deployed in the current study. [Section 4](#) provides a detailed literature review and hypothesis development. [Section 5](#) illustrates the current research methodology and methods used to clarify the findings. [Section 6](#) presents the empirical findings and a discussion. [Section 7](#) presents additional analysis through adding additional controls to the analysis. [Section 8](#) illustrates additional measures for robustness analysis and additional tests for endogeneity problem. Finally, [section 9](#) provides concluding remarks, limitations and opportunities for future research.

2. EGX context

The third-most populated nation in Africa is Egypt, which has the highest population density in the Arab world, with a population of 109 million, according to the World Bank (2021). Its economy is diversified, and it is a lower-middle-income nation known to be one of the leading MENA emerging markets. The Egyptian Stock Exchange (EGX) was the primary stock exchange founded in the MENA region and is one of the first-born stock exchanges worldwide (Metwally, 2022; Metwally et al., 2021). Egypt has transitioned into a market-oriented economy over the past two decades, and it has realized that it needs legislative reforms to go along with its economic transformation.

To increase market confidence, Egyptian authorities starting early 90s have collaborated with relevant international organizations by implementing best practices and global standards that support sustainable markets by moving toward a free market and implementing privatization courses to stimulate economic development (Abdelazim et al., 2023; Diab et al., 2023). Moreover, international organizations have successfully advanced several activities in Egypt, and government authorities have published international accounting standards to encourage foreign investment, enhance trustworthiness and ensure the transparent disclosure of financial reports (Abdelfattah & Aboud, 2020; El-Bassiouny & Letmathe, 2018).

The Egyptian economy gradually improved because of a new transformational restructuring agenda launched in 2014 and assistance from some Gulf nations, with the annual growth rate of gross domestic product (GDP) reaching 4.3% in 2015/2016 (UNCTAD, 2017). Also, in 2016 the International Monetary Fund authorized a \$12 billion credit package for three years in November of the same year intending to boost investor confidence and the economy. Egypt received \$8.1 billion more in foreign direct investment in 2017 than in 2016 (World Bank, 2017). In addition, the Egyptian government restructured its taxation system by issuing Law 91 for 2005, which aims to change the taxation structure by accompanying a self-assessment routine for corporate taxes that supposes an increase in tax revenues. In addition to the encouragement of the economic reform program supported by the International Monetary Fund through the introduction of VAT in 2016, it helped Egyptian authorities increase collection for a higher level of taxable revenues, but because there is still a low degree of tax conformity contributing toward aggressive tax practices that result in loss of tax collections than predicted (Abdel-Mowla, 2012).

Unlike the social, political and economic background of emerging financial markets, rather than developed financial markets, this creates special considerations of CSR practices that require further research. In Egypt, stakeholder information strategy is mostly used to share CSR efforts. As part of this strategy, businesses use one-way communication mechanisms to forbid stakeholder participation or input regarding their CSR operations. However, Egypt was the first Arab nation to address sustainability issues and the ESG index. The appearance of the ESG index presents data and non-financial disclosures motivating the CSR practices of the top 100 companies. The index aims to disclose companies' environmental, social and governance practices, and it releases only the top 30 companies annually.

Moreover, CSR practices varied widely before and after the 2011 and 2013 movements, and the pre-2011 and 2013 movement CSR practices were led by private companies and aimed at being

committed to enhance employees' local communities and society (Diab & Metwally, 2020). After the 2011 and 2013 movements according to Darrag and Crowther (2017) CSR practices were found to shift toward more socially accountable practices and dues toward society in response to the socio-economic and political changes that occurred in Egypt during this period. Accordingly, our research uses observations and data extracted from 52 non-financial Egyptian companies listed in the ESG index covering 2012 to 2021.

3. Theoretical framework

The impact of CSR on OCFOP was connected mainly to agency theory on most of the studies that reported positive relation between CSR and OCFOP. However, many other theories and perspectives were deployed to explain this relationship. These theories include institutional theory and organizational factors (Brahem et al., 2022; Sial et al., 2018), firm opacity theory (Agnes Cheng et al., 2020; Ball et al., 2000; Hamrouni et al., 2021; Prior et al., 2008; You & Chen, 2022), signaling theory (You & Chen, 2022), stakeholder theory and stewardship theory (Mohmed et al., 2019; Nair et al., 2019). These different theories and perspectives in the literature were deployed to explain different aspects of the relationship between CSR and OCFOP. As some of them were used to explain and support the positive relationship while others were used to explain the negative relationship.

Agency theory explains that the separation between ownership and management was detected with the emergence of big corporations, and therefore, leads to the so-called agency problems (Fama & Jensen, 1983). Agency problems are considered as a cost because of the information asymmetry. Kiliç and Kuzey (2018) explained that the management (agent) is having all the access to the information available, so what would guarantee that the management will utilize the whole information set in support of the owners' (stockholders) benefits instead of his/her remunerations. While opacity causes poor transparency in financial reporting, therefore increasing the costs of the agency and raising the opportunistic behaviour of managers. As a result of opportunistic behaviour by managers, they may use their engagement in CSR practicing presenting a good image of the company's reporting practice thus hiding their true company's performance at this moment CSR would act to provide a diversion tactic rather than aiming to present an initiative for further voluntary disclosure and subsequently reducing the agency costs (Abdelfattah & Elfeky, 2021; Joubert, 2019b; Mohmed et al., 2019; Rahman & Zheng, 2022).

On the contrary, studies that reported negative relationship between CSR and OCFOP deployed mainly two theories stakeholder theory and stewardship theory. Stakeholder theory views the most essential task for a firm as to carry out the stakeholder expectations, and therefore, meet their interest toward the most efficient use of the firm's resources (Grougiou et al., 2019). Based on the theory's concepts it would be expected that companies highly engaged with CSR activities would be less corporate tax avoidance and imply less aggressive accounting which limits the opacity of financial reporting and would enhance financial transparency and reporting quality by employing having fewer earnings opacity (Nair et al., 2019). Besides stewardship theory promotes that corporate managers perform as the optimal agents for their shareholders and therefore would likely maximize their interest in better-making shareholders' economic decisions (Mohmed et al., 2019).

Theoretically, tax avoidance moderating role can be explained through stakeholder theory, legitimacy theory and agency theory. Stakeholders and legitimacy theories represent an opposing view to how agency theory explain the tax avoidance impact on the relationship between CSR and OCFOP. Stakeholder and legitimacy theories explain how companies that promotes CSR practices are expected to be more transparent and have less OCFOP. Hence, firms practicing CSR are willing to maintain social prosperity, and therefore, tax avoidance would show management's act of negligent behaviour toward its firm reputation and stakeholders' interest (Chouaibi et al., 2021; Du & Li, 2023; Hoi et al., 2013; Liu & Lee, 2019; Van & Ly, 2021). On the contrary, agency theory through concentrating on opportunistic behaviour managers is used to explain how managers will tend to increase the CSR practices and disclosure to hide underneath the tax savings through tax avoidances (Gavious et al., 2022). Therefore, CSR practices will induce managers to be tax incentivized resulting in being less transparent and presenting more opacity in disclosing their financial reports (Abdelfattah & Aboud, 2020; Abid & Dammak, 2021; Jiang et al., 2022; Lee & Bose, 2021; Marwat et al., 2021; Zeng, 2019).

4. Literature review and developing hypotheses

4.1. Corporate social responsibility and operating cash flow opacity

The association between CSR and OCFOP in the literature is discussed by deploying different perspectives and theories. Many studies have stressed the importance of institutional and organizational factors as they directly affect CSR practices. These factors impact managers and their activities to enhance equality, embrace justice and product development, or they may behave in an opportunistic way and work for their own benefits (Brahem et al., 2022; Sial et al., 2018). Moreover, firm opacity theory states that most firms seek profit maximization. While seeking this goal, firms use CSR practices as signals for their ethical practices and high quality performance, and to mitigate the information asymmetry in their reporting (Agnes Cheng et al., 2020; Ball et al., 2000; Hamrouni et al., 2021; Prior et al., 2008; You & Chen, 2022). The impact of this signaling is more profound when the firm has high levels of information asymmetry or opacity (You & Chen, 2022). In that sense, opacity focuses on the possibility of misleading potential and existing investors of the company's true financial position by diminishing information movement from insiders to outsiders, delivering a company's mysterious financially healthy situation (Kim & Yoo, 2022). In the current study, we used the OCFOP as an opacity detection building on the Agnes Cheng et al. (2020) model for measuring opacity. The OCFOP is essential in assessing a firm's performance by supporting managers with masks to keep back bad news, making it easier for them to misuse the company's resources (Agnes Cheng et al., 2020).

Numerous studies within the extant literature have extensively investigated the link between CSR and earnings management. These studies have yielded a diverse array of findings, underscoring the lack of consensus within the body of research (Abdelfattah & Elfeky, 2021; Brahema et al., 2022; Grougiou et al., 2019; Lee, 2012; Liu & Lee, 2019; Mohamed et al., 2019; Mohamed et al., 2019; Nguyen, 2022; Prior et al., 2008; Sial et al., 2018). Theoretically, the association between CSR and OCFOP has been connected to agency theory by many studies in the literature. Agency-based studies report a positive relationship between CSR and OCFOP (Muttakin & Subramaniam, 2015; Prior et al., 2008; Rahman & Zheng, 2022; Salewski & Zülch, 2014; Sial et al., 2018).

Based on agency theory, those studies explained that the management (agent) has access to the information available, and they may behave to utilize the whole information for their own remunerations and other benefits instead of supporting the owners' (stockholders) benefits (Fama & Jensen, 1983; Kiliç & Kuzey, 2018). Opacity causes poor transparency in financial reporting, thereby increasing agency costs and raising managers' opportunistic behavior. As a result of this opportunistic behavior, managers may use their engagement in CSR practices to present a good image of the company's reporting and thus hide their true company's performance. At this moment, CSR would act to provide a diversion tactic rather than presenting an initiative for further voluntary disclosure and subsequently reducing agency costs (Abdelfattah & Elfeky, 2021; Joubert, 2019b; Mohamed et al., 2019; Rahman & Zheng, 2022). Likewise, Abdelfattah and Elfeky (2021) empirical findings in the Egyptian market suggest a positive relationship between CSR practices and earnings management, in addition to Mohamed et al. (2019) finding that most Egyptian listed firms used to hide their poor earnings quality by investing in CSR practices.

In contrast, studies that report a negative relationship between CSR and OCFOP have mainly deployed two theories: stakeholder theory and stewardship theory (Cho et al., 2013; Chulkov & Wang, 2023; Cui et al., 2018; Kim & Yoo, 2022; Nair et al., 2019). Stakeholder theory views the most essential task for a firm to carry out stakeholder expectations and, therefore, meet their interest toward the most efficient use of the firm's resources (Grougiou et al., 2019). Based on the theory's concepts, it is expected that companies highly engaged in CSR activities would be less corporate tax avoidant and imply less aggressive accounting, which limits the opacity of financial reporting and enhances financial transparency and reporting quality by employing fewer earnings opacities (Abdul Wahab et al., 2018; Cho et al., 2013; Cui et al., 2018; Nair et al., 2019). Firms are recommended to disclose more information regarding their CSR practices, which enhances financial transparency and reporting quality by employing fewer earnings opacities (Nair et al., 2019).

Moreover, stewardship theory assumptions support the negative relationship between CSR and OCFOP, as corporate managers are expected to perform as optimal agents for their shareholders and, therefore, would likely maximize their interest in better-making shareholders' economic decisions (Mohamed et al.,

2019). Accordingly, based on academic research empirically found that theories, a negative relationship exists between CSR and opacity (Brahem et al., 2022; Chulkov & Wang, 2023; Hamrouni et al., 2021; Kim & Yoo, 2022). The same suggestions for such inverse relationships have been empirically revealed in emerging economies such as Egypt, India and East Asian markets (Aboud & Diab, 2018; Nair et al., 2019; Nguyen, 2022). Furthermore, firm opacity theory proposes that, unlike firms in developed markets, firms in less developed markets are motivated to signal their CSR activities as a reflection of financial statement transparency, and CSR practices signaling is more profound as these markets lack the essential governance tools, awareness and include a high level of information asymmetry and/or opacity (Aboud & Diab, 2018; Metwally, 2022; Metwally et al., 2021; You & Chen, 2022).

In summary, based on theoretical perspectives and previous literature explaining the relationship between CSR practices and OCFOP, we can conclude that stakeholder theory and stewardship theory-based studies explain the negative relationship between CSR practices and OCFOP by clarifying that managers would act toward maximizing their agents' interests. Conversely, firm opacity theory and agency theory-based studies explain the positive relationship between CSR and OCFOP through management's opportunistic behavior and maximizing their own benefits by producing opacity and/or asymmetry to make their CSR practices more profound in their signaling. Given the divergent findings within the existing body of literature, we postulate the presence of a potential correlation between CSR and the degree of OCFOP in the Egyptian market, refraining from making anticipatory assertions regarding the specific nature of this correlation. Consequently, we articulate our initial hypothesis as follows.

H1. There is an association between CSR and the level of operating cash flow opacity.

4.2. Moderation effect of tax avoidance between CSR and OCFOP

Several studies concentrated on the association between CSR and tax avoidance and reported contradictory results (Abdelfattah & Aboud, 2020; Abdul Wahab et al., 2022; Abid & Dammak, 2021; Chouaibi et al., 2021; Du & Li, 2023; Gavius et al., 2022; Hoi et al., 2013; Jiang et al., 2022; Kacem & Brahim Omri, 2021; Liu & Lee, 2019; Rakia et al., 2023; Richardson et al., 2013; Van & Ly, 2021; Zeng, 2019). Engaging heavily in CSR practices reduces profits because activities such as community support initiatives are often viewed as donations (Flammer, 2015). Furthermore, CSR efforts can put companies at a disadvantage compared to non-CSR competitors, as they might involve investments in environmental protection equipment, which increases costs without an immediate return. Hence, from an agency theory perspective, managers' opportunistic behavior is used to explain how managers tend to increase CSR practices and disclosure to hide underlying tax savings through tax avoidance (Gavius et al., 2022; Hoi et al., 2013; Jiang et al., 2022; Van & Ly, 2021).

On the contrary, from the agency perspective, stakeholder theory and legitimacy theorists challenge this view and argue that firms engaged in CSR can become more profitable (Van & Ly, 2021). This is due to various external factors, such as improved legitimacy, a better reputation and increased value, as well as internal factors, such as enhanced human resources (Kacem & Brahim Omri, 2021; Liu & Lee, 2019). In line with this argument, advocates of the significance of a company's resources suggest that CSR investments can help build a positive corporate reputation and enhance investment efficiency (Branco & Rodrigues, 2006; Chouaibi et al., 2021; Du & Li, 2023; Hoi et al., 2013; Lin et al., 2021; Liu & Lee, 2019; Van & Ly, 2021).

Tax avoidance and opacity association were the concerns of other studies in the literature; these studies achieved mixed results (Arman & Mira, 2021; Balakrishnan et al., 2018; Chen & Lin, 2017; Lastiati, 2020; Lee & Bose, 2021; Sá & Alves, 2022; Wang, 2010). Some studies have found a negative association between firm opacity and tax avoidance (Arman & Mira, 2021; Balakrishnan et al., 2018; Wang, 2010). Other studies found a positive association between tax avoidance and firm opacity (Chen & Lin, 2017; Kerr, 2013; Lastiati, 2020; Lee & Bose, 2021; Sá & Alves, 2022). Theoretically, the negative and positive impacts are explained by deploying the agency theory. The supporters of the negative association concentrated on managers' opportunistic behavior and how their intentions to engage in tax avoidance push them to disclose more information (e.g. management reports, CSR and other narrative disclosures) to hide their tax aggressiveness (Arman & Mira, 2021; Balakrishnan et al., 2018; Wang, 2010). On the

contrary, studies that reported positive relationships explained that managers tend not to disclose information regarding their tax plans and produce an opaque environment to hide the information and keep it for themselves (Chen & Lin, 2017; Kerr, 2013; Lastiati, 2020; Lee & Bose, 2021; Sá & Alves, 2022). However, there is a notable scarcity in the examination of the moderating influence of corporate tax avoidance on the interplay between CSR and OCFOP. Nevertheless, antecedent research underscores an established connection between tax avoidance, CSR and OCFOP. Aligning with the theoretical discourse and precedent empirical evidence, it is anticipated that tax avoidance will exert a discernible influence on the relationship between CSR and OCFOP within the Egyptian market. Accordingly, we propose the following hypothesis:

H2. Corporate tax avoidance moderates the relationship between CSR and operating cash flow opacity.

5. Research design

5.1. Identifying sample and sources

The initial sample selected for the current research was based on the top companies listed on the Egyptian Exchange, representing EGX 100. However, according to the aim of the research, which is to investigate the association between CSR and OCFOP, the sample was limited to companies listed on the S&P/EGX ESG index for 10 consecutive years, covering the period from 2012 until the end of 2021. The index started to publish only the top 30 Egyptian firms since 2007 marking their best performance within three factors environmental, social and corporate governance responsibility in comparison to other firms (Mohmed et al., 2019). However, the researchers obtained data for the top 100 listed companies that were highly committed to CSR practices. Any companies with missing data because they did not include CSR scores and had negative cash effective tax rates, in addition to insurance and financial companies, were excluded because of their special characteristics in accounting and financial reporting (Abdelazim et al., 2023; Diab et al., 2023). The final sample consists of 52 companies, making 520 observations representing 10 industries, as described in detail in Table 1. Data in this research were collected from annual reports, company websites, Bloomberg Asharq and Mubasher Egypt.

5.2. Research methodology: variables and regression models definition

We used Pooled OLS and random effect regression analysis with robust standard errors to mitigate the concerns of *heteroscedasticity and autocorrelation*, to investigate the relationship proposed according to the research hypotheses. Therefore, two regression models were generated to formulate the two hypotheses as follows:

Model I:

$$OCFOP_{it} = \alpha + \beta_{it} CSR + \beta_{it} LEV + \beta_{it} SIZE + \beta_{it} ROE + \varepsilon_{it}$$

Table 1. Sample classification and industry type.

Industry segment	Number of companies	Number of observations	Percentage, %
Basic resources	3	30	5.8
Building materials	5	50	9.6
Food, beverage and tobacco	10	100	19.2
Health care & pharmaceuticals	3	30	5.8
Textile & durables	4	40	7.7
Real estate	12	120	23
Shipping & transportation services	5	50	9.6
Industrial goods, services and automobiles	8	80	15.4
Energy and support services	2	20	3.9
Total	52	520	100

Model II:

$$\text{OCFOP}_{it} = \alpha + \beta_{it} \text{CSR} + \beta_{it} \text{CETR} + \beta_{it} \text{CSR} * \text{CETR} + \beta_{it} \text{LEV} + \beta_{it} \text{SIZE} + \beta_{it} \text{ROE} + \varepsilon_{it}$$

where OCFOP represents the operating cash flows opacity; CSR denotes the reported corporate social responsibility score as disclosed in the S&P/EGX ESG index, CETR symbolizes tax avoidance, LEV denotes leverage, SIZE denotes company size, ROE symbolizes return on equity and CSR*CETR is the interaction variable, which is the outcome of the independent and moderator variables.

5.3. Variables identification and measurements**5.3.1. Dependent variable: operating cash flows opacity**

As supposed by Dechow et al. (1998) we use the following model to estimate the value of abnormal operating cash flows as a measurement for operating cash flow management, as implemented by Agnes Cheng et al. (2020) and Lee (2012) using each company-level annual data over time series for the prior ten years:

$$\frac{\text{OCFOP}_t}{\text{TA}_{t-1}} = \lambda_0 + \lambda_1 (1 / \text{TA}_{t-1}) + \lambda_2 (\text{SALE}_t / \text{TA}_{t-1}) + \lambda_3 (\Delta \text{SALE}_t / \text{TA}_{t-1}) + \varepsilon_t$$

where OCFOP is the operating cash flow for period t , TA is the total assets for the ending period of $t - 1$ and SALE and Δ SALE represent the reported total sales and the change in reported total sales during period t . Therefore, we used the parameter estimate to expect a deviation from normal OCFOP, so the residuals from the estimation model denote the difference between the normal expected levels of OCFOP. Therefore, higher values of OCFOP imply that companies are more likely to manage reported OCF, thus, having higher levels of operating cash flows opacity.

5.3.2. Independent variable: corporate social responsibility

Earlier studies employ several approaches to gauge CSR, typically combining both corporate governance (CG) and CSR into CSR measurement. However, Kim et al. (2012) separate the impact of CSR and CG by removing the CG score to calculate their CSR scores. Having a closed pointer toward the Egyptian market, Mohamed et al. (2019) have researched into the environmental and social dimensions of CSR within the Egyptian S&P/ESG index. These CSR dimensions, namely community, environment, employees and consumers/products, are derived from data within the S&P/ESG index, which encompasses environmental, social and governance scores. Other studies such as Bozzolan et al. (2015), Muttakin and Subramaniam (2015) and Salewski & Zülch (2014) base their CSR measurements on three common dimensions: society, employees and the environment. Therefore, in proportion to preceding readings and for the current research purpose, we used the composite score to measure CSR as computed according to the S&P/EGX ESG index, as suggested by Kim et al. (2012) and Mohamed et al. (2019).

5.3.3. Moderator variable: tax avoidance

Following the literature, we use the cash effective tax rate to measure tax avoidance (Jiang et al., 2022). This measurement is used to explain that the cash amount of tax would help reduce the likely effect of assessment allowance according to Dyreng et al. (2008) thus, we computed using based on the following equation:

$$\text{CETR}_t = \frac{\text{Cash Tax Paid}_t}{\text{Pre Income Tax}_t}$$

where CETR is the cash effective tax rate for period t , cash tax paid is the amount of taxes paid as disclosed in the statement of cash flows for period t , and pre-income tax is earnings before taxes, as computed in the income statement for period t .

5.3.4. Control variables

In this research, we controlled for companies' leverage, firm size and return on equity, which are expected to influence the firm's level of OCFOP. Leverage is the ratio of a firm's total debt to its total assets, while firm size is measured by the log of a firm's total assets. We measure the return on equity by dividing each company's total equity by its net income (Bozzolan et al., 2015; Eliwa et al., 2016; Francis et al., 2005; Muttakin & Subramaniam, 2015). The following Table 2 summarizes all variables used in the current study.

6. Empirical results

6.1. Descriptive statistics

Table 3 presents a descriptive analysis of all the variables tested in the study. As can be seen from the table, CSR recorded an average score of 4.8157, associated with a median of 4.8153 and standard deviation of 0.07131. The minimum CSR score in our sample was 4.69 and the maximum was 4.99. CETR reported an average score of 14.23% and ranges between 0 and 1 following prior studies we deleted observations with negative CETR and further CETR of companies result in greater than one was normalized to one (Abdelfattah & Aboud, 2020; Dyreng et al., 2010; Hope et al., 2013), besides CETR was associated with a median of 9.6% and a standard deviation of 0.2184. The OCFOP reported a mean (median) of 4.62% (2.85%) and varied between 0.082% and 27.43% with a standard deviation of 5.14%.

Furthermore, controls indicated average leverage, size and ROE of 42%, 21.5% and 16.6%, respectively, with medians of 38.7%, 21.6% and 11.6%, respectively. Leverage indicated a standard deviation of 0.23, while size was 1.72, and ROE represented a standard deviation of 0.27. In addition, we noticed a significant difference in the companies' size included in the sample, as it reported a range between a minimum of 17 and a maximum of 24.77.

6.2. Correlation analysis

Based on the analysis shown in Table 4, the correlation matrix for the current research variables indicates some significant and non-significant relationships. As presented in the table a positive association occurs between the company's OCFOP and CSR at $p < 0.01$ of significance level and also a positive association between the company's OCFOP and CETR at $p < 0.01$ significance level besides a significant positive

Table 2. Summary of variables identification.

Variables	Code	Definition	Measurement
Operating cash flow opacity	OCFOP	Because of accruals in the form of estimates and judgments, management tried to manage operating cash flows	Measuring abnormal operating cash flows estimated using the residuals of the Dechow et al. (1998) model
Corporate social responsibility	CSR	CSR score was according to the index following each firm's practices of community, environment, employees and consumer and product	The natural logarithm of social and environmental reporting is the total of four categories measured by the Egyptian ESG index (community, environment, employees and consumer and product) for the firm i in the year t
Tax avoidance	CETR	The act to reduce taxes paid to the minimum level	Cash tax paid divided by pre-income tax
Leverage	LEV	Use of borrowings to fund assets acquisition	Total debt is divided by total assets.
Size	SIZE	Natural logarithm of total assets.	Log of assets
Return on equity	ROE	Reference for the return on the total amount of equity	Net income divided by total equity

Table 3. Descriptive statistics.

Variables	Mean	Median	SD	Min	Max
OCFOP	0.0461852	0.0285461	0.0513805	0.0008292	0.2743154
CSR	4.815743	4.815324	0.0713068	4.68907	4.9985
CETR	0.1422681	0.0957809	0.2183579	0.00000	0.833961
LEV	0.4182298	0.3866356	0.233507	0.0251077	1.052822
SIZE	21.47447	21.62185	1.721356	17.04227	24.77042
ROE	0.1660711	0.1155342	0.2687309	-0.3442261	1.664038

association between OCFOP and LEV at $p < 0.05$. However, a significant negative association was observed between OCFOP and size ($p < 0.01$). A positive relationship emerges between CSR and both SIZE and ROE at $p < 0.01$ level of significance while no significant association exists between CSR, CETR and LEV. Furthermore, a positive relationship arises between CETR and both LEV and SIZE at a significance level of $p < 0.10$ and $p < 0.01$, respectively. In addition, a significant positive relationship occurs between LEV and SIZE at $p < 0.01$, while a significant negative association exists between LEV and ROE at $p < 0.01$. Finally, a significant positive correlation was observed between the SIZE and ROE ($p < 0.05$). Furthermore, the analysis showed that there was no multicollinearity between the independent variables; coefficients were not higher than 0.34 (). Also, to make a double checking for the absence of multicollinearity, the variance inflation factor (VIF) reported the highest observed value of 1.32 which is below the conventional cut off of 10.0 besides Mean VIF stated value of 1.14 which is less than 2 (Rakia et al., 2023).

6.3. Findings and discussions

As demonstrated in Tables 5 and 6, the analysis revealed from the pooled ordinary least squares OLS regression and the random effects of the regression model are summarized for firms' operating cash flow opacity, including corporate social responsibility, leverage, size and return on equity, as indicated in Model I. The next step shows the pooled OLS regression and the random effects regression model of firms' OCFOP involving corporate social responsibility, cash effective tax rate, leverage, size and return on equity, as implied based on Model II.

Therefore, based on the pooled OLS and random effects results indicated in Model I of Table 5. The pooled OLS estimator does not consider the panel structure of the data, leading to a potential shortcoming in the procedure of biased estimates (Cameron & Trivedi, 2005). Accordingly, the Hausman test indicated that random effects are preferred over the fixed effects model estimator ($\chi^2 = 0.56$, Prob > $\chi^2 = 1.000$); hence, a random effects model is also projected (Boshnak, 2021). The table demonstrates that a positive relationship exists between the independent variable CSR and the dependent variable OCFOP, as the coefficient was 0.129 for the pooled model and 0.068 for the random effects model, which is significant for both models, as indicated by $p < 1\%$ and $p < 10\%$, respectively. Likewise, based on the pooled OLS model, controls, such as LEV and ROE, show a positive association alongside the dependent variable OCFOP with coefficients of 0.045 and 0.018, and both were significant at $p < 1\%$ and $p < 5\%$, respectively; however, from the random effects model, only LEV demonstrates a positive association with the dependent variable OCFOP with a coefficient of 0.049, which is significant at the 1% level. However, SIZE denotes a significant negative association per OCFOP, with a coefficient of -0.008 for the pooled OLS

Table 4. Correlation matrix.

Variables	OCFOP	CSR	CETR	LEV	SIZE	ROE	VIF
OCFOP	1.0000						NA
CSR	0.1222***	1.0000					1.12
CETR	0.1778***	0.0458	1.0000				1.05
LEV	0.1127**	0.0619	0.0802*	1.0000			1.17
SIZE	-0.1333***	0.3106***	0.2120***	0.3399***	1.0000		1.32
ROE	0.0655	0.1384***	-0.0379	-0.1318***	0.1032**	1.0000	1.06
Mean VIF	1.14						

For significant correlation indication, *** $p < 0.01$, ** $p < 0.05$ and * $p < 0.10$.

Table 5. Results of regression analysis – Model I.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef	Z	P>Z	Coef	Z	P>Z
CSR	0.1295585	4.03	0.000***	0.0681275	1.74	0.082*
LEV	0.0452244	4.52	0.000***	0.0498479	4.23	0.000***
SIZE	-0.0080252	-5.67	0.000***	-0.074818	-3.71	0.000***
ROE	0.0182556	2.21	0.028**	0.00683	0.70	0.484
Cons	-0.4273445	-2.88	0.004***	-0.1432141	-0.79	0.431
Adjusted R ²		0.0801			0.2043	
F-value		12.31***			25.06***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

Table 6. Results of regression analysis – Model II.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef.	Z	P>Z	Coef.	Z	P>Z
CSR	0.1275501	4.06	0.000***	0.0697886	1.84	0.066*
CETR	0.0571337	5.58	0.000***	0.0534501	5.21	0.000***
CSR*CETR	0.2328622	1.99	0.052*	0.2691652	1.86	0.063*
LEV	0.0445705	4.57	0.000***	0.0479674	4.18	0.000***
SIZE	−0.009396	−6.68	0.000***	−0.0087985	−4.50	0.000***
ROE	0.0216879	2.68	0.008***	0.0105676	1.12	0.265
Cons	−0.396823	−2.74	0.006***	−0.1305659	−0.74	0.458
Adjusted R ²		0.1395			0.2825	
F-value		13.86***			54.70***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

model and −0.075 for the random effects model, and this association is significant for both models at the $p < 1\%$ level.

Moreover, the two models illustrate F -value equal to 12.31 and 25.06 respectively and both models were significant at the 1%; this significant positive association indicates that the whole model is significant. In addition, the pooled model had an adjusted R^2 of 0.0801 and a significant F -value ($F=12.31$, $p < 0.001$), indicating that the independent variable CSR and the controls LEV, SIZE and ROE could explain an 8.01 percentage of variation in the dependent variable OCFOP. Moreover, the random-effects model had an adjusted R^2 of 0.2043 and a significant F -value ($F=25.06$, $p < 0.001$). The findings of the previous analysis support the acceptance of the first hypothesis H_1 and reject the null hypothesis H_0 making it clear that companies with higher CSR deliver a higher rate of cash flow opacity.

The above results support agency theory assertions regarding managers' opportunistic behavior resulting from information asymmetry. Therefore, managers are incentivized to act in their own interests rather than in the interests of their companies' shareholders (Mohmed et al., 2019). These results are consistent with those of previous studies (Muttakin & Subramaniam, 2015; Prior et al., 2008; Rahman & Zheng, 2022; Salewski & Zülch, 2014; Sial et al., 2018). Those who concluded a similar positive relationship between CSR and OCFOP indicated a reference to opportunistic behavior by the company's management, intending to conceal their manipulation of financial reporting and not transparently disclose the true financial position of the company. In contrast, it disagrees with other studies that report either a negative or no significant relationship between CSR and OCFOP (Aboud & Diab, 2018; Brahem et al., 2022; Chulkov & Wang, 2023; Hamrouni et al., 2021; Kim & Yoo, 2022; Nair et al., 2019; Nguyen, 2022). Thus, the results of the current study do not support stakeholder and stewardship theories. Managers of Egyptian non-financial firms did not perform as optimal agents for their shareholders, and they tended to be less transparent in their disclosures.

In Table 6, the pooled OLS and random effects results indicated in Model II show a positive relationship between the independent variable CSR and the dependent variable OCFOP, as the coefficient was 0.128 for the pooled OLS model and 0.069 for the random effects model, which are significant at the 1% and 10% levels, respectively. Similarly, the findings revealed a positive relationship between the moderator CETR and the dependent variable OCFOP, with a coefficient of 0.0571 for the pooled OLS model and 0.0535 for the random effects model, which is significant at $p < 1\%$ for both models, thus indicating the effect of CETR as an independent variable. Additionally, based on the pooled OLS model, the interaction of CSR*CETR shows a positive relationship with the dependent variable OCFOP, with a coefficient of 0.052 and a coefficient of 0.063 based on the random effects model, which is significant at $p < 10\%$ for both models. Conversely, based on the pooled OLS model, a negative relationship exists between SIZE as a control and the dependent variable OCFOP with a coefficient of −0.009, and from the random effects model with a coefficient of −0.008, both of which were significant at the 1% level. However, other controls, such as LEV and ROE, deliver a positive association with the dependent variable OCFOP with a coefficient for LEV of 0.0446 for the pooled OLS model and 0.048 for the random effects model, both of which were significant at the 1% level. In addition, the ROE coefficient of 0.0217 was significant only for the pooled OLS model at the 1% level.

Furthermore, the two models illustrate F -value equal to 13.86 and 54.70 respectively and both models were significant at the 1% level; this significant positive association indicates that the whole model is

significant. In addition, the findings in Table 6 indicate that the pooled model has an adjusted R^2 of 0.14 and a significant F -value ($F=13.86$, $p<0.001$), supporting that the independent variable CSR, moderator CETR and the controls LEV, SIZE and ROE can interpret 14 percent of the variation in the dependent variable OCFOP. In addition, the random-effects model had an adjusted R^2 of 0.283 and a significant F -value ($F=54.70$, $p<0.001$). As a result of the previous analysis, the findings support the acceptance of the second hypothesis H_2 and reject the null hypothesis H_0 , assuming that companies with higher CSR moderated with higher values of CETR generate a higher level of cash flow opacity. This implies that corporate tax avoidance has a positive moderating role as it strengthens the effect of CSR on OCFOP.

The results presented above substantiate the assertions of agency theory concerning managers' OB. This consequently portrays CSR practices as a form of greenwashing for the company's aggressive tax strategies, which mirrors their lack of transparency in financial disclosures. These findings align with earlier research that interpreted a direct connection between CSR and tax avoidance, revealing a consistent positive correlation (Abdelfattah & Aboud, 2020; Abid & Dammak, 2021; Gavius et al., 2022; Jiang et al., 2022; Marwat et al., 2021; Zeng, 2019). As these companies achieve tax savings while providing increased CSR information, CSR practices incentivize managers to prioritize tax savings, leading to reduced transparency and heightened opacity in their financial reporting (Lee & Bose, 2021). On the contrary, the current study's results contradict the results of some studies, as these studies concluded a negative association between firms' transparency and tax avoidance (Arman & Mira, 2021; Lastiati, 2020; Sá & Alves, 2022; Wang, 2010). That said, the results of this study do not align with the assertions of stakeholder and legitimacy theories, which suggest that firms engaging in CSR are persuaded to uphold social prosperity. Consequently, tax avoidance may be seen as a manifestation of management's neglectful behavior toward the company's reputation and stakeholders' interests of its stakeholders (Chouaibi et al., 2021; Hoi et al., 2013; Van & Ly, 2021).

7. Additional analyses

As an additional test, we investigated whether the relationship between corporate social responsibility and operating cash flow opacity is subject to change because of other factors by employing more control variables including, tangibility which is measured by dividing property, plant and equipment to total assets based on Dietrich (2007), return on assets which is an accounting-based indicator measured by dividing net income over firm's total assets as stated by Diab et al. (2024), cash proportion of cash and short-term investment to total assets as cited by Cao et al. (2022) and selling, general and administrative expenses as proportion to net sales as mentioned by Beneish (1999). As a result, to additionally examine the association of CSR on firm opacity, the previous models are reformulated as follows:

Model I:

$$OCFOP_{it} = \alpha + \beta_{it}CSR + \beta_{it}LEV + \beta_{it}SIZE + \beta_{it}ROE + \beta_{it}TANG + \beta_{it}ROA + \beta_{it}CASH + \beta_{it}SGA + \varepsilon_{it}$$

Model II:

$$OCFOP_{it} = \alpha + \beta_{it}CSR + \beta_{it}CSR * CETR + \beta_{it}LEV + \beta_{it}SIZE + \beta_{it}ROE + \beta_{it}TANG + \beta_{it}ROA + \beta_{it}CASH + \beta_{it}SGA + \varepsilon_{it}$$

where:

$OCFOP_{it}$ is the operating cashflows of firm i for period t .

CSR is the corporate social responsibility score as disclosed in the S&P/EGX ESG index

LEV is the leverage

SIZE is the company size measured by log of total assets

ROE is the return on equity

TANG is the tangibility

ROA is the return on assets

Table 7. Results of regression analysis using additional control variables – Model I.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef	Z	P>Z	Coef	Z	P>Z
CSR	0.1378	4.27	0.000***	0.0748	1.93	0.054*
LEV	0.0347	2.99	0.003***	0.0337	2.56	0.010**
SIZE	-0.0078	-4.54	0.000***	-0.0065	-2.88	0.004***
ROE	0.02464	2.48	0.013**	0.0171	1.57	0.116
ROA	-0.0291	-2.29	0.022**	-0.326	-2.18	0.029**
TANG	-0.0268	-3.18	0.002***	-0.0221	-2.06	0.040**
Cash	-0.0323	-1.74	0.083*	-0.0424	-1.98	0.048**
SAG	-0.4507	-1.38	0.167	-0.0043	-0.27	0.784
Cons	-0.4507	-3.05	0.002***	-0.1757	-0.98	0.328
Adjusted R ²		0.105			0.252	
F-value		8.65***			39.81***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

Table 8. Results of regression analysis using additional control variables – Model II.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef.	Z	P>Z	Coef.	Z	P>Z
CSR	0.1332	4.23	0.000***	0.0749	2.00	0.046**
CETR	0.0584	5.74	0.000***	0.05441	5.34	0.000***
CSR*CETR	0.2172	1.89	0.062*	0.2379	1.75	0.082*
LEV	0.0307	2.72	0.007***	0.0308	2.40	0.016**
SIZE	-0.0085	-5.07	0.000***	-0.0074	-3.40	0.001***
ROE	0.0309	3.19	0.001***	0.0223	2.10	0.036**
ROA	-0.0351	-2.84	0.005***	-0.0375	-2.58	0.010**
TANG	-0.248	-3.03	0.003***	-0.0208	-2.01	0.044**
Cash	-0.3001	-1.66	0.098*	-0.0362	-1.74	0.085*
SAG	-0.0112	-0.79	0.430	-0.0011	-0.17	0.745
Cons	0.2273	6.35	0.000***	0.2028	4.35	0.000***
Adjusted R ²		0.156			0.343	
F-value		10.63***			71.43***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

Cash is the cash holding

SGA is the selling, general and administrative expenses

CSR*CETR is the interaction variable which is the outcome of the independent and the moderator.

Table 7 presented a positive relationship exists between the independent variable CSR and the dependent variable OCFOP, as the coefficient was 0.1378 for the pooled model and 0.0748 for the random effects model, which is significant for both models, as indicated by $p < 1\%$ and $p < 10\%$, respectively. Furthermore, based on the pooled OLS model, additional controls interacted, such as ROA, TANG and CASH, show a negative relationship alongside the dependent variable OCFOP with coefficients of -0.0291, -0.0268 and -0.0323, and were significant at $p < 5\%$, $p < 1\%$ and $p < 10\%$, respectively; however, from the random effects model, TANG and CASH demonstrates a significant at the 5% level. Likewise, the two models illustrate F-value equal to 8.65 and 39.81, respectively, and both models were significant at the 1%; this significant positive association indicates that the whole model is significant.

Table 8 shows the pooled OLS and random effects results indicated in the reformed Model II illustrates a positive relationship between the independent variable CSR and the dependent variable OCFOP, as the coefficient was 0.1332 for the pooled OLS model and 0.0749 for the random effects model, which are significant at the 1% and 5% levels, respectively. Similarly, the findings revealed a positive relationship between the moderator CETR and the dependent variable OCFOP, with a coefficient of 0.0584 for the pooled OLS model and 0.05441 for the random effects model, which is significant at $p < 1\%$ for both models, thus, indicating the effect of CETR as an independent variable. Additionally, based on the pooled OLS model, the interaction of CSR*CETR shows a positive relationship with the dependent variable OCFOP, with a coefficient of 0.2172 and a coefficient of 0.2379 based on the random effects model, which is significant at $p < 10\%$ for both models.

Conversely, adding the new controls, as ROA, TANG and CASH, the pooled OLS model shows a negative relationship alongside the dependent variable OCFOP with coefficients of -0.0351 , -0.248 and -0.3001 , and were significant at $p < 1\%$, $p < 1\%$ and $p < 10\%$, respectively; furthermore, from the random effects model, TANG and CASH demonstrates a significant at the 5% level. Similarly, the two models illustrate F -value equal to 10.63 and 71.43, respectively, and both models were significant at the 1%; this significant positive association indicates that the whole model is significant.

As a result, the additional analysis provided by employing extra control variables using the reformed model 1 and 2 yields outcomes consistent with the previous findings suggesting a positive significant relationship between corporate social responsibilities and operating cash flow opacity. Additionally, there is a suggestion of the significance of the moderating effect of the corporate tax avoidance variable.

8. Robustness analysis

8.1. Exploiting another measurement of the dependent variable

To validate the findings of the current study, an alternate measurement of the dependent variable was used. Thus, another measurement was used to measure OCFOP, we use the absolute value of the change in cash conversion cycle measured as the absolute value of the change in days in accounts receivable plus days in inventory minus days in accounts payable from the fourth quarter in year $t - 1$ ($|\Delta CC|$) as suggested by Agnes Cheng et al. (2020).

Tables 9 and 10 shows the findings of the sensitivity analysis used to evaluate the sensitivity of the results to changes in firm opacity by presenting a different dependent variable measurement $|\Delta CC|$. The findings are robust for the purpose of delivering another measurement of firm opacity, as the outcomes of both models were coherent with the prior outcomes.

8.2. The endogeneity issue

Although the current research findings indicates that there's a significant positive relationship between CSR and OCFOP besides exhibiting the moderating effect of tax avoidance, endogeneity bias may occur. Endogeneity problem is a possible matter that may appear because of omitted variables affecting the

Table 9. Results of regression analysis using another measurement for dependent variable – Model I.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef	Z	$P > Z$	Coef	Z	$P > Z$
CSR	0.9816	2.70	0.007***	1.4283	3.41	0.000***
LEV	0.1478	1.13	0.259	0.2243	1.45	0.148
SIZE	-0.0190	-1.06	0.290	-0.0073	-0.23	0.818
ROE	0.1780	1.66	0.098*	0.2470	1.92	0.055*
Cons	3.820	10.18	0.000***	4.3666	6.60	0.000***
Adjusted R^2	0.032			0.023		
F -value		4.11***			17.51***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

Table 10. Results of regression analysis using another measurement for dependent variable – Model II.

Variables	Pooled OLS regression model			Random effects regression model		
	Coef.	Z	$P > Z$	Coef.	Z	$P > Z$
CSR	0.9378	2.56	0.011**	1.4054	3.38	0.001***
CSR*CETR	0.2368	1.81	0.071*	0.2008	1.74	0.076*
LEV	3.9234	2.50	0.013**	5.0818	3.44	0.001***
SIZE	0.1139	0.87	0.383	0.1759	1.14	0.255
ROE	-0.0183	-1.00	0.318	-0.0090	-0.28	0.776
Cons	3.843	10.18	0.000***	4.4142	6.59	0.000***
Adjusted R^2		0.048			0.021	
F -value		4.27***			31.88***	
Observation		520			520	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

Table 11. Results of regression analysis using two step GMM method.

Predictor	Model 1		Model 2	
	Coef	Z	Coef	Z
OCFOP _{it-1}	0.3578	4.41***	0.2225	2.67***
CSR	0.2263	2.41**	0.1302	2.45**
CETR	–	–	0.0730	1.82*
CSR*CETR	–	–	1.047	2.09**
LEV	0.0163	1.95**	0.0172	1.74*
SIZE	–0.0015	–1.66*	–0.0002	–1.13
ROE	0.0296	2.01**	0.0067	1.96**
Cons	0.1880	0.64	0.0257	0.84
F-value	693.93***		498.36***	
Obs.	520		520	
AR1(p-value)	0.000		0.002	
AR2(p-value)	0.806		0.524	
Sargan test (p-value)	0.547		0.425	
Hansen test (p-value)	0.156		0.226	

Notes: ***, ** and * reflect significance at 1, 5 and 10% levels, respectively.

relationship between our dependent and independent variable and needs to be examined using supplementary testing. Consequently, we managed to re-estimate both models 1 and 2 outlining the two-step system Generalized Method of Moments (GMM). As illustrated through Table 11, we used standard diagnostic tests like Arellano–Bond (AR) test for first-order and Second-order correlation, Sargan test and Hansen test (Ali et al., 2024; Diab et al., 2024).

As indicated in Table 11, the Arellano–Bond autocorrelation tests shows no existence of serial correlation in error terms since the *p*-value of the AR2 is < 0.05 in both models, besides the *p*-value of the Sargan and Hansen tests is < 0.05 for models 1 and 2 which propose that the instruments employed in the GMM predictor are exogenous. Thus, results analysed from Table 9 are supported with the main results obtained from the current study (i.e. remain the same with no variations due to sensitivity).

9. Conclusion, limitations and future research

A sample of 52 Egyptian non-financial institutions is listed on the EGX with 520 observations covering the period from 2012 to 2021. This study investigates the relationship between companies with CSR and OCFOP. Moreover, this study examines the moderating role of tax avoidance in the association between a company's reported CSR score and OCFOP level. Our results show that the relationship between CSR and OCFOP is positively significant, indicating that firms that practice CSR are involved in a higher level of OCFOP. This result supports the early findings of some early studies (Muttakin & Subramaniam, 2015; Prior et al., 2008; Rahman & Zheng, 2022; Salewski & Zülch, 2014; Sial et al., 2018) in their findings that CSR practices are an opportunity to hide the true financial reporting of the company toward their stockholders. To the best of our knowledge, this study is the first to investigate the moderating effects of tax avoidance on the relationship between CSR practices and OCFOP in an emerging market in general and Egypt specifically. Moreover, our findings reveal that corporate tax avoidance moderates the relationship between CSR and OCFOP as it strengthens their relationship and shows that firms engaged in CSR practices if incentivized with tax avoidance opportunities would report higher opacity in their cash flow reporting.

Although the present investigation offers a substantive contribution, it is pertinent to acknowledge certain constraints. Primarily, this study confines its scope to non-financial entities listed on the EGX in Egypt from 2012 to 2021. Nevertheless, prospective research endeavors hold the potential to replicate this study in diverse African contexts, with a particular emphasis on the MENA region, which exhibits a paucity of studies focusing on OCFOP. Such replications assume significance within the MENA region, given that many nations therein have recently experienced parallel political and economic upheaval during the Arab Spring revolution. Second, the cash effective tax rate is widely used as a proxy to measure tax avoidance in the literature; however, it has also been criticized for its accuracy in clarifying tax avoidance exists (Dyrenge et al., 2008; Hope et al., 2013). The current research relies on data revealed from non-financial listed companies, which cannot be generalized because CSR reporting in Egypt includes financial and non-listed Egyptian companies, which may not represent the population of listed firms in Egypt.

This study has several implications for Egyptian companies, investors and regulators. Based on the findings of this study, it is recommended that the stockholder awareness of practices of companies' management may be involved in attaining their objectives. In addition, the current study recommends having efficient internal controls that would be reflected in limiting cash flow opacity and thus providing more transparent and valid financial reports. Moreover, the results revealed that companies must engage in future CSR practices that could commit to sustainability concepts rather than being a way diverting from weak transparency in financial reporting. In addition, both local and international investors are advised to consider the aforementioned findings when deliberating their investment choices within the realm of Egyptian listed enterprises. For example, it is suggested that any investor in the Egyptian market should augment their information search beyond the confines of annual reports and CSR disclosures, particularly when considering investments in companies exhibiting elevated levels of CSR disclosure, or those identified as deeply committed to CSR activities. Finally, the current findings support the enforcement of further investment acts that would enrich the protection of stockholders' rights, consequently making the Egyptian market more attractive for foreign investments.

In conclusion, the present study lays the foundation for future research endeavors, advocating for an expansion of the sample to encompass financial entities listed in the EGX and engaging in CSR activities correlated with levels of OCFOP. Additionally, future investigations could entail further comparative analyses across different sectors within the EGX as well as the incorporation of non-Egyptian listed firms to bolster our empirical substantiation. Furthermore, the introduction of an additional moderator, such as political affiliation, may provide additional insights into both CSR initiatives and taxation practices. Notably, the existing study omits any discourse on governance mechanisms that could potentially mitigate managers' opportunistic behaviors. In light of this, future research may focus on delineating the moderating influence of corporate governance mechanisms (e.g. board composition, board size, board meeting frequency and board gender diversity) on the interplay between CSR and OCFOP.

Authors' contributions

Conceptualization, A.B.M.M., A.A.M.E. and M.I.S.; methodology, A.B.M.M., A.A.M.E. and M.I.S.; software, A.B.M.M., A.A.M.E. and M.I.S.; validation A.B.M.M., A.A.M.E. and M.I.S.; analysis and interpretation of the data A.B.M.M., A.A.M.E. and M.I.S.; drafting of the paper A.B.M.M., A.A.M.E. and M.I.S.; critical revision for intellectual content A.B.M.M., A.A.M.E. and M.I.S.; funding acquisition, A.B.M.M. All the authors have read and agreed to the published version of the manuscript.


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Data availability statement

Data is available upon request from researchers who met the eligibility criteria. The corresponding author was contacted privately through e-mail.

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