

Does Disclosure of Sustainability Reports via social media Moderate the Relationship between Information Asymmetry and Cash Holding? Exploratory Study from Egypt

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Abstract

Purpose: This research aims to: 1) discover the relationship between the level of information asymmetry (IA) and cash holding (CH) according to the trade-off theory (TOT), Pecking-Order Theory (POT), and free cash flow theory (FCFT) in companies listed on the Egyptian Stock Exchange (EGX), 2) examine the role of Sustainability Reports Disclosure via

social media (SRDSM) in moderating this relationship considering the three theories.

Design/methodology/Approach: we first revealed the existence of an optimal level (OL) of cash of the companies listed on (EGX), and its association with profitability which represents in return on assets (ROA), Data were collected from (97) companies, with a total of (1067) observations for the period from (2012 to 2022) Using a model designed for this purpose, including these variables and some control variables that reflect the characteristics of the company. Then, a questionnaire was designed, and the total sample consisted of (210) individuals (94 financial analysts/116 from the Investor Relations Management team) to test the relationship between (IA) and (CH). IA was categorized as a high level and low level, while four items were included for TOT, two items for POT, and four items for FCFT. To examine the moderating role of (SRDSM), a question was put that included three indicators: environmental performance indicators –EPIs (12 items); social performance indicators –SPIs(11 items); and governance performance indicators- GPIs(10 items).

Findings: the applied study indicate that companies hold an (OL) of cash with the aim of maximizing profitability and that with a high level of (IA) companies tend to increase the level of cash, and vice versa, the field study indicate that there is a positive relationship between (IA) and (CH) under (TOT) and (POT), and

a negative relationship under (FCFT). Moreover, SRDSM moderates the relationship between (IA) and (CH) according to (TOT) for all the three dimensions of (SRDSM), while it does not moderate the relationship according to (POT) and (FCFT).

Originality/value: This study is the first to discover the relationship between the level of (IA) and (CH) and determine managers' behavior toward (CH) according to TOT, POT, and FCFT Egypt, which is one of the emerging economies. Furthermore, this study provides clear insights into the role of (SRDSM) in moderating this relationship, which is an unexplored research area in Egypt, as most studies are made in advanced environments.

Keywords: Disclosure via social media - Sustainable Reports-Information Asymmetry - Explanatory Theories of Cash Holding - Cash Holding practices in Egypt .

الملخص

الهدف: يهدف البحث إلى: (١) اكتشاف العلاقة بين مستوى عدم التماثل المعلوماتي (IA) وبين الاحتفاظ بالنقدية (CH) في ظل كلا من نظرية المقايضة (TOT)، نظرية تسلسل مصادر التمويل (POT)، ونظرية التدفقات النقدية الحرة (FCFT)، وذلك في البيئة المصرية من واقع الشركات المقيدة بالبورصة المصرية (EGX)، (٢) اختبار دور الإفصاح عن تقارير الاستدامة عبر مواقع التواصل الاجتماعي (SRDSM) في تعديل هذه العلاقة في ظل النظريات الثلاثة.

التصميم/النموذج/المنهجية: تم أولاً التحقق من مدى وجود المستوى الأمثل للنقدية (OL) بداخل الشركات المقيدة في (EGX) ومدى ارتباطه بالربحية والتي تتمثل هنا في العائد على الأصول، وتم تجميع بيانات فعلية من (٩٧) شركة بإجمالي عدد مشاهدات (١٠٦٧) وذلك عن الفترات من (٢٠١٢-٢٠٢٢)، وفيما بعد تم تصميم قائمة إستقصاء وتكونت العينة الإجمالية من (٢١٠) فرداً (٩٤) محللين ماليين/١١٦ من فريق إدارة علاقات المستثمرين) وذلك لإختبار العلاقة بين (IA) و(CH)، وتم التعبير عن (IA) بمستوى مرتفع ومستوى منخفض، بينما تم التعبير من خلال ٤ بنود لـ (TOT)، ٢ بند لـ (POT)، ٤ بنود لـ (FCFT) وذلك لمعرفة الإتجاه الذي تسلكه الإدارة في وجود (IA)، ولإختبار الدور المعدل لـ (SRDSM) تم وضع سؤال خاص بها يتضمن ٣ مؤشرات وهم مؤشرات الأداء البيئي (EPI) ويضم ١٢ عبارة، مؤشرات الأداء المجتمعي (SPI) في ١١ عبارة، ومؤشرات الأداء الحوكمي (GPI) في ١٠ عبارات.

النتائج: تشير نتائج الدراسة التطبيقية إلى إحتفاظ الشركات بـ "مستوى أمثل للنقدية" بهدف تعظيم الربحية، وأنه مع المستوى المرتفع لـ (IA) تميل الشركات لزيادة مستوى النقدية، والعكس صحيح في حالة المستوى المنخفض لـ (IA)، بينما تشير نتائج الدراسة الميدانية إلى وجود علاقة إيجابية بين (IA) و(CH) في ظل (TOT) و (POT)، وعلاقة سلبية في ظل (FCFT)، كما يؤدي (SRDSM) إلى تعديل العلاقة بين (IA) و(CH) وفقاً لـ (TOT) وذلك للأبعاد الثلاثة لـ (SRDSM)، بينما لم يؤدي إلى تعديل العلاقة في ظل نظريتي (POT) و (FCFT).

الأصالة/القيمة: تعد الدراسة الحالية الأولى من نوعها في إكتشاف العلاقة بين مستوى (IA) و(CH) وتحديد إتجاه سلوك الإدارة نحو الإحتفاظ بالنقدية في ضوء النظريات الثلاثة (TOT-POT-FCFT) من داخل البيئة المصرية والتي تمثل أحد الإقتصاديات الناشئة، كما توفر الدراسة الحالية رؤى واضحة لدور الإفصاح عن تقارير الإستدامة في تعديل العلاقة بين (IA) و(CH) والذي يمثل مجالاً بحثياً غير

مكتشف في مصر، وبذلك تعد الدراسة الحالية إضافة للأدب المحاسبي في هذا الشأن، حيث أن معظم الدراسات - في حدود علم الباحثين- تمت في بيئات متقدمة.

الكلمات الدالة: الإفصاح عبر السوشيال ميديا - تقارير الإستدامة - عدم التماثل المعلوماتي- النظريات المفسرة للإحتفاظ بالنقدية - ممارسات الإحتفاظ بالنقدية في مصر.

1. Introduction

Accounting information plays a crucial role in capital markets given that it helps "investors" in investment decision-making (Wang et al., 2023). Information must have a great deal of transparency (Nguyen & Kimura, 2023). since it results in the fair allocation of disclosed information between the two parties. Owning more information by one party than the other leads to (IA), which occurs not only between internal and external users, but also between investors themselves, especially uninformed "small investors" (Ji et al., 2023). This causes market failure and affects the value of firms listed on the stock exchange market (Ho et al., 2023) and makes "investors" incur additional costs to obtain "private information" (Nagar et al., 2019).

Akerlof (1970) was the first to introduce the concept of IA through the example of low quality for "used cars market" (Akerlof, 1970). Fama (1970) developed the concept of EFM, meaning that stock prices reflect "full information", and all the participants have the same amount of information (Fama,

1970; Goel et al., 2021; Khlifi, 2021). This embodies an "ideal world" for financial markets. However, in "real world", IA is widespread, and markets are more complex, and this assumption does not exist (Goel et al., 2021). Furthermore, due to the differences in complexities imposed by operational environments, financial reports failed to accommodate such differences, resulting in a different degree of IA in different environments (Goel et al., 2021).

Meanwhile, IA is an essential factor that influences managerial decision-making regarding (CH) due to its effect on both management behavior and its interpretability by external parties (Szymanek & Bialek-Jaworska, 2023). The issue of companies' behavior toward CH has gained importance following the contributions of Miller & Orr (1966), Modigliana & Miller (1958) (Siddiqua et al., 2019). By analyzing the accounting literature that investigated the effect of IA on CH, we found that previous studies took two opposite directions:

The first direction is from the perspective of (TOT), which was established by Miller & Orr (1966). Cash is looked upon as a "level", where the presence of IA drives management behavior toward holding an "optimal cash level" (OL) that can be reached when both CH's marginal "costs" and marginal "benefits" are equal. In case of selecting from among lost

investment opportunities, "OL" can be reached when there is a balance between "costs" of liquidity shortage and "costs" of CH (Siddiqua et al., 2019; Miller & Orr, 1966; Akhtar, 2024; Opler et al., 1999; Guizani & Ajmi, 2021). Therefore, deviations from "OL", whether increasing or decreasing, are not to the company's advantage.

The second direction is from the perspective of (POT) and (FCFT), where cash is looked upon as "value". According to POT, which was established by Myers (1984) and Myers & Majluf (1984), an (OL) does not exist because of the differences in priorities among the management, shareholders, investors, and other stakeholders of the company. What really happens is that the management attempts to reduce the costs associated with IA, represented by "external financing costs" and "transaction costs". Management behavior will thus tend to choose a source of financing that is less sensitive to (IA), and the sequence of their choice will prioritize internal financing sources, since they are not affected by IA, through retained earnings, If it is inadequate, the second choice is financing through debt, whereas the last choice is equity or share-issuing (Myers, 1984; Siddiqua et al., 2019; Guizani & Ajmi, 2021; Akhtar, 2024; Haj-Salem & Hussainey, 2021). According to (FCHT), founded by Jensen (1986), IA causes a conflict of interests between "managers" and "shareholders", as the cash surplus due to (IA) increases the opportunistic

behavior of managers and incites them to exploit it to achieve their personal interests at the expense of the shareholders' interests and desires. The management seeks to maximize its wealth by investing the surplus in projects that might be of negative net value, whereas shareholders seek to obtain dividends, which causes an agency problem between both parties due to conflict of interests (Siddiqua et al., 2019; Jensen, 1986; Akhtar, 2024; Guizani & Ajmi, 2021).

On the other hand, in recent decades, the world witnessed a huge development in industry, resulting in using some resources until they became scarce and expensive. This caused exhaustion of resources, especially natural ones, to an extent that harmed the environment and humanity and reflected a "negative image" of companies in society. The harm affects not only the present generations but also "future generations". This has attracted attention to environmental and social issues and prompted the "United Nations World Commission for Environment and Development – Brundtland- UNWCED" in 1987 to suggest the concept of "sustainable development". Its purport is to preserve future human society's rights without being affected by present human practices (Abeysekera, 2022). As a result, accounting thought came out with what is known as "sustainable development accounting", and companies became responsible toward the society for "sustainable practices". Furthermore, the "economic aspect"

or "profit realization" is no more the focus of the management as its attention is directed toward "social and environmental aspects". Companies are responsible for disclosing such practices, as financial disclosure does not meet the requirements of "sustainability" and "expectations of stakeholders-SH", especially after the increasing pressures on companies (Alsehani et al., 2023). Moreover, companies must take serious steps toward sustainability requirements, and there are pressures from institutional investors and the media (Jie & Jiahui, 2023) since focusing on "profits" will make the company consume resources to achieve its interests without considering its "ethical considerations" toward others (Torelli, 2021). Accordingly, the scope of disclosure had to expand to meet the requirements of "sustainability". Because of these pressures, the "Global Reporting Initiative" (GRI) developed the concept of "sustainability reporting-SR" through several issues, the latest being the fourth issue (G4, 2013), and defined it as "the practices of measuring, disclosure, and accountability of organizational performances into sustainability development goal". Subsequently, with the increasing crises and natural disasters due to climate change, the concept of "sustainability" was extended to include "economic", "social", and "governance" dimensions (Ogochukwu & Grace, 2022; Ezeoha & Omkar, 2017). The increased focus on "organizational accountability and transparency" has led companies to express

their concern to the society about sustainability issues and their implementation of good governance, and companies' need for transparency became essential not only in "financial aspects" but also in "environmental and social aspects", as expressed in guidelines and initiatives (Correia et al., 2021). The accounting literature is rich in studies that discuss "companies' social and environmental responsibility". As SR is concerned with future generations' rights, this type of disclosure shows future and present performance of firms and considers "non-financial disclosures". On the other hand, with the huge development in the (IT) field, communication channels between "companies" and "SH" have witnessed developments over different periods. First, the mode of delivering disclosed information was done through traditional media (e.g., newspapers). Subsequently, with the expansion of internet networks, most companies moved on to "electronic disclosure" (ED) through their websites (Rozario et al., 2022; Boylan & Boylan, 2017). In recent years, SM became part of individuals' daily lives (Lodhia et al., 2020; Said et al., 2023). SM has brought about radical changes, as the "disclosure" method has developed and "accounting information disclosure through SM" has become widespread. Moreover, SM platforms have become a "communication channel", as they are run through applications that can be downloaded on mobile devices, which are available to many individuals (Lodhia et al., 2020;

Said et al., 2023; Reilly & Hynan, 2014), and investors are among the users of such applications (Farkas & Keshk, 2019). Reilly & Hynan (2014) confirmed that communication methods play a significant role in sharing companies' interest of "sustainability" with (SH) and that (SM) is the ideal method and many companies adopted it as an internal and external communication channel for "sustainability information". SRDSM allows access to such information by users in a timely manner at high speed and low cost, and users can search for information through (SM) and reach it immediately (Lodhia et al., 2020; Said et al., 2023; Russo et al., 2022). In addition, it supports "two-way communication- TWC", which allows the receiver to respond to the sender, thereby creating a dialogue between the "company" and "SH". Moreover, TWC extends to other individuals besides different stakeholders, allows effective interaction, feedback, information, and exchange of ideas between the two parties, and shows others' opinions and impressions about firms. It also increases the number of users of such information, as it facilitates its dissemination and circulation by individual users of (SM) (Lodhia et al., 2020; Said et al., 2023; Giacomini et al., 2020). SM refers to what is called "technology facilitated dialogue", which makes it an effective method of communication compared to other methods of disclosure, as it represents "one-way communication-OWC". Contrary to the above situation, OWC

means disseminating information in a way that does not allow for the possibility of communication between the two parties, and it is sometimes called pushing information into one-way direction without the possibility of interaction (Lodhia et al., 2020; Said et al., 2023). Cummings (2001) noted that awareness of SH, especially investors, has developed simultaneously with technological development, as their main desires are no longer merely to be informed, but they became more interested in being more engaged with the company. Gackowski (2017) confirmed this concept and clarified that normal methods of communication could not meet this "perception development" and were no longer an effective method and that moving on to the stage of (TWC) represented a new stage that fit the development of stakeholders' "perception" regarding their relations with the company. De Luca et al. (2022) and Mehmood et al. (2023) showed that (SM) enhances the concept of engagement with (SH) regarding the goals of "sustainable development". Numerous studies discussed (SRDSM). Zhou et al. (2022) demonstrated that Facebook and Twitter are effective for the "disclosure of sustainable development-DSD" by maritime shipping container industry, which has a negative effect on water, as this disclosure broadens our understanding and awareness of this industrial sector to achieve "sustainability". De Luca et al. (2022) demonstrated the role of "Twitter" in the "disclosure of

sustainability information in Europe" and indicated that it aids in strengthening engagement between the "company" and "stakeholders". Borah et al. (2022) showed that (SM) improves sustainability performance in (SMEs) through disclosure and that it has positive effects on innovative skills. Abdel Magid et al. (2023) confirmed the positive effect of "sustainability disclosure" through (SM) on investors' decisions and enhancing companies' reputation. Lodhia et al. (2020) pointed out that (SRDSM) is considered a tool that can consolidate "legitimacy" of the firm in accordance with "legitimacy theory". Said et al. (2023) found that (SRDSM) affects competitiveness positively. Despite the importance of (SRDSM), studies focusing on this topic are still limited. Moreover, several studies have addressed the relationship between (IA) and (CH), but they are rare and did not give a "clear picture" of the relationship between them. Additionally, they were all conducted in different environments other than the Egyptian environment, except for one study (Shehata & Rashed, 2021), which was carried out in Egypt with "IA" as a mediating variable between "CH" and "accounting conservatism". Thus, to the best of the researchers' knowledge, no study examined the role of (SRDSM) as a moderating variable in the relationship between "IA" and "CH". This represents a new path taken by the present study for companies listed on the (EGX) and the Egyptian Sustainability Index (S&P/EGX-ESG). This study aimed to examine the relationship

between "IA" and "CH" from the perspective of (TOT), (POT), and (FCFT) and explore the role of (SRDSM) in moderating this relationship according to each theory. The motives and importance of the research lie in several aspects: EGX is a leader in the field of "sustainability" as the "Egyptian index for sustainability" was launched in 2010 to be the first and only in North Africa and the Middle East region and second in emerging markets after India. EGX is also considered an effective member in the "sustainability group" of the World Federation of Exchanges, founded in March 2014 (The Egyptian Exchange Annual Sustainability Report, 2021). In addition, the number of listed companies on the (ESG) has increased: in 2021 (The Egyptian Exchange Annual Sustainability Report, 2021; The Egyptian Exchange Model Guidance for Reporting on ESG Performance & SDGs, 2019). Furthermore, Egypt is considered attractive to "foreign investments", and foreign direct investment (FDI) has risen to (5792,60 M \$) in the second quarter of 2023. Investment experts and financial analysts expect an increase to (6000,00 M \$ in 2025). Therefore, (SRDSM) should be given adequate attention, as it is considered a pivotal matter to these investors (Trading Economics Report, 2023). Moreover, according to reports issued by the Central Agency for Public Mobilization and Statistics (CAPMAS), cash balances have increased by 41.9% in the year (2015–2016) amounting to (25.45 billion

dollars) in comparison with the previous year (2014–2015) (Shehata & Rashed, 2021). The Central Bank of Egypt revealed an increase in the volume of "cash balances" in banks in the private and family sectors by 489.8 billion Egyptian pounds and (878.293 billion Egyptian pounds) compared to the previous years (Mounir, 2023). In 2018, (EGX) encouraged companies to adopt the "Online Disclosure System-ODS", and by the end of 2018, the number of companies using the (ODS) increased to 220 companies (Abdel Magid et al., 2023; The Egyptian Exchange Annual Report, 2018). Nevertheless, companies listed on the (EGX) do not disclose information through (SM), which highlights the need to encourage companies to disseminate information through (SM). In view of the above, Egypt is considered an ideal environment deserving attention in this field.

The marginal expected value of this study can be shown as follows:

- Testing the relationships between variables, which is the focus of this research, is an unexplored area in Egypt. This study contributes to the accounting literature as it is the first study to investigate the relationship between (IA) and (CH) and the moderating role of (SRDSM), thereby providing practical evidence from Egypt.
- The study is consistent with (EGX) efforts and international bodies efforts to make sustainability reporting disclosure

mandatory, as most studies indicate that it is still "voluntary disclosure" despite its importance.

- The study is compatible with improvement in stakeholders' perceptions about the inaptitude of "traditional methods of disclosure" in creating dialogues with the company.
- The results are expected to raise managers' awareness by providing them with additional insights into the role of (SRDSM) and the importance of adopting disclosure through (SM).
- The study explores managers' behavior in the listed companies on (S&P/EGX-ESG) toward (CH) decisions in the presence of (IA) under the three mentioned theories. It also provides us with an understanding of how the relationship between (IA) and (CH) changes and to what extent with the moderating role of (SRDSM).

We first revealed the existence of an optimal level of cash (OL) of the companies listed on (EGX), and its association with profitability, Data were collected from (97) companies, from (2012 to 2022) Using a model designed for this purpose, including these variables and some control variables that reflect the characteristics of the company.

Then, A questionnaire was designed and sent to financial analysts and managers of investor relations in companies listed on (S&P/EGX-ESG), given that they have great experience in and knowledge of the internal environment of companies and

are more interactive with investors. IA levels were categorized into two levels (high & low), and each category select a certain level and provide answers to questions representing management behavior in (CH) under the three theories to examine the direction taken by the management in the presence of (IA). The "TOT" was formulated in four items based on its assumptions, two items from the "POT", and four items from the "FCFT". A question about "SRDSM" was formulated and divided into "EPIs" (12 items), "SPIs" (11 items), and "GPIs" (10 items).

2. Literature review and development of hypotheses

2.1 IA and the level of CH

Chung et al. (2015) states that companies with high levels of (IA) have lower (CH) levels after applying effective corporate governance, and cash adds a lower value to companies with high levels of (IA). The results support the hypothesis of (CH) levels monitoring costs more than investment opportunities.

Lin et al. (2022) concludes that (CH) levels in dual ownership companies differ from individual ownership companies and that agency costs for dual ownerships rise over the cycle of the company's life, revealing an increase in (IA). The relationship between (IA) and (CH) was explained through three theories, as mentioned in Section 1, as follows:

2.1.1 TOT and development of the first hypothesis

TOT suggests that the trade-off between marginal benefits and costs of (CH) determines the "optimal cash level" of the company (Hendijani Zadeh et al., 2023). Costs of (CH) are represented by costs of alternative opportunities (Loncan & Caldeira, 2014). Mouline (2021) states that costs associated with (CH) represents the ratio of returns from liquid assets, which is often less than the companies' resources, the presence of cash that diminishes the company's profitability, and the estimation of costs and benefits associated with cash, which may differ between shareholders and managers. Nevertheless, the benefits of (CH) according to Opler et al. (1999) are saving costs of fund-raising transactions and not being forced to liquidate assets to meet payments and use liquid assets to finance investments if other financing resources are expensive. Saddour (2006) states that (CH) constitutes a security buffer to avoid costs of external funds. Hendijani Zadeh et al. (2023) indicates that (CH) helps companies reduce transaction costs and default risks. When external financing is hard to obtain due to (IA), companies tend to hold cash if they are more prone to liquidity shocks and financing risks. Limanta & Malelak (2017) states that the main advantages of (CH) are that companies avoid financial difficulties and may use cash. According to Lau & Block (2012), based on the concept of "transactional motive", managers hold additional cash if the cost

of external financing and alternative opportunities for lost investments is high. However, according to the "precautionary motive", the cost of external financing is taken into consideration to determine the "OL". Guizani (2017) mentions that "transactional motive" reduces the possibility of realizing investment projects that cannot be realized without those finances due to financial constraints. In view of the above, the first hypothesis of the research is as follows:

H1: There is a relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG) from the perspective of "TOT".

2.1.2 POT and development of the second hypothesis

Theory indicates that there is no (OL) of (CH), and cash is used as a barrier between "retained earnings" and "investment needs" (loncan & Caldeira, 2014; Guizani, 2017; Hendijani Zadeh et al., 2023; Saddour, 2006). Cash level is a result of financing and investment decisions (Guizani, 2017; Saddour, 2006). Companies tend to use the lowest cost financing, namely "internal financing" (Limanta & Malelak, 2017). If retained earnings are insufficient, companies use debts and then equity (Hendijani Zadeh et al., 2023). In view of the above, the second hypothesis of the research is developed as follows:

H2: There is a relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG) from the perspective of "POT".

2.1.3 FCFT and development of the third hypothesis

Theory suggests that managers hold cash to increase their own benefits instead of paying dividends to shareholders (Jensen, 1986). Managers want to hoard cash to increase the assets they possess and gain more power in investment decisions (Loncan & Caldeira, 2014; Guizani, 2017). POT and FCFT state that there are no target levels of (CH) while (TOT) states otherwise (Guizani, 2017). These theories assume that companies that have (IA) or agency problems find it difficult to obtain external financing at low cost, which drives them to hold more cash (Hendijani Zadeh et al., 2023). In view of the above, the third hypothesis can be formulated as follows:

H3: There is a relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG) from the perspective of "FCFT".

2.2 Disclosure through social media (DSM) and information asymmetry (IA)

Evans (2017) asserts that (DSM) leads to reducing (IA), The results focus on the inverse relation between (DSM) and (IA) in New Zealand, LinkedIn is the only platform inversely related to (IA). Khlifi (2021) supports the assumptions of agency, monitoring, and signal theory. Disclosure on websites and (SM) reduces (IA) for big companies, lenders who adopt (XBRL) and receive positive users' feedback through (SM) enjoy suitable price clauses for contracts of bank loans in the (USA) (Chong, 2016). Wulandari et al. (2023) shows the effectiveness of disclosure of the institution's risk management and intellectual capital on (SM) in reducing (IA) in companies listed on the LQ45 index in Indonesia. Nuseir & Qasim (2021) indicates that companies may use (SM) to mitigate IA between "managers and investors", As SM is used to disclose positive news and selective information only, investors may improve their investment decisions by communicating with companies on (SM).

2.3 Effects of SRDSM and development of the fourth, fifth, and sixth hypotheses

Al-Sartawi & Hamdan (2019) states that the level of disclosure on SM significantly affects the value of companies, which indicates that investors interact positively with companies

involved in "sustainable development" activities. Amin et al. (2024) discusses whether disclosure of companies' social responsibility (CSR) on "Twitter" sends signals to the market about the actual performance of (CSR), or it is merely a tool of green washing to mislead consumers about companies' environmental practices and conceal the deterioration of (SR) performance through followers' tweets on "Twitter". In addition, they found that there is a relationship between (CSR) performance and disclosure on "Twitter" as it supports "signal theory" and expressed doubts about the behavior of green washing among companies in the (UK) on (SM). Amin et al. (2021) shows that Twitter's fame as a platform for (CSR) disclosure spread in the last few years, the presence of a female in the board of directors was positively related to the level of (CSR) disclosure on "Twitter".

Khan & Gupta (2023) indicates that tweeters think positively of green accounting. Regarding the challenges facing "green accounting", misleading clients about the company's actual environmental performance is the most tweeted content on "Twitter".

Ma & Rahman (2022) shows that company size, leverage, and growth are positively related to using (SM) for disclosure and that cultural dimensions mediates the relationship between disclosure on (SM) and disclosure determinants.

Lodhia et al. (2020) points out the limited nature of using (SM) in gaining (SR) legitimacy. The results showed that companies using (SM) can acquire legitimacy and that disclosure on (SM) has a positive effect.

Russo et al. (2022) shows that there is a positive relationship between (SM), represented by "Twitter" and companies' sustainable performance-SP, since companies driven by environmental, social, and governance factors use "Twitter" as a tool to achieve higher levels of legitimacy and manage "sustainability" strategies and performances, Therefore, (SM) substantially contributes to creating "social responsibility" identity, which refers to a causal relationship between (SM) and companies' SP. Iazzi et al. (2022) add that the disclosure of "social responsibility" via (SM) affects the success of stakeholders' participation in environmental issues facing companies. Xiang & Birt , (2021) note that a company's (SM) strategy is affected by its size and classification on (ESG) index. Alhares et al. (2023) refers to a negative relationship between environmental, social, and governance disclosures and the level of (CH) in the listed companies in five members of (OECD), which occurs at stages of access to the market, growth, deterioration, and market exit of a company. Based on the above, the following hypotheses can be developed:

***H4: SRDSM moderates the relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG).**

In addition, most studies have shown that disclosure of sustainability reports has three dimensions: environmental, social, and governance. Accordingly, the following sub-hypotheses are derived:

-H4.1: EPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG).

-H4.2: GPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG).

-H4.3: SPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG).

***H5: SRDSM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG).**

Similarly, the following sub-hypotheses are derived according to the three dimensions:

-H5.1: EPI_SM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize

sources of funding in companies listed on the index (S&P/EGX/ESG).

-H5.2: GPI_SM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG).

-H5.3: SPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an OL of cash in companies listed on the index (S&P/EGX/ESG).

***H6: SRDSM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).**

the following sub Similarly, the following sub-hypotheses are derived according to the three dimensions:

-H6.1: EPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).

-H6.2: GPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).

-H6.3: SPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash

to achieve their interests in companies listed on the index (S&P/EGX/ESG).

3. Methodology and model Design

3.1 Sample

To reveal the extent to which companies listed on (EGX) hold an optimal level of cash, realistic data for 97 companies from various sectors, with a total of 1067 observations, were collected, covering the period from 2012 to 2022. These data were collected from Mubasher website and the website of the (EGX). To conduct the field study, the sample consisted of 210 individuals (94 financial analysts/116 employees at the Investor Relations Department). The questionnaire was sent to them electronically.

3.2 Variables and their measurements

Table (1) shows the variables for the applied and field study.

Table (1): Variables and their measurements

Study	Variables	Measurement
Applied study	IA	Bid-ask spread (BAS) = Ask prices – bid prices divided by the average price of the bid and ask prices
	CH	Ratio of cash and cash equivalents to total assets
	ROA	Net income available for common stocks divided by total assets
	Size	Natural logarithm for total assets
	Lev	Total liabilities divided by total assets
	Tang	(Plant + property + equipment) to total assets
	CPX	Capital expenditure to total assets
	FCFF	Free cash flow to the firm divided by total assets

Field Study	IA	High level – low level
	CH	Sub-items for the three theories: (A scale from 0% to 100% is used for each sub-item, where 0% refers to does not do so at all, while 100% refers to do so at 100%) • Trade-off theory (TOT): 4 items • Pecking order theory (POT): 2 items • Free cash flow theory (FCFT): 4 items (see Appendix 1)
	SRDSM	Divided into three indicators: (A scale from 0% to 100% is used for EPIs, SPIs, & GPIs, where 0% refers not important at all, while 100% refers to 100% important) • Environmental performance indicators (EPIs): 12 items • Social performance indicators (SPIs): 11 items • Governance performance indicators (GPIs): 10 items

3.3 Applied study and model design

The trade-off between (CH) and (ROA) is challenging. Firms with a higher level of (CH) have a higher liquidity level to meet their short-run obligations and drive lower profitability. Thus, we must test the existence of an (OL) of (CH) in association with (ROA) (i.e., a level of CH that maximizes ROA and any deviation from this level of CH will negatively impact firm ROA).

Research model

$$\begin{aligned}
 ROA_{i,t} = & \beta_0 + \beta_1 CH_{i,t} + \beta_2 CH_Square_{i,t} + \beta_3 Size_{i,t} \\
 & + \beta_4 Lev_{i,t} + \beta_5 Tang_{i,t} + \beta_6 Cpx_{i,t} \\
 & + \beta_7 FCF_{i,t} + \varepsilon_{i,t}
 \end{aligned}$$

Table (2) shows the sector classification of our sample according to the Global Industry Classification Standard (GICS).

GICS Sector	Firms	Freq.	Percent
Communication Services	2	22	2.06
Consumer Discretionary	17	187	17.53
Consumer Staples	14	154	14.43
Energy	1	11	1.03
Health Care	5	55	5.15
Industrials	18	198	18.56
Materials	20	220	20.62
Real Estate	19	209	19.59
Utilities	1	11	1.03
Total	97	1067	100.00

3.4.Optimal (CH) in association with (ROA) for Egyptian listed firms

Descriptive statistics

Table (3) presents the statistical summary for (ROA), (CH), (IA) measured by Bid-Ask spread (BAS), and firm-specific control variables. The variables are subjected to Winsorization, where the extreme values at the top and bottom 3% are replaced with less extreme values to reduce the impact of outliers.

Table (3): Descriptive statistics

Variables	Obs.	Mean	Median	Std. Dev.	Min	Max
ROA	1067	.036	0.030	.08	-.159	.274
CH	1067	.075	0.052	.073	0	.393
BAS	1067	0.048	0.040	0.037	0	0.12
Size	1067	20.705	20.503	1.781	16.578	25.817
Lev	1067	.496	0.452	.339	.005	4.713
Tang	1056	.323	0.278	.25	0	1.094
Cpx	1036	.03	0.0135	.043	0	.338
FCFF	1040	.004	0.004	.115	-1.121	.465

ROA is 0.036. This average value is higher than the median value of 0.030. It suggests that the top firms possess superior (ROA), while most firms have lower (ROA). Regarding (CH), it shows a standard deviation of 0.052, which represents around (69%) of the mean (0.075). The (CH) level shows high dispersion around the mean through time and across firms. BAS shows a mean of 0.048, with high dispersion around the mean of (0.037), meaning that (IA) levels vary between high and low for Egyptian listed firms.

On the other hand, firms' characteristics, which represent the control variables such as firm size, leads to smoothing in the total assets, resulting in small variances in firm size among the sample firms. Thus, the size shows a standard deviation of 1.78, which is very small relative to the overall mean of 20.70. In addition, the small range between the minimum value of 16.578 and the maximum value of 25.82 reflects homogeneity in firm size. In contrast, the (Lev) shows approximately 45.2% standard deviation around the overall mean of 49.6%, indicating that some firms depend heavily on liabilities to finance their assets.

Moreover, 32.3% of the total assets are tangible assets, with high dispersion around the mean, reflecting heterogeneity in asset structure for Egyptian listed firms. Cpx shows a mean of 3%, with a low standard deviation, indicating that Egyptian listed firms have the same expansion plans. Finally, free cash flow to

the firm (FCFF) shows a mean of 0.004, with a standard deviation of 0.004.

3.5 Correlation

The correlation matrix offers preliminary insights into the association between (ROA) and (CH). Furthermore, it assists in detecting potential multicollinearity, which can lead to inaccurate estimations. To assess this matter, we calculated the variance inflation factor for every independent variable. The calculated variance inflation factors range from 1.11 to 1.32, which is lower than the threshold of 10 specified by (Chatterjee and Hadi ,2013). Hence, no multicollinearity was detected between the regressors used to test the existence of the optimal CH associated with (ROA) for Egyptian listed firms. The highest correlation coefficient is (0.534) between (ROA) and (FCFF), as shown in Table (4).

Table (4): Correlation matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) ROA	1.000						
(2) CH	0.319*** (0.001)	1.000					
(3) Size	0.110 (0.282)	-0.048 (0.642)	1.000				
(4) Lev	-0.222** (0.029)	-0.076 (0.462)	0.290*** (0.004)	1.000			
(5) Tang	-0.132 (0.201)	-0.142 (0.168)	-0.072 (0.489)	-0.218** (0.033)	1.000		
(6) Cpx	0.083 (0.429)	0.159 (0.125)	-0.180* (0.082)	-0.050 (0.629)	0.296*** (0.004)	1.000	
(7) FCFF	0.329*** (0.001)	-0.069 (0.506)	0.228** (0.027)	-0.105 (0.316)	0.008 (0.940)	-0.155 (0.135)	1.000
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$							

Table (4) reports the Pearson correlation coefficients for our research variables. CH and FCFF are positively and significantly associated with (ROA). In contrast, Lev negatively and significantly correlates with (ROA). On the other hand, Size, Tang, and Cpx have no direct linear significant association with (ROA).

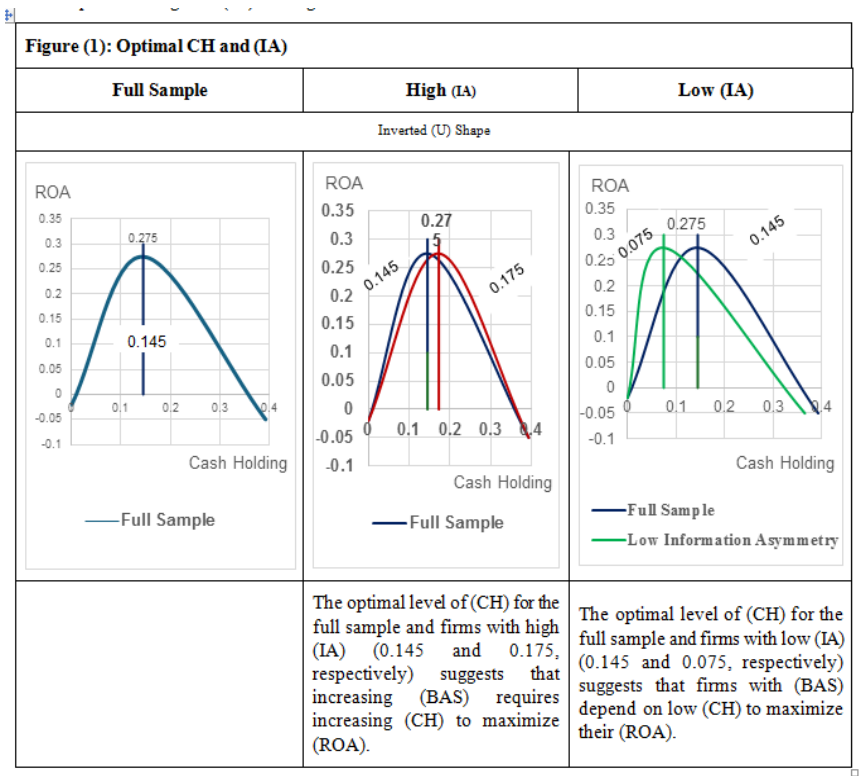
3.6 Optimal cash holding for Egyptian listed firms

We examined the existence of an optimal level of (CH) that maximizes (ROA) for Egyptian listed firms and for firms with high and low (IA) to test the impact of (IA) on shifting the optimal level of (CH).

Table (5): The impact of (IA) on the optimal level of (CH) in association with (ROA)

Variables	Full Sample	High (IA)	Low (IA)
std_CH	0.0304***	0.0250***	0.0356***
std_CH2	-0.0158***	-0.0105*	-0.0235***
Size	0.0050***	0.0068***	0.0035**
Lev	-0.0710***	-0.0837***	-0.0637***
Tang	-0.0860***	-0.0857***	-0.0901***
Cpx	0.3515***	0.3682***	0.3454***
FCFF	0.2186***	0.2275***	0.2188***
Cons	-0.001	-0.0345	0.0326
Obs	1036	510	526
R2	0.3832	0.3449	0.4255
Adjusted R2	0.379	0.3357	0.4177
*, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.			

Figure (1) shows a curvilinear relationship between (CH) and (ROA), indicating an optimal level of (CH). Any deviation will lead to inefficiency in the (ROA). There is an inverted U-shaped relationship between (CH) and (ROA), where the (CH) parameter is positive (>0) and significant and CH2 squared is negative (<0) and significant.



3.7 Examining the relationship between (IA) and managers' (CH) practices, and moderating role of (SRDSM) using a questionnaire

this section presents data reduction and factor analysis, descriptive statistics, validity and reliability, diagnostic statistics, and hypotheses testing. Moreover, SPSS 26, STATA 17, and SmartPLS 4 were used to conduct all the statistical analyses necessary for testing the validity of the developed hypotheses. Data were collected from 210 respondents with the following demographic characteristics.

Table (6): Sample characteristics			
		Freq.	Percent
Education	Bachelor's	116	55.24
	Diploma	13	6.19
	Doctorate	8	3.81
	Master's	73	34.76
Gender	Female	124	59.05
	Male	86	40.95
Work Experience	From 15 to less than 25 years	33	15.71
	From 5 to less than 15 years	102	48.57
	Less than 5 years	57	27.14
	More than 25 years	18	8.57
Job	Financial analyst	94	44.76
	Investors relationship management	116	55.24
Total		210	100.00

Table (7): Factor analysis and descriptive statistics									
Construct	CA	CR	AVE	Sample Mean	SD	Low IA	High IA	Diff.	P-Value
CH-FCFT	0.877	0.876	0.645	.237	.12	0.266	.221	0.044	0.009
CH-POT	0.912	0.958	0.919	.672	.142	0.546	.745	-.199	0.000
CH-TOT	0.923	0.944	0.809	.225	.198	0.151	.268	-.116	0.000
EPI-SM	0.931	0.947	0.781	.691	.209	0.696	.689	.007	0.802
GPI-SM	0.953	0.849	0.496	.665	.194	0.632	.684	-.053	0.055
SPI-SM	0.964	0.966	0.851	.732	.192	0.763	.714	.049	0.074

Cronbach's alpha (CA) and composite reliability (CR) measure internal consistency in scale dimensions. CA assumes that factor loadings of all measurements are the same, while CR does not. 65% or greater is the benchmark for good internal consistency measured by CA and CR . As shown in Table (7), all CA and CR values are greater than 87.7%, which illustrates a strong internal consistency between the items of each construct. All constructs have explained variance greater than the acceptable level of 50%. The minimum observed explained variance is 49.6%. Table (7) presents the average perception of each construct for the entire sample, high IA and low IA samples, and its standard deviation. The results in Table (7) show that the respondents have very negative views of (CH) under the FCFT and TOT and positive perceptions of (CH) under the POT.

On the other hand, the respondents have positive perceptions of the three dimensions of disclosure. t-test compares the differences between the means for the high and low levels Our findings show a negative significant difference between (CH) for

firms with high and low IA under the FCFT (Diff = 0.044, P-value= 0.009), which means firms with high IA require low (CH) levels. In contrast, there is a positive significant difference in (CH) for firms with high and low IA according to the POT and TOT (Diff = 0.199, P-value= 0.000; Diff = 0.116, P-value= 0.000), respectively. This means firms with high IA require high (CH) levels according to the TOT and POT. On the other hand, there is no significant difference between firms with high and low IA regarding all the three dimensions of disclosure.

Table (8): The moderating effect of SRDSM		
Path	ESG	
	Coefficient	R ²
IA → CH_TOT	0.660***	0.174
SRDSM → CH_TOT	-0.092***	
IA* SRDSM → CH_TOT	0.415***	
IA → CH_POT	1.413***	0.47
SRDSM → CH_POT	-0.118**	
IA* SRDSM → CH_POT	0.095	
IA → CH_FCFT	-1.184***	0.333
SRDSM → CH_FCFT	0.076	
IA* SRDSM → CH_FCFT	0.004	
*** p<0.01, ** p<0.05, * p<0.1		

Table (8) summarizes the proposed hypotheses. The results show that firms with high (IA) hold higher cash levels according to the TOT and POT. In contrast, firms with high (IA) hold higher cash levels according to the FCFT.

According to the TOT and POT, disclosure of sustainability reports positively impacts (CH). In contrast, disclosure of sustainability reports does not affect (CH) according to the POT and FCFT.

As per the TOT, disclosure of sustainability reports mitigates the positive impact of (IA) on (CH). However, it does not affect the association between (IA) and (CH) according to the POT and FCFT.

Table (9): The moderating effect of SRDSM						
Path	EPIs_SM		GPIs_SM		SPIs_SM	
	Coefficient	R ²	Coefficient	R ²	Coefficient	R ²
IA → CH_TOT	0.658***	0.214	0.647***	0.146	0.675***	0.161
SRDSM → CH_TOT	-0.046*		-0.072**		0.012	
IA* SRDSM → CH_TOT	0.508***		0.384**		0.316***	
IA → CH_POT	1.412***	0.468	1.448***	0.614	1.403***	0.477
SRDSM → CH_POT	-0.067		-0.090*		-0.014	
IA* SRDSM → CH_POT	0.091		-0.487*		-0.125	
IA → CH_FCFT	-1.096***	0.320	-1.207***	0.339	-1.205***	0.341
SRDSM → CH_FCFT	0.134***		-0.009		0.003	
IA* SRDSM → CH_FCFT	0.073		-0.004		0.046	
*** p<0.01, ** p<0.05, * p<0.1						

According to the FCFT, high (IA) requires low (CH) . Moreover, EPIs_SM has a positive significant impact on (CH) . In contrast, GPIs-SM and SPIs-SM does not impact (CH) . Furthermore, all dimensions of disclosure have no moderating effect on the

association between (IA) and (CH). IA and SRDSM and their interaction explain 0.32, 0.339, and 0.341, respectively.

According to the POT, high (IA) requires high (CH). Moreover, all dimensions of disclosure do not impact (CH). In addition, EPIs_SM and SPIs-SM has no moderating effect on the association between (IA) and (CH). In contrast, corporate governance mitigates the negative impact of (IA) on (CH), indicating that corporate governance increases the (CH) level for firms with high (IA). IA and SRDSM and their interaction explain 0.468, 0.614, and 0.477, respectively.

According to the TOT, high (IA) requires high (CH). In addition, EPIs_SM and GPIs-SM significantly negatively impacts (CH). In contrast, SPIs-SM does not impact (CH). Furthermore, three dimensions mitigate the positive impact of (IA) on (CH). IA and SRDSM and their interaction explain 0.214, 0.146, and 0.161, respectively.

Hypothesis Tests can be summarized in table (10)

Table (10) Summary of Hypothesis tests

Hypothesis		Finding	Direction
H1	There is a relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG) from the perspective of "TOT"	Supported	Positive
H2	There is a relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG) from the perspective of "POT."	Supported	Positive
H3	There is a relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG) from the perspective of "FCFT".	Supported	Negative
H4	SRDSM moderates the relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG).	Supported	Positive
H4.1	EPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG).	Supported	Positive
H4.2	GPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG)	Supported	Positive
H4.3	SPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG)	Supported	Positive
H5	SRDSM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H5.1	EPI_SM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H5.2	GPI_SM moderates the relationship between the level of IA and managers' behavior toward holding cash to prioritize sources of funding in companies listed on the index (S&P/EGX/ESG).	Supported	Negative
H5.3	SPI_SM moderates the relationship between the level of IA and managers' behavior toward holding an optimal level of cash in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H6	SRDSM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H6.1	EPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H6.2	GPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).	Rejected	---
H6.3	SPI_SM moderates the relationship between the level of IA and managers' behavior toward exploiting excess cash to achieve their interests in companies listed on the index (S&P/EGX/ESG).	Rejected	---

4. Conclusions & future research

This study analyzed the relationship between IA and CH and the moderating role of SRDSM divided into three indicators: SPIs, GPIs, and EPIs. Thus, this study provides insights into this important research field especially in Egypt. According to POT and TOT, a high level of IA requires a high level of cash and vice versa according to FCFT. Moreover, this study found that the three indicators of SRDSM do not moderate the relationship between IA and CH according to FCFT and POT, while they moderate the relationship according to TOT. In general, managers determine the optimal level of cash through the trade-off between marginal benefits and costs, where SRDSM leads to reduces the positive effect of IA on CH. The current study has many practical implications. 1) It promotes developing the role of disclosure through SM in achieving sustainability. 2) It provides an overview of managers' behavior toward CH. 3) the results of this study provide guidance to companies that seek to enhance their communication strategies with stakeholders to disclose sustainability reports, including the three indicators. Future research should examine the effect of corporate disclosure through SM in response to climate changes on the relationship between IA and CH in accordance with their fulfillment of sustainability requirements and facing urgent environmental crises. also examine the impact of the characteristics of the board of directors on the relationship between IA and CH. we

recommend conducting a study on the role of disclosure of sustainability reports in helping information users predict future stock prices and proposing mechanisms for controlling impression management to reduce misleading information through SM to improve investment decisions.

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Appendix (1) – Sub Items of three theories

TOT	▪ Item (1): To what extent does the management focus on determining the optimal cash level? ▪ Item (2): To what extent does the management determine the optimal cash level by achieving a balance between the costs and benefits of holding cash? ▪ Item (3): To what extent does the management determine the optimal cash level by achieving a balance between the costs of holding cash and costs of raising cash? ▪ Item (4): To what extent does the management determine the optimal cash level by achieving a balance between the costs of liquidity shortage and the costs of holding cash when doing a trade-off between lost investment opportunities due to lack of available funds?
POT	▪ Item (1): To what extent does the management direct toward determining the three alternatives for financing for the purpose of minimizing the costs resulting from information asymmetry represented in transaction costs and external financing costs? (Alternatives include internal financing, debt financing, and equity financing.) ▪ Item (2): To what extent does the management choose a source of financing that has the lowest cost and lowest sensitivity to information asymmetry?
FCFT	▪ Item (1): To what extent does the management direct toward holding cash to achieve its own interests regardless of the interests of investors and shareholders? ▪ Item (2): To what extent does the management direct toward holding cash, but without the desire to divide earnings among shareholders? ▪ Item (3): To what extent does the management direct toward holding cash to avoid risks and uncertain circumstances? ▪ Item (4): To what extent does the management direct toward financing in net negative present value investment projects due to its reliance on presence of excess cash that is not subject to external financing conditions?