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The effect of ownership structure on water disclosure in Indonesian companies

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ABSTRACT

The purpose of this study is to empirically investigate the relationship between ownership structure and the extent of water disclosure made by Indonesian listed companies. It is analyzed using the lens of agency theory which emphasizes the relationship between the principal and the agent. The data set comprises 673 Indonesian listed companies with 2279 firm-year observations for the period of 2018–2021. This study finds that institutional ownership has a negative and significant relationship with water disclosure. The extent of water disclosure is positively and significantly associated with government ownership and foreign ownership. Our finding indicates that companies tend to disclose less water information if the firms' shares are concentrated to a few hands of shareholders. Further analysis documents that industry sensitivity strengthens the influence of government and foreign ownership on the level of water disclosure.

1. Introduction

Nowadays, water has been classified as "the world's top global risk" by World Economic Forum (2023). It is primarily driven by the continuously declining water availability due to climate change, population growth, economic development, globalization, urbanization, and industrialization (Ben-Amar and Chelli, 2018). These factors have led to water crises in many countries around the world. Such water crises can result in decreased food production, such as rice, vegetables, and fruits, exacerbating global food insecurity (World Economic Forum, 2023). All water users, including companies, must be responsible for maintaining water availability and quality. There is a fact that the company is one of the largest water users and has the potential to pollute water sources (Cesar and Jhony, 2021; Komnitsas, 2020; Nguyen, 2021). Hence, the company is expected to show water stewardship activities to support water preservation.

Water disclosure is important for companies to communicate water-related information to all stakeholders (Wicaksono and Setiawan, 2022, 2023a). Hazelton (2013) argues that water disclosure is human rights for all stakeholders, so companies must be accountable to meet their rights. As water is a basic necessity for humans and other creatures, stakeholders are now more active in urging companies to improve water management practices and increase transparency regarding its impact on water quantity and quality (Zeng et al., 2020). Thus, companies can no longer operate with a "business-as-usual" mentality (Yu et al., 2020). When a company wastes water or pollutes water sources, it violates its fundamental obligations to society (Burritt et al., 2016).

Botha (2022) mentions that water governance is crucial for managing firm activities' impacts on water quality and quality. One important governance pillar is shareholders who can control the company through ownership (Salehi et al., 2017). As principals, shareholders expect agents (managers) to act in their best interests to maximize shareholders' wealth (Jensen and Meckling, 1976). When the demand for water information increases, shareholders will play a vital role in encouraging and supervising managers to engage in such activities. Subsequently, shareholders request that managers be transparent by making water disclosures, which is important for survival. Shareholders do not want the company to fail to manage its negative impact because it can disrupt the potential returns for shareholders (Pham and Tran, 2020). In addition, water disclosure can be suggested to reduce a firm's risks and enhance financial performance (Zeng et al., 2020). Therefore, shareholders are more likely to provide pressure to managers to show water stewardship activities and disclosure.

Research on factors influencing water disclosure has mainly focused

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on the significance of stakeholders pressure (Zhang et al., 2021; Wicaksono and Setiawan, 2023a) and corporate characteristics (Burritt et al., 2016; Yu et al., 2020; Zhang et al., 2021; Yu, 2022). However, no research focuses on the association between ownership structure and water disclosure. Several studies have provided empirical evidence that ownership structure is a significant driver of CSR-related disclosure (Muttakin and Subramaniam, 2015; Qa'dan and Suwaidan, 2019; Ullah et al., 2019). It can be suggested that shareholders actively press and supervise the managers to conduct CSR activities and disclose them to all stakeholders. Hence, our research is addressed to fill the gap by providing empirical evidence regarding the relationship between ownership structure and water disclosure.

Our study investigates this relationship using Indonesian-listed companies as research samples. It is based on several reasons. First, previous studies investigate the water disclosure practices of companies in developed countries (Burritt et al., 2016; Ben-Amar and Chelli, 2018; Yu et al., 2020). It is because firms in developed countries are more aware of sustainability issues than those in developing countries such as Indonesia (Bhatia and Makkar, 2020; Giannarakis, 2014). Second, Indonesia is a country blessed with abundant water, but it faces serious water problems, and water in Indonesia is going to be scarce. It is caused by population and economic growth that increase water demand. In addition, according to The Central Statistics Agency (BPS), many water sources in Indonesia, such as lakes and rivers, have been contaminated with waste from households and industries that contain hazardous materials (Badan Pusat Statistik (BPS), 2022). Climate change then exacerbates water problems in Indonesia (Anbumozhi et al., 2012).

This study finds a negative and significant relationship between institutional ownership and water disclosure using the data from Indonesian firms listed on the Indonesia Stock Exchange (IDX). This finding indicates that institutional shareholders tend to pursue short-term profit so that they do not take into account water disclosure.We also find that government ownership is positively and significantly associated with water disclosure practices. It shows that the government plays an active role in pressing managers to disclose water information. Our finding indicates that the higher percentage of ownership of foreign investors drives the higher level of water disclosure. This study finds a negative and significant relationship between ownership concentration and water disclosure, indicating that a firm discloses less water information when a firm's ownership structure is concentrated in a few shareholders.

This research makes several contributions. First, we provide empirical evidence regarding water disclosure practices in companies from developing countries, namely Indonesia, as previous studies focus on developed countries and cross-country analysis. Second, while prior studies focus on the effect of stakeholder pressures and corporate characteristics, our study examines the relationship between the different types of ownership and water disclosure. Third, our result can be used to promote more extensive water disclosure practices among Indonesian companies.

The rest of this paper is structured as follows. Section 2 provides an overview of the impacts of industries' activities on water quantity and quality in Indonesia. Section 3 elaborates theoretical framework and develops the hypothesis. Section 4 presents the research method. Section 5 discusses the statistical results. Section 6 presents the discussion of findings. Section 7 concludes the study.

2. Potential impacts of industries' activities on the water in Indonesia

The industry is considered one of the contributors to environmental degradation in Indonesia, including the decline in water quantity and quality. BPS (2020) reports that the industry is the second-largest water consumer after the household. In 2019, Indonesian water drinking companies distributed 2679 million m^3 of water to society and 477 million m^3 of water to industry. The total amount of distributed water can be higher in upcoming years due to the growth of population and industry in Indonesia, which increase water demand in Indonesia. On the other hand, Indonesia's water sources are gradually decreasing due to climate change and development that deplete water sources (Bates et al., 2008). This phenomenon indicates strong competition between industry and society regarding access to clean water, as their water sources are groundwater, rivers, lakes, etc.

Water-sensitive industries may use higher amounts of water than others. They potentially result the conflict between the company and society because water-sensitive company reduces water availability or disappears water sources in Indonesia. Not only does the industry reduce water availability, but the company also diminishes water quality of water sources in Indonesia. Companies' activities contaminate public water sources by discharging waste into rivers. Then, the water color changes, containing the hazardous elements that threaten human health if the water is consumed (Suriadikusumah et al., 2021). Asian Development Bank (2016) reports that the waste from households and industries, such as agriculture, and food and beverage, causes the bad quality of water rivers and lakes in Indonesia. For example, Greenpeace reports that a mining company has destroyed the landscape and damaged groundwater quality in several provinces in Kalimantan Island, Indonesia. Mining also leaves the landscape from cleared forests to polluted water and contaminated land (Greenpeace Indonesia, 2016). BPD (2022) reports that almost all rivers in Indonesia are considered polluted, ranging from low to heavy contaminated levels. It can be concluded that Indonesia has serious water problems due to the negative impacts of the company's activities on water quantity and quality. In addition, water demand in Indonesia has increased; in contrast, water supply has decreased over the years. This situation can potentially lead to water crisis if the unbalance of water demand and supply in Indonesia is not properly anticipated.

3. Theoretical framework and hypotheses development

3.1. Theoretical background on water sustainability

Since there is a serious water crisis and climate change, water sustainability is an emerging issue because there is a problem related to water supply and demand. Water was a key topic of the Rio Summit in 1992, and Chapter 18 of Agenda 21 discuss the sustainable use of water resources (Hazelton, 2015). Water sustainability is one of the goals of the United Nations Sustainable Development Goals (SDG), which was released in 2015 (Bebbington and Unerman, 2018). In terms of water sustainability concern, Ali et al. (2023) propose the direction for both academics and practitioners to develop water innovations to strengthen water management systems and practices as it is essential to sustainable development. Ali et al. (2023) also suggest that water management practices such as water reuse, green infrastructure, wastewater to energy, and stormwater management are necessary to address water-related problems including water scarcity, low water quality, and flooding challenges. In addition, innovation in water management practices can potentially adopt digital technology to achieve the SDG goals including water goals. Although not specifically discussing water sustainability, Di Vaio et al. (2022) provide the example of using digital technology for sustainable waste management in cruise industry and find that the technology is effective in reducing waste. Innovation in digital transformation can be a key success factor for accountability and increase sustainable performance even in the Covid-19 pandemic situation (Di Vaio et al., 2023a, 2023b).

Besides water management, water governance also plays a crucial role in achieving water sustainability (Di Vaio et al., 2021). This water governance can be used to accommodate population growth and economic development and to face climate change (Botha, 2022; World Economic Forum, 2016). Although there is no universal definition, water governance refers to all social, political, economic, and administrative systems related to water resources development and management. Water governance encourages all parties (governments, private

sectors, institutions, and society) to make the best decision to use, allocate, develop, and manage water resources (Tortajada, 2010). Di Vaio et al. (2021) argue that the effective water governance system cannot be addressed by a single actor alone. It needs collaboration and coordination to find out the best way to preserve water where every single party has roles and responsibilities. The participation of government, organizations, companies, and society is important to understand their interest in water and mediate the differences among them. The government can play a regulatory role by issuing regulations that emphasize water preservation. However, it will be useless if there is no strong commitment from the government and the water users including society and industry. Therefore, partnership, active participation, and stakeholder engagement are recommended to achieve water sustainability to overcome water-related problems. Di Vaio et al. (2021) further explain that strong partnership between institutions and organizations is useful to meet SDG goal number 6 (Clean water and Sanitation) even in the uncertain conditions such as Covid-19 pandemic.

In terms of industrial context, it is widely known that companies use higher amounts of water and potentially contaminate water sources with hazardous elements from their waste (Hazelton, 2013; Wicaksono and Setiawan, 2022, 2023a). Consequently, their stakeholders will take into account companies activities and expect companies to maintain water availability and quality for moral obligation to society. Lambooy (2011) argues that people and industry are competing water users and the water competition will increase due to the declining of water availability and quality. It will be a challenge for companies to make sure that companies provide an insignificant impact on water resources. It means that companies around the world are recommended to continue their operation without "business as usual" mentality (Burritt et al., 2016; Yu et al., 2020). Hence, water governance is going to be important as it consists of a corporate water framework where water objectives are decided and water strategies are developed (Botha, 2022; Woodhouse and Muller, 2017). Companies are also expected to have effective water management to manage their impact to water. This water management can be used to support three pillars of sustainability, namely planet, people, and profit, which are also known as the environment, social, and economic (Di Vaio et al., 2021; Elkington, 1997). Effective water management can preserve the earth by maintaining water sources and giving society an access to freshwater (Ali et al., 2023). In terms of economic pillar, prior studies provide evidence that water management can enhance firm financial performance and reduce firm risks so that companies can maximize their profit (Khuong, 2022; Zeng et al., 2020).

Not only are water management and governance important to manage the water, accounting technique is also required to account for water use and assess the impacts on water. Hence, water accounting is developed as an innovation to maintain water sustainability and achieve global goals such as water goals in SDGs. In addition, water accounting is crucial to help a company manage its interaction with water and promote water sustainability (Christ and Burritt, 2017a). In general, water accounting generates information that managers can use to measure the water risks and enhance firm's efficiency (Morrison et al., 2010; Christ and Burritt, 2017b). Information generated from water accounting can also be disclosed to stakeholders in order to show that companies actively maintain water availability and quality. Hazelton (2013) argues water information constitutes a human right so that disclosing water information is necessary for the realization of human rights.

Like financial accounting that results financial disclosure, water accounting also results water disclosure that consists of corporate water information. However, water disclosure is not presented in standalone report but it usually belongs to the framework of sustainability report. Sustainability disclosure is not only presented in periodic corporate reports such as annual and sustainability report, this disclosure can also be presented in social media which allow followers to express their opinion on corporate sustainability practices (Arrigo et al., 2022). This sustainability disclosure is useful in making sure that companies have a positive image on the face of stakeholders and maintain their social license which is important for their survival (Di Vaio et al., 2023a, 2023b).

In the context of water disclosure, it can shape corporate accountability because it depends on water information disclosed by companies (Hazelton, 2015). Companies usually use water guidelines to understand what information that should be provided by companies. Although it is not mandatory, many companies in the world adopt water guideline provided by the Global Reporting Initiative (GRI) (Hewawithana et al., 2023). The latest version of GRI water standard, GRI-303, consists of five water indicators that cover management for the impact of water discharge, total amount of water discharge, withdrawal, and consumption. Despite companies follow the water guideline, it is important for companies to recognize the specific expectations from stakeholders that are not covered in this guideline. Hence, stakeholder engagement is suggested to capture stakeholders' expectations and improve water management through direct participation from stakeholders in decision-making processes (Arrigo et al., 2022; Hazelton, 2013).

3.2. *Agency theory*

Our study is anchored by agency theory because we suggest that disclosure is a product of the agency relationship between principals and agents. Agency theory postulates that there is a contract between principals and agents because principals delegate decision-making authority to agents. Principals expect agents to use some corporate resources in order to maximize principals' wealth. However, if there is a separation between ownership and management, it can be assumed that information asymmetry will exist between principals and agents (Muttakin and Subramaniam, 2015). Furthermore, when both parties want to maximize their wealth, agents will not act following the best interest of principals (Jensen and Meckling, 1976). This theory also argues that agents potentially behave in their personal interest, and the interests of principals are not their priority (Salehi et al., 2017). The principals can solve this problem by providing monitoring mechanisms although it emerges the costs. This monitoring mechanism will put pressure to management to satisfy the demands and expectations of principals.

The agency theory approach suggests that firms disclose information is a function of management discretion to solve information asymmetry problems (Vu et al., 2011; Aboagye-Otchere et al., 2012). In addition, agents use corporate disclosure to show that they are attempting to meet principals' expectations in the best way possible (Rouf and Al-Harun, 2011). Disclosure practices can be deemed as a tool to align the interests of agents and principals. Management therefore tend to increase the level of corporate disclosure to convince the principals that they are acting optimally because they understand that principals control their behavior through monitoring mechanism (Vu et al., 2011; Aboagye-Otchere et al., 2012). Corporate disclosure is also important for principals to reduce the cost of obtaining corporate information and is a mechanism to supervise firm's management.

It has been mentioned above that separation between ownership and management potentially emerges information asymmetry experienced by principals. Principals may experience some difficulties in obtaining corporation information due to this separation. Hence, the shareholders will actively push the managers to create corporate disclosure to diminish information asymmetry problem and supervise the management. In terms of water, companies recently are under pressure from external stakeholders, especially society, to conduct water stewardship activities in order to maintain water quantity and quality (Wicaksono and Setiawan, 2023b). In some conditions, companies need to engage with their stakeholders, including shareholders, to catch up with the demands and expectations of stakeholders. These can be the input for companies to create water policies, water programs, and water disclosure (Di Vaio et al., 2021). On the other hand, when companies fail to show water sustainability activities, they will have higher risks because society can make any protests and blockades (Burritt et al., 2016; Wicaksono and Setiawan, 2022). Then, their social contract can be revoked temporarily or permanently because firms fail to align with

stakeholders expectations. This condition can disturb the achievement of shareholders' goals so that shareholders will actively influence managers to conduct water stewardship activities and disclose these to all stakeholders. Previous studies indicate that water disclosure can reduce firm risks and potentially have positive impacts on firm performance (Zeng et al., 2020; Liu et al., 2021). Literature in corporate disclosure indicates that shareholders, investigated through ownership structure, significantly influence CSR-related disclosure. However, the different type of shareholders may have different motives and purposes for making investments in a company. It then can be suggested that the different types of shareholders provide different influences on companies regarding water disclosure practices. Our study investigates four different types of shareholders or ownership, namely institutional ownership, government ownership, and foreign ownership. We also test ownership concentration to understand the effect of the largest shareholders on water disclosure. The hypothesis development is described in the next section.

3.3. Hypotheses development

3.3.1. Institutional ownership

Institutional investors are typically large investors with higher firm shares and greater voting power (Muttakin and Subramaniam, 2015; Qa'dan and Suwaidan, 2019). According to Salehi et al. (2017)), institutional investors have no intention to control companies and play an active role in corporate governance. It is because their job is to invest the wealth in the most profitable opportunities. On the other hand, scholars argue that institutional investors will control the company because they have a larger percentage of the firm's shares than other shareholders (Habbash, 2016; Nurleni et al., 2018; Ullah et al., 2019). According to agency theory, increasing institutional ownership is the better way to reduce agency costs because the investors actively oversee the managers (Jensen and Meckling, 1976). Although there is a debate about whether institutional investors are active or passive in controlling companies, institutional investors need to ensure that their investments are safe to achieve their objectives (Qa'dan and Suwaidan, 2019).

Institutional investors are perceived to have an effective oversight role in monitoring and controlling corporate activities (Mekaoui et al., 2022). These investors have privileges regarding access to internal information sources that are unavailable to other stakeholders (El-diftar et al., 2017; Acar et al., 2021). However, they actively encourage companies to be accountable and transparent to all stakeholders by disclosing company information, including water information. Institutional investors require information disclosure to monitor companies and make investment decisions (Ullah et al., 2019). Although no research examines the relationship between institutional ownership and water disclosure, previous studies provide evidence that institutional investors have a positive relationship with social and environmental disclosure. (Elgergeni, Khan and Kakabadse, 2018) find that institutional ownership is positively linked to disclosure practices. Furthermore, Shahab and Ye (2018) demonstrate a positive relationship between institutional ownership and the level of social and environmental disclosure. These findings indicate that institutional investors have the motivation and power to promote and control disclosure practices. Therefore, this study assumes that institutional ownership influences managers to provide water information. This study proposes the following hypotheses.

H1. : There is a positive and significant relationship between institutional ownership and water disclosure.

3.3.2. Government ownership

The Indonesian government actually has a strong commitment to preserve water availability in Indonesia. According to the 1945 Constitution, water in Indonesia is under the power of the State and shall be used to the greatest benefit of the people. In Indonesia, numerous regulations concerning water are aimed to maintain water availability. All industrial sectors are regulated to maintain the quantity and quality of water in Indonesia actively. Additionally, the Indonesian government issues Law No. 40/2007, which regulates companies to disclose CSR-related information, including water, in their annual reports. Furthermore, the Financial Services Authority (OJK) issued Regulation No. 51/2017, which requires companies to present sustainability reports that can be included in their annual or separate reports. Under these regulated conditions, the government can press companies to comply with the regulations and disclose corporate information.

In Indonesia, the government can invest money in companies by holding a certain number of shares. When the government is a majority shareholder or holds more than 50 % of the shares, a company is categorized as a state-owned company. If the government is a firm's shareholder, it provides extra power for the government to press management to conduct certain behavior, including disclosure practices. This is because the government can directly influence management to disclose corporate information (Alfraih and Almutawa, 2017; Wicaksono and Setiawan, 2022). According to Muttakin and Subramaniam (2015), state-owned companies tend to be politically sensitive because their activities are more visible to the public. There are high expectations from the public that state-owned companies comply with regulations and more engage in accountability activities as a moral obligation. Hence, the government asks the managers to create a higher level of corporate information disclosure to legitimize state-owned company activities. Previous studies find that government ownership is a significant driver of corporate disclosure (Ghazali, 2007; Said et al., 2009; Alotaibi and Hussainey, 2016; Alnabsha et al., 2018). Wicaksono and Setiawan (2022) document a significant positive relationship between government ownership and water disclosure. Therefore, this study develops the following hypotheses.

H2. : There is a positive and significant relationship between government ownership and water disclosure.

3.3.3. Foreign ownership

Foreign ownership is one of the corporate ownership structure dimensions investigated in the corporate disclosure literature (Cahaya et al., 2012; Nagata and Nguyen, 2017; Adel et al., 2019). It is widely known that foreign investment is a mechanism for enhancing corporate governance, firm performance, and profitability (Bokpin and Isshaq, 2009). Foreign ownership represents the influence of foreign practices on firm behavior (Jeon et al., 2011; Oh et al., 2011). However, there is a significant separation between foreign investors and companies due to the geographical distance between them (Sari et al., 2021). Consequently, foreign investors face difficulties in monitoring and obtaining information about the company. From the agency theory perspective, foreign investors tend to request more information to reduce information asymmetry problems (Muttakin and Khan, 2014; Wicaksono and Setiawan, 2022). The foreign investors will actively push the managers to create a higher level of corporate disclosure, including social and environmental disclosure. This disclosure can be a signal that the company is socially responsible so that investing in this company is safe for foreigners. Then, foreigners use corporate disclosure to predict future prospects and reduce the cost of obtaining information (Cai et al., 2019).

Prior studies provide evidence that disclosure practice is strongly influenced by foreign investors from developed countries (Oh et al., 2011; Qa'dan and Suwaidan, 2019). This is because investors from developed countries have better experience in social responsibility activities and disclosures (Bhatia and Makkar, 2020; Giannarakis, 2014). As Indonesia receives investments from many investors from developed countries, it can be assumed that Indonesian companies receive a lot of pressure from foreign investors to be more accountable and transparent. (Dyck et al., 2019) argue that investors from developed countries usually transfer their values and cultures to the company where their money is invested. Several studies find that there is a positive and significant

relationship between foreign ownership and CSR-related information disclosure (Huafang and Jianguo, 2007; Hu et al., 2018; Ismail et al., 2018). In terms of water disclosure, (Wicaksono and Setiawan, 2022) find that a higher percentage of shares owned by foreign investors results in a higher level of water disclosure. As such, this study proposes following the directional hypotheses.

H3. : There is a positive and significant relationship between foreign ownership and water disclosure.

3.3.4. Ownership concentration

Scholars have extensively investigated ownership concentration to understand its influence on corporate disclosure practices. According to Zouari and Dhifi (2022), ownership concentration is a mechanism to control executives by shareholders. Under such ownership, conflicts can arise between agents and principals because agent behavior can be more opportunistic (Reverte, 2009). In Asian countries, agency conflict usually occurs between ownership concentration and minority shareholders because they have strong power to influence the managers including providing the information (Vu et al., 2011). When corporate ownership is concentrated in the hands of few shareholders, management will be less likely to respond to the demand for information from other shareholders and stakeholders (Burritt et al., 2016). It can be said that ownership concentration diminishes the need for corporate disclosure (Fama and Jensen, 1983). On the other hand, firms tend to disclose more information when the ownership structure is more dispersed (Reverte, 2009). Corporate disclosure can be a bonding and monitoring tool in order to reduce agency conflicts between agents and principals (Fama and Jensen, 1983).

Empirical evidence regarding the relationship between concentrated ownership and voluntary disclosure is mixed. Some studies document a positive relationship between ownership concentration and firm disclosure (Ghazali, 2007; Said et al., 2009; Garas and ElMassah, 2018). On the other hand, there is empirical evidence that ownership concentration has negative influence on information disclosure (Tsamenyi et al., 2007; Ismail and El-Shaib, 2012; Chitambo and Tauringana, 2014; Shahab and Ye, 2018). In terms of water disclosure, (Burritt et al., 2016) find that ownership concentration has a negative association with water disclosure. In contrast, Yu et al. (2020) find that ownership concentration positively affects water disclosure. This study develops the following hypotheses based on the assertion supported by agency theory that large shareholders do not need more comprehensive information disclosure. Therefore, we develop the following hypotheses.

H4. : There is a negative and significant relationship between ownership concentration and water disclosure.

4. Research method

4.1. Sample

This research examines the annual and sustainability reports of Indonesian companies listed on the Indonesia Stock Exchange (IDX). It is because Indonesian listed companies are required to create CSR-related or sustainability report although there is no guidance for creating this report so that the content of the report can vary across companies (Cahaya et al., 2012). In addition, the government and OJK require Indonesian listed companies to upload the report in the website. Hence, the information regarding listed companies can be easier gathered than unlisted firms. Our study examines Indonesian listed companies from 2018–2021. We choose these examination periods because we want to understand the level of corporate disclosure after OJK releases the regulation in 2017. OJK regulation mentions that sustainability report is mandatory for all Indonesian companies. This report can be included in the annual report or presented as a separate report. To obtain the data, we download corporate reports from company's official. This study uses unbalanced panel data because there are companies' reports that are unavailable on the website or the report files cannot be opened. This research also includes Indonesian companies that is listed for the first time during the years of observation. The company is excluded from the sample lists if the report cannot be accessed in all examination years. Our final samples consist of 673 companies from 11 industrial sectors following IDX's industrial classification, with 2279 firm-year observations. The sample distribution is presented in Table 1.

4.2. Variable measurement

The dependent variable in this study is water disclosure. This variable is measured using the water disclosure index based on the Global Reporting Initiative's (GRI) Water Guidelines (GRI-303), which consists of 5 water disclosure items. This study applies a checklist technique to capture the company's water information, which is matched with the GRI Water Guidelines. We adopt a dichotomous procedure whereby a company is awarded a "1" if a water item is disclosed and "0" if it is not disclosed. According to (Haniffa and Cooke, 2005), to make sure that the judgment is not biased, the entire corporate report is read before any judgment is made. Therefore, to obtain the data, we carefully read the annual and sustainability reports to ensure that no water-related information is missed and our judgment is unbiased. Accordingly, the water disclosure index is derived by calculating the ratio of the actual score of water disclosure to the maximum score that the company can achieve.

This study has four independent variables: institutional ownership, government ownership, foreign ownership, and ownership concentration. The definition of institutional ownership follows (Nurleni et al., 2018), which defines institutional ownership as ownership by the parties in the form of institutions such as foundations, banks, insurance companies, investment firms, pension funds, limited liability companies, and other institutions. This variable is measured by the percentage of the company's shares owned by institutions. We also use this technique to measure the government ownership variable, which is measured by taking the percentage of share ownership by the government (Al-Janadi et al., 2016). Foreign ownership is assessed using the percentage of shares owned by foreign investors (Saini and Singhania, 2019). Ownership concentration is measured using the percentage of total shares owned by the top five shareholders (Burritt et al., 2016).

This study also includes corporate characteristics and corporate governance variables as control variables. Financial performance is assessed using return on asset by calculating the ratio of net profit or loss to total assets. Firm size is measured by the natural logarithm of the firm's total assets. Leverage is measured by the ratio of total liabilities to total assets. Firm age is measured by the number of years since the firm's

Table 1
Sample distribution.

Industry	Frequency	Percentage
Panel A: Sample based on classification of the industry		
Energy	63	9.35
Material	85	12.61
Industrial	46	6.82
Consumer non-cyclicals	91	13.50
Consumer cyclicals	112	16.62
Healthcare	19	2.82
Financial	97	14.39
Properties and real estate	64	9.50
Technology	23	3.42
Infrastructure	51	7.71
Transportation and logistic	22	3.26
Total	**673**	**100**
Year	**Frequency**	
Panel B: Sample per examination year		
2018	511	
2019	553	
2020	585	
2021	630	
Total	**2279**	

inception. As Indonesia adopts a two-tier governance system, this study controls the variables related to commissioners and directors. The size of commissioners is measured using the number of commissioners in the board of commissioners. The number of independent commissioners in the board of commissioners measures the Independent commissioners variable. Directors size is measured by the number of directors on the board of directors. Women director is assessed by the number of women directors in the board of directors.

4.3. Model specification

To investigate the effect of ownership structure on the extent of water disclosure in listed Indonesian companies during the period of 2018–2021, this research develops a regression model as follows:

$$\begin{aligned} WDI_{it} = {} & \beta_0 + \beta 1\ INS_{it} + \beta 2\ GOV_{it} + \beta 3\ FOR_{it} + \beta 4\ CON_{it} + \beta 5\ ROA_{it} \\ & + \beta 6\ SIZE_{it} + \beta 7\ LEV_{it} + \beta 8\ AGE_{it} + \beta 9\ COMSZ_{it} + \beta 10\ COMIDP_{it} \\ & + \beta 11\ DIRSZ_{it} + \beta 12\ DIRWOM_{it} + e_{it} \end{aligned}$$

Where: WDI is water disclosure index, INS is institutional ownership, GOV is government ownership, FOR is foreign ownership, CON is ownership concentration, ROA is return on asset, SIZE is firm size, LEV is firm leverage, AGE is firm age, COMSZ is size of commissioners, COMIDP is independent commissioners, DIRSZ is directors size, and DIRWOM is women directors on the board of directors.

5. Results

Table 2 indicates descriptive statistics for all variables included in this study. Water disclosure index has a mean value of 0.197, with the minimum value of 0 and maximum value of 0.857. It implies that the level of water disclosure in Indonesian companies are relatively low. The mean value for institutional ownership is 61.468 %. The average government ownership is 3.243 %. The average level of foreign ownership is 14.746 %. Ownership concentration has a mean value of 53.470 %. In terms of control variables, the average values of corporate characteristics variables, namely financial performance, firm size, leverage, and firm age are 1.042; 28.630; 207.381; and 33.099, respectively. The mean values for corporate governance variables, namely directors size, women directors, commissioner size, and independent commissioner are 3.859; 1.615; 4.434; and 0.643, respectively.

Table 3 presents the correlation matrix for the variables investigated in this study. The table shows that the water disclosure index is negatively correlated with institutional ownership ($\rho = -0.096$). In contrast, water disclosure index is positively associated with government

Table 2
Descriptive statistics.

Variables	Mean	Minimum	Maximum	Std. Deviation
WDI	0.197	0	0.857	0.283
INS	61.468	0	99.990	27.720
GOV	3.243	0	90.030	14.269
FOR	14.746	0	99.940	26.115
CON	53.470	0	99.990	21.828
ROA	1.042	-476.699	830.236	32.488
SIZE	28.630	18.117	35.030	1.951
LEV	207.381	-27.700	319,253	6600.235
AGE	33.099	2	162	18.343
COMSZ	3.859	1	16	1.758
COMIDP	1.615	1	6	0.804
DIRSZ	4.434	1	14	1.974
DIRWOM	0.643	0	6	0.912

Note: WDI = water disclosure index; INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration; ROA = financial performance; SIZE = firm size; LEV = leverage; AGE = firm age; COMSZ = size of board of commissioners; COMIDP = independent commissioners; DIRSZ = size of board of directors; DIRWOM = female directors

Table 3
Correlation matrix.

	WDI	INS	GOV	FOR	CON	ROA	SIZE	LEV	AGE	COMSZ	COMIDP	DIRSZ	DIRWOM
WDI	1												
INS	-0.096 * **	1											
GOV	0.168 * **	-0.466 * **	1										
FOR	0.003	0.328 * **	-0.097 * **	1									
CON	0.055 * **	0.413 * **	0.119 * **	0.137 * **	1								
ROA	0.010	-0.001	0.005	-0.012	0.022	1							
SIZE	0.181 * **	-0.069 * **	0.312 * **	0.123 * **	0.066 * **	0.112 * **	1						
LEV	-0.011	0.003	-0.005	0.013	-0.020	-0.099 * **	-0.117 * **	1					
AGE	0.105 * **	-0.036 *	0.210 * **	0.178 * **	0.065 * **	0.003	0.332 * **	-0.004	1				
COMSZ	0.122 * **	-0.012	0.246 * **	0.191 * **	0.007	0.022	0.583 * **	-0.024	0.329 * **	1			
COMIDP	0.129 * **	-0.021	0.241 * **	0.216 * **	0.042 * *	0.016	0.595 * **	-0.017	0.333 * **	0.306 * **	1		
DIRSZ	0.119 * **	-0.013	0.211 * **	0.177 * **	0.049 * *	0.016	0.635 * **	-0.016	0.322	0.583 * **	0.584 * **	1	
DIRWOM	0.018	0.097 * **	-0.031	0.032	0.065 * **	0.015	0.174 * **	-0.014	0.110 * **	0.159 * **	0.223 * **	0.382 * **	1

Note: WDI = water disclosure index; INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration; ROA = financial performance; SIZE = firm size; LEV = leverage; AGE = firm age; COMSZ = size of board of commissioners; COMIDP = independent commissioners; DIRSZ = size of board of directors; DIRWOM = female directors. *, **, *** = statistically significant at less than 0.10, 0.05 and 0.01 levels, respectively.

ownership (ρ = 0.168), foreign ownership, and ownership concentration (ρ = 0.055). However, the relationship between foreign ownership and water disclosure is insignificant at all levels of significance. The score of water disclosure is also positively and significantly linked with control variables, namely firm size (ρ = 0.181), firm age (ρ = 0.105), commissioner size (ρ = 0.122), independent commissioner (ρ = 0.129), and directors size (ρ = 0.119). All the coefficient correlations shown in Table 3 are less than 0.8, indicating no serious multi-collinearity problem (Saunders et al., 2016; Sekaran and Bougie, 2016).

Table 4 reports the regression results using water disclosure index as a dependent variable. In Model 1, this study examines the effect of institutional ownership on water disclosure. We find a negative and significant coefficient of institutional ownership variable (β = −0.0002, $p < 0.01$). This finding does not support our first hypotheses. It also contradicts the findings of previous studies that document a positive coefficient (Elgergeni et al., 2018; Nurleni et al., 2018). Our finding implies that the higher ownership of institutional investors results in a lower extent of water disclosure. Although the effect of institutional ownership is statistically significant, the coefficient of this variable is not economically significant. It is because the level of water disclosure decreases by only 0.02 points when institutional shareholders hold 100 % of firm's shares.

In Model 2, we investigate the influence of government ownership on water and find a positive and significant coefficient (β = 0.005, $p < 0.01$). Thus, our second hypothesis is supported. This result indicates that government actively presses managers to disclose more water-related information. It is consistent with the findings of (Yu, 2022), who suggest that companies with higher government ownership report more water information to comply with the regulations. The effect of government ownership is also economically significant as the extent of water disclosure increases by 0.25 points if government has only 50 % of company' shares. In Model 3, this study reports a positive and significant coefficient of foreign ownership variable (β = 0.008, $p < 0.10$), that supports the third hypothesis. This finding is consistent with the research findings of (Wicaksono and Setiawan, 2022), indicating that foreign investors press the managers to create water disclosure to reduce information asymmetry problems. Based on the magnitude of the coefficient of foreign ownership, the level of water disclosure will increase significantly when foreigners own higher percentage of firm's shares. Thus, it can be said that the effect of foreign ownership is economically significant.

In Model 4, this research documents a negative and significant coefficient of ownership concentration variable (β = −0.001, $p < 0.10$). Hence, the fourth hypothesis is supported. It is consistent with the findings of (Burritt et al., 2016) in Japanese companies. This finding implies that the firm's ownership structure is concentrated to a few hands of shareholders, resulting in a lower level of water disclosure. However, the effect of ownership concentration is not economically significant because the level of water disclosure decreases insignificantly, although the largest shareholders hold higher percentage of the shares. Finally, we regress water disclosure on all ownership variables in Model 5. Our results are consistent with the findings reported in Model 1-Model 4. In regards to control variables, We find that firm size, firm age, and size of board of commissioners have positive and significant relationships with water disclosure.

5.1. Robustness check

This study conducts robustness check to ensure our findings are robust. First, we change the measurement of water disclosure from GRI guidelines to water items developed by (Morikawa et al., 2007). The regression results are presented in Table 5. This table shows the consistent result where institutional ownership and ownership concentration have a negative and significant relationship with water disclosure. In contrast, government and foreign ownership have positive and significant associations with the extent of water disclosure. Second, we decompose our sample into two groups based on periods following the case of the Covid-19 pandemic. This robustness check is to understand whether or not pandemic Covid-19 changes the association between ownership structure and water disclosure as presented in Table 4. The first group consists of the firms' data before the pandemic (2018–2019), and the second group is for the firms' data during the pandemic (2020–2021). We conduct this test because financial and social performance decrease during the pandemic years (Sahut et al., 2023). This situation potentially decrease firm's capability and motivation to conduct social activities and disclosure because social information requires significant costs and resources (Donthu and Gustafsson, 2020; Golubeva, 2021). The results are shown in Table 6. The table reports no different results regarding the effect of institutional ownership, government ownership, foreign ownership, and ownership concentration on water disclosure practices in the prior and during the pandemic years. It can be concluded that the influence of ownership structure on water disclosure is consistent, although the Covid-19 pandemic potentially disturbs the firm's financial performance.

Table 4
Multiple regression results.

Variable	Model 1 Coeff. (t-value)	Model 2 Coeff. (t-value)	Model 3 Coeff. (t-value)	Model 4 Coeff. (t-value)	Model 5 Coeff. (t-value)	Economic Significance
INS	-0.0002***(−4.721)				-0.0005*** (−3.518)	Not significant
GOV		0.005***(3.629)			0.006*** (2.819)	Significant
FOR			0.008* (1.869)		0.004* (1.732)	Significant
CON				-0.001*** (4.287)	-0.001*** (3.564)	Not significant
ROA	-0.001(−0.531)	-0.001(−0.639)	-0.001(−0.864)	-0.001(−0.912)	-0.001(−0.773)	Not significant
SIZE	0.049***(4.289)	0.042***(4.185)	0.051*** (4.381)	0.051*** (3.756)	0.051*** (2.816)	Significant
LEV	-0.001(−0.865)	-0.001(−0.928)	-0.001(−0.843)	-0.001-(0.730)	-0.001-(0.554)	Not significant
AGE	0.001*(1765)	0.001(1.452)	0.001** (2134)	0.001* (1.749)	0.001* (1.828)	Not significant
COMSZ	0.017*(1.839)	0.014(1.322)	0.016* (1.856)	0.017* (1.911)	0.009* (1.859)	Significant
COMIDP	-0.014(−1.187)	-0.016(−1.231)	-0.011 (−1.319)	-0.015 (−1.284)	-0.014(−1.113)	Not significant
DIRSZ	0.006(1.362)	0.005(1.176)	0.007 (1.267)	0.006 (1.148)	0.003(1.359)	Not significant
DIRWOM	-0.013(−1.112)	-0.010(−0.993)	-0.019 (−1.231)	-0.023* (−1.842)	-0.020* (−1.891)	Not significant
Adjusted R^2	0.204	0.216	0.196	0.197	0.216	-
Period Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
Industry Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
F-Stat	49.755	53.370	47.257	47.781	58.498	-
Prob. (F.stat)	0.000***	0.000***	0.000***	0.000***	0.000***	-

Note: INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration; ROA = financial performance; SIZE = firm size; LEV = leverage; AGE = firm age; COMSZ = size of board of commissioners; COMIDP = independent commissioners; DIRSZ = size of board of directors; DIRWOM = female directors. * , **, *** = statistically significant at less than 0.10, 0.05 and 0.01 levels, respectively.

Table 5
Regression results for robustness check.

Variable	Model 1 Coeff. (t-value)	Model 2 Coeff. (t-value)	Model 3 Coeff. (t-value)	Model 4 Coeff. (t-value)	Model 5 Coeff. (t-value)	Economic Significance
INS	-0.0008 * ** (−5.219)				-0.0007 * *(−2.317)	Not significant
GOV		0.007 * ** (2.829)			0.006 * ** (2.799)	Significant
FOR			0.004 * (1.729)		0.003 * (1.703)	Significant
CON				-0.001 * ** (3.863)	-0.002 * *(2.125)	Not significant
ROA	-0.004(−0.491)	-0.003(−0.389)	-0.002(−0.411)	-0.003(−0.512)	-0.001(−0.573)	Not significant
SIZE	0.059 * ** (2.984)	0.052 * ** (2.863)	0.051 * ** (3.539)	0.058 * ** (3.912)	0.051 * (1.938)	Significant
LEV	-0.001(−0.763)	-0.001(−0.828)	-0.001(−0.811)	-0.001-(0.842)	-0.001-(0.754)	Not significant
AGE	0.001 * ** (3114))	0.001(1.341)	0.001 * *(2264)	0.001 * ** (1.981)	0.001 * (1.714)	Not significant
COMSZ	0.026 * *(2.139)	0.019(1.003)	0.019 * (1.887)	0.020 * (1.921)	0.020 * (1.898)	Significant
COMIDP	-0.018(−1.276)	-0.017(−1.231)	-0.016(−1.219)	-0.019(−1.084)	-0.013(−1.086)	Not significant
DIRSZ	0.003(1.264)	0.003(1.375)	0.004(1.118)	0.004(1.248)	0.003(1.447)	Not significant
DIRWOM	-0.018(−1.016)	-0.014(−0.942)	-0.016(−1.126)	-0.063 * *(−1.739)	-0.050 * *(−2.278)	Not significant
Adjusted R^2	0.381	0.317	0.356	0.361	0.382	-
Period Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
Industry Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
F-Stat	63.534	65.441	67.936	61.185	58.498	-
Prob. (F.stat)	0.000 * **	0.000 * **	0.000 * **	0.000 * **	0.000 * **	-

Note: INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration; ROA = financial performance; SIZE = firm size; LEV = leverage; AGE = firm age; COMSZ = size of board of commissioners; COMIDP = independent commissioners; DIRSZ = size of board of directors; DIRWOM = female directors. * , * *, * ** = statistically significant at less than 0.10, 0.05 and 0.01 levels, respectively.

Table 6
Regression results for before and during pandemic Covid-19 periods.

Variable	Model 1 Coeff. (t-value)	Model 2 Coeff. (t-value)	Model 3 Coeff. (t-value)	Model 4 Coeff. (t-value)	Model 5 Coeff. (t-value)	Economic Significance
Panel A: Before Pandemic Covid-19 Period						
INS	-0.0008 * *(−2.164)				-0.0005 * (−1.873)	Not significant
GOV		0.004 * ** (4.826)			0.003 * ** (3.114)	Significant
FOR			0.003 * ** (2.378)		0.004 * ** (2.472)	Significant
CON				-0.001 * ** (4.830)	-0.001 * *(1.993)	Not significant
Control variables	*Included*	*Included*	*Included*	*Included*	*Included*	-
Adjusted R^2	0.256	0.294	0.271	0.238	0.265	-
Period Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
Industry Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
F-Stat	41.273	37.193	39.742	38.211	39.198	-
Prob. (F.stat)	0.000 * **	0.000 * **	0.000 * **	0.000 * **	0.000 * **	-
Panel B: During Pandemic Covid-19 Period						
INS	-0.0003 * ** (−3.486)				-0.0004 * *(−2.169)	Not significant
GOV		0.003 * (1.837)			0.004 * (1.898)	Significant
FOR			0.003 * ** (3.316)		0.004 * *(2.248)	Significant
CON				-0.002 * ** (−2.837)	-0.001 * *(−2.145)	Not significant
Control variables	*Included*	*Included*	*Included*	*Included*	*Included*	-
Adjusted R^2	0.211	0.283	0.243	0.294	0.315	-
Period Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
Industry Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
F-Stat	39.864	35.639	32.887	37.154	39.887	-
Prob. (F.stat)	0.000 * **	0.000 * **	0.000 *	0.000 *	0.000 *	-

Note: INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration. * , * *, * ** = statistically significant at less than 0.10, 0.05 and 0.01 levels, respectively.

5.2. Further analysis

This study also undertakes further analysis by considering industry sensitivity in the association between ownership structure and water disclosure. Previous studies find that water-sensitive companies provide greater water information than non-sensitive companies (Burritt et al., 2016; Yu et al., 2020; Zhang et al., 2021). We use industry sensitivity as a moderating variable that moderates the relationship between ownership structure and water disclosure. Following Burritt et al. (2016), we classify energy, material, industrial, consumer non-cyclical, property and real estate, and infrastructure sector as water-sensitive industries. The remaining industries are classified as non-sensitive industries. We measure this variable using a dichotomous technique with "1" representing companies from water-sensitive industries and "0" representing firms from non-sensitive industries. The results are presented in Table 7. The findings indicate that industry sensitivity significantly strengthens the positive effect of government and foreign ownership on water disclosure. On the other hand, industry sensitivity weakens the negative association of institutional ownership and ownership concentration with water disclosure. The findings indicate that all types of ownership will place their attention on water disclosure when the company is categorized into water sensitive industry. Hence, they press managers to show water stewardship activities and disclose water information to reduce the water risks and negative public perceptions about company.

6. Discussion of findings

This study investigates the relationship between ownership structure and the extent of water disclosure in Indonesian companies. Our analysis is anchored by agency theory emphasizing the principal-agent relationship (Jensen and Meckling, 1976). In this theory, the principal asks the agent to disclose more corporate information as a monitoring

Table 7
Further analysis.

Variable	Model 1 Coeff. (t-value)	Model 2 Coeff. (t-value)	Model 3 Coeff. (t-value)	Model 4 Coeff. (t-value)	Model 5 Coeff. (t-value)	Economic Significance
INS	-0.008 * (−1.852)				-0.006 * (−1.736)	Not significant
INS*WS	0.163 * *(2.286)				0.123 * ** (3.553)	Significant
GOV		0.028 * ** (3.287)			0.015 * ** (3.892)	Significant
GOV*WS		0.183 * *(2.278)			0.119 * (1.884)	Significant
FOR			0.015 * *(2.318)		0.011 * *(2.289)	Significant
FOR*WS			0.129 * (1.865)		0.122 * *(1.968)	Significant
CON				-0.008 * ** (−4.298)	-0.003 * *(2.428)	Not significant
CON*WS				0.149 * *(2.379)	0.116 * (1.852)	Significant
Control variables	*Included*	*Included*	*Included*	*Included*	*Included*	-
Adjusted R^2	0.472	0.418	0.457	0.472	0.485	-
Period Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
Industry Fixed-effect	Yes	Yes	Yes	Yes	Yes	-
F-Stat	58.148	53.395	55.818	54.952	59.847	-
Prob. (F.stat)	0.000 * **	0.000 * **	0.000 * **	0.000 * **	0.000 * **	-

Note: WS = water sensitive industry; INS = institutional ownership; GOV = government ownership; FOR = foreign ownership; CON = ownership concentration. *, **, *** = statistically significant at less than 0.10, 0.05 and 0.01 levels, respectively.

mechanism to ensure that the agent conducts any behavior expected by the principal (Salehi et al., 2017). In addition, corporate disclosure can be used to reduce information asymmetry problems and agency costs (Vu et al., 2011). Using the data from Indonesian companies listed on IDX, this study provides empirical evidence that supports the notion of agency theory. Our findings suggest that ownership structure has a significant association with water disclosure.

The first hypothesis testing indicates a negative and significant relationship between institutional ownership and water disclosure. Although this finding does not support the first hypothesis, it aligns with previous studies that find a significant negative effect of institutional ownership. In Indonesia, institutional investors hold over 70 % of shares of companies listed on the IDX (CNN Indonesia, 2015), indicating institutional investors as large investors. Although (Claessens et al., 2002) argue that large shareholders have strong incentives to exert pressure on managers and use company information to mitigate agency problems, the negative effect of institutional ownership may suggest that institutional investors tend to pursue short-term profit rather than long-term profit. This result indicates that this investor may not use water disclosure as a tool to achieve their goals. It is because water disclosure entails any costs that potentially reduce the return received by institutional investors. Hence, it can be said that they do not actively press the managers to provide water information. Indeed, institutional investors can collect corporate information from internal sources due to their strong power (Acar et al., 2021). Yet, they will influence the managers to maximize firms' profitability so that they ignore any activities that raise the costs such as water stewardship activities and disclosures. In this situation, firms' managers are under pressure to achieve short-term goals expected by institutional investors (Salehi et al., 2017). Therefore, it can be concluded that institutional investors in Indonesia are less likely to influence managers to provide water information as they focus only on firm performance especially firm financial performance.

In the second hypothesis, this study predicts that government ownership has a positive influence on water disclosure. The statistical result indicates that government ownership has a positive and significant coefficient on water disclosure. This suggests that the government presses companies to disclose more water-related information. When the government is in the firm's ownership structure, the government can easily encourage the managers to show water stewardship activities and disclosures. This pressure can be a government commitment to preserve water availability and quality in Indonesia. The 1945 Constitution of the Republic of Indonesia states that water is controlled by the State and used extensively for the benefit of the people. This implicitly indicates that the Indonesian government is responsible for maintaining the water in Indonesia, including the negative impacts of companies' activities. On the other hand, state-owned companies are sensitive because their activities are more visible in the public eye (Muttakin and Subramaniam, 2015). Hence, there is a higher expectation from the public that state-owned companies more actively promote stewardship activities. It is therefore government requests the managers to conduct water activities and disclose more water-related information in order to legitimize state-owned companies.

Another research finding finds a positive and significant relationship between foreign ownership and water disclosure, which supports the third hypothesis. It indicates that foreign investors have a strong concern for water sustainability, so they demand a higher level of water disclosure. In Indonesia, most foreign investors come from developed countries such as Singapore, China, Japan, the USA, the UK, and others. Foreign investors from developed countries usually pay more attention to corporate accountability, particularly how companies attempt to meet public expectations related to sustainable business practices (Sari et al., 2021). Foreigners then urge companies to engage in greater corporate information disclosure, including water disclosure, as a commitment to maintain water availability and quality. From an agency theory perspective, this water disclosure is used by foreign investors to mitigate information asymmetry problems as they face more serious information asymmetry problems than domestic investors due to the geographical separation (Vu, Tower and Scully, 2011). It can be suggested that foreign investors need water disclosure to assess a firm's water-related risks as investing in foreign companies is risky due to the difficulties of gathering information (Wicaksono and Setiawan, 2022, 2023b).

An interesting finding from this research is a significant negative relationship between ownership concentration and water disclosure. This finding indicates that water disclosure level will be lower when company's ownership structure is concentrated in the few hands of shareholders. It is because larger (controlling) shareholders can obtain corporate information directly from internal sources (Reverte, 2009). Larger shareholders usually enjoy complete controlling rights over companies so that they are likely to enjoy private benefits of control including gathering corporate information (Grassa, 2018; Hessayri and Saihi, 2018). Indeed, larger shareholders will actively supervise the managers through the effective monitoring function to achieve their interests (Alomran, 2023; Claessens et al., 2002). However, when corporate ownership is highly concentrated, larger shareholders will expropriate the interests of minority shareholders because they want acquire private benefits (Su et al., 2013). Consequently, the managers will be reluctant to disclose any information and potentially hurt minority shareholders because the company provides lower transparency (Hessayri and Saihi, 2018). In terms of water disclosure, minority shareholders may place their intention on water stewardship activities

and disclosure, but they have lower ability to influence the managers. On the other hand, managers tend to prioritize the interest of large shareholders so that managers focus on how to satisfy the demands and expectations of largest shareholders. As large shareholders have enough power to influence managers, managers will provide corporate information to them so that large shareholders do not need corporate disclosure including water disclosure to obtain corporate information.

The findings of further analysis indicate that institutional investors begin to pay attention to water information when companies are categorized as water-sensitive companies. This is because water-sensitive companies attract more attention from various external stakeholder groups as water is an essential source of life. Investments of institutional investors may be at higher risk if companies fail to manage water effectively and show water stewardship activities. Therefore, institutional investors request more water information to meet the expectations, especially from external stakeholders. This research also finds that industry sensitivity strengthens government and foreign ownership's influence on water disclosure. This indicates that the government and foreign investors play an active role in encouraging managers to create water disclosure in water-sensitive companies.

6.1. Comparative analysis with previous studies

We find several studies examining the determinants of water disclosure practices in the literature, although the published articles on this topic are limited. A study from Burritt et al. (2016) is the first article that explores the driver of the extent of corporate water disclosure. Their study adopts stakeholder theory to understand whether stakeholder pressures have a significant influence on water disclosure in Japanese companies. Company-specific characteristics represent stakeholder pressures and find that firm size, industry water sensitivity, and ownership concentration have significant influence. Another study from Yu et al. (2020), anchored with stakeholder and legitimacy theory, examines the effect of stakeholders and firm characteristics on water disclosure in US firms. This study reveals that firm leverage, blockholder ownership, firm visibility, and industry water sensitivity are significant drivers of water disclosure. Wicaksono and Setiawan (2023b) focus on testing the effect of the origin region of institutional shareholders on water disclosure in Indonesian companies. This study discovers that institutional shareholders from Western country has a positive relationship with water disclosure.

Other studies apply cross-country analysis in order to provide more comprehensive findings that are not limited to a single country. A study by Zhang et al. (2021) adopts self-regulation theory to investigate the factors contributing to corporate decisions to disclose water information. Using firms that participated in the Carbon Disclosure Project (CDP) as samples, the study finds that self-regulation index, water consumption intensity, and regulation stringency have a positive association with corporate water disclosure. Wicaksono and Setiawan (2022) investigate the relationship of stakeholder pressures with water disclosure in agriculture companies around the globe. This study finds that government, foreign shareholders, and international operations are the significant drivers. Another research from Wicaksono and Setiawan (2023a) examine water disclosure practices in Asian mining companies. Using stakeholder theory as the theoretical basis, this study finds that regulation stringency, media exposure, and international operation positively and significantly influence the extent of water disclosure in Asian mining companies.

Based on the explanation above, it can be concluded that prior studies on water disclosure has mainly focused on the significance of corporate characteristics and stakeholder pressures (Burritt et al., 2016; Wicaksono and Setiawan, 2023a; Yu et al., 2020). Hence, there is no study specifically investigate the relationship between ownership structure and water disclosure. In the social and environmental disclosure literature, the ownership structure is understood as one of the significant factors of social and environmental-related disclosure (Muttakin and Subramaniam, 2015; Ullah et al., 2019). Despite Wicaksono and Setiawan (2022) test government ownership and foreign ownership, Burritt et al. (2016) and Yu et al. (2020) examine ownership concentration, these are used to represent the pressures from specific groups of stakeholders, namely government, foreign investors, and larger shareholders. It is therefore our research is addressed to fill this gap in water disclosure literature by investigating and providing empirical evidence about the effect of ownership structure on water disclosure. Unlike prior studies, the agency theory is adopted in our study because we believe that water disclosure comes from agency relationship between principals (shareholders) and agents (managers). Principals need water disclosure to supervise agents' behavior and reduce information asymmetry problems.

We also capture the fact that the majority of prior studies investigate corporate water disclosure practices in developed countries or multi-countries. For instance, Burritt et al. (2016) examine water disclosure in Japanese companies and Yu et al. (2020) test it in US firms. In addition, Wicaksono and Setiawan (2022) examine water disclosure in agriculture companies in the world. Zhang et al. (2021) investigate companies participated in CDP and Wicaksono and Setiawan (2023a) in Asian mining companies. It can be said studies assessing water disclosure in developing country contexts are scant and less explored. Wicaksono and Setiawan (2023b) investigate water disclosure in Indonesia, which is a developing country located in Southeast Asia. Our study extends Wicaksono and Setiawan (2023a) to understand the influence of ownership structure on water disclosure in Indonesian companies. We choose Indonesia because this country is blessed with extraordinary natural resources including water. However, this country experiences serious water problems due to climate change, population, and economic growth. Companies in Indonesia are the second highest of water users and significantly contribute to the decrease in water quantity and quality (BPS, 2020).

7. Conclusions

Drawing upon agency theory, this study examines the impacts of different types of ownership on the extent of water disclosure in Indonesian firms. The results highlight that institutional ownership has a negative and significant association with water disclosure. It is because this investor deems water stewardship activities and disclosure entails costs that disturb potential return. In addition, institutional shareholders tend to pursue short-term benefits so that they will actively press the managers to create the decisions and policies that potentially increase their return. Our study also suggests that government plays an important role by influencing managers to disclose water information. When the government is in firm's ownership structure, government will influence managers to take into account water sustainability as government has an obligation to preserve water availability and quality for public welfare. Our next finding reveals that foreign ownership has a positive impact on the level of water disclosure. It is because foreign investors have better knowledge and experience regarding sustainability activities including water so that they actively press the managers to disclose water information. Foreigners also demand higher level of disclosure to mitigate information asymmetry problems due to the different of geographical locations. Our last finding discovers a negative and significant association between ownership concentration and water disclosure. It is because larger shareholders have strong power to influence managers so that they can easily gather corporate information. Hence, larger shareholders do not actively press the managers to create corporate disclosure such as water disclosure.

This study has several theoretical implications for social and environmental disclosure, particularly water disclosure. First, this study contributes to the literature by providing empirical evidence on the impact of ownership structure on water disclosure. Previous studies focus on the influence of stakeholder pressure and corporate characteristics on water disclosure. According to our best knowledge, there is

small number of studies investigating water disclosure in developing countries like Indonesia. Second, this research supports agency theory, where agents make water disclosures to meet principal demands. However, there are conflicting perspectives regarding the impact of institutional investors. Jensen and Meckling (1976) argue institutional investors have strong monitoring mechanism when they own larger percentage of shares. However, they focus on short-time profit so that they do not actively press the managers to disclose water information. In addition, we reveal potential agency problem when firm's ownership structure is concentrated. It is because largest shareholder tend pursue their goals and ignore the interest of minority shareholders.

In terms of practical implications, this research offers several suggestions. First, the descriptive statistics indicate that the level of water disclosure in Indonesian companies is low. We recommend Indonesian government to create more stringent regulation that press firms' management to take into account on water sustainaibility practices. In addition, the regulation should encourage management to make water disclosure in order to be accountable and transparent to all stakeholders. Second, our finding indicates that water disclosure level is lower when institutional investor own higher percentage of firm shares. In Indonesia, there is a fact that majority of firms' shares owned by institutional shareholders. Our statistic descriptive result confirms that institutional ownership is higher than others with the value of mean is 61.648 %. In addition, institutional investors is largest shareholders in many Indonesian firms' ownership structure. Because this investor tends to pursue short-time profit and ignore sustainability activities, the regulators are suggested to consider the limitation of percentage of shares owned by institutional investor although this investor provide significant financial resources for companies. It is addressed to make firm ownership structure is more dispersed to improve coprporate governance practices and reduce agency problems. Hence, managers can place their attention on sustainability practices and disclosure such as water activities and disclosure rather than focus merely on financial performance.

This study has several limitations. The first limitation is related to the measurement of water disclosure levels. The scores of the water disclosure index may be potentially inaccurate because we do not implement double-check procedures or invite independent evaluators to review the measurement process. Second, this research only uses annual reports and sustainability reports as data sources. We recognize that companies also use Internet platforms to disclose their activities, such as websites, digital newspapers, and social media. Future research is suggested to involve these internet platforms as data sources to measure corporate disclosure (Ramananda and Atahau, 2020). Third, this study only examines companies listed on the IDX as research sample. Indonesian unlisted companies may also produce annual reports or sustainability reports because CSR-related regulations in Indonesia regulate corporate social practices and disclosures for all companies either listed or unlisted firms. Future research is recommended to include all companies to obtain more complete results. It is better if future research conducts cross-country analysis of water disclosure practices in developing countries.

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Ethical statement

No applicable because this article does not contain any studies with human or animal subjects.

CRediT authorship contribution statement

Aditya Pandu Wicaksono: Conceptualization, Methodology, Data Curation, Investigation, Formal Analysis, Project Administration, Visualization, Writing - Original draft, Writing - Review & Editing, **Doddy Setiawan:** Conceptualization, Methodology, Data Curation, Investigation, Formal Analysis, Visualization, Writing - Original draft, Writing - Review & Editing.**Y. Anni Aryani:** Conceptualization, Methodology, Formal Analysis, Writing - Original draft, Writing - Review & Editing.**Sri Hartoko:** Conceptualization, Methodology, Formal Analysis, Data Curation, Investigation, Writing - Original draft, Writing - Review & Editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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