

# Information Transparency and Stakeholder Trust: Evidence from Taiwan's Semiconductor Industry

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## Abstract

This study examines whether information transparency (IT) enhances stakeholder trust in Taiwan's semiconductor industry. Using IT scores obtained from the Taiwan Economic Journal (TEJ) database for 179 publicly listed semiconductor firms (86 TWSE and 93 TPEX firms) and questionnaire evaluations from 111 senior executives, the final dataset comprises 19,869 firm–respondent observations. We estimate the relationship using quantile regression, which allows the transparency–trust relationship to vary across different trust levels. The results demonstrate that IT is positively and statistically significantly associated with stakeholder trust across all model specifications ( $p < .05$ ). Robustness analyses—including subsample comparisons, alternative transparency classifications, and separate analyses of TWSE and TPEX firms—produce consistent findings. More importantly, quantile regression reveals an increasing nonlinear effect, indicating that the positive influence of IT becomes progressively stronger among firms with higher stakeholder trust, suggesting heterogeneous marginal returns to transparency. These findings provide empirical evidence that greater transparency reduces information asymmetry, strengthens corporate accountability, and reinforces stakeholder confidence. From a practical perspective, the results suggest that regulators should continue strengthening disclosure requirements, while managers should regard transparency as a strategic governance mechanism for building long-term stakeholder trust and organizational legitimacy. This study contributes to the literature by demonstrating the heterogeneous trust-enhancing effects of information transparency and by extending sustainability research through its implications for corporate governance and SDGs 9, 12, and 16.

**Keywords:** Information Transparency; Trust; Information Transparency Hypothesis; Semiconductor Industry; Transparency Fallacy

## 1. Introduction

The present study investigated whether the “information transparency hypothesis”<sup>1</sup>(hereafter IT hypothesis)—which suggests a significant positive relationship between information transparency (hereafter IT) and trust—was supported for Taiwanese semiconductor companies. According to the Market Intelligence & Consulting Institute (2024), Taiwan's semiconductor output is expected to reach NT\$4.17 trillion in 2024, accounting for 17.7% of Taiwan's GDP.<sup>2</sup> From January to August 2022, semiconductor exports constituted 47.7% of Taiwan's total export value.<sup>3</sup> Additionally, according to *Wealth Magazine* (2023), Taiwan Semiconductor Manufacturing Company Limited's chip foundry output in the third quarter of 2023 accounted for 57.8% of the global market.

The United States Environmental Protection Agency (EPA) discovered in September 2015 that the Volkswagen (VW)

<sup>1</sup>Lee et al. (2012); Kao et al. (2012); Tsang, et al. (2023); Luo et al. (2024); and Zhu and Wang (2024) observed a significant and positive relationship between information transparency and trust. The present study refers to this relationship as the information transparency hypothesis.

<sup>2</sup> According to the Taiwan Economic Journal Database, Taiwan's GDP in 2023 was NT\$23.55085 trillion. Furthermore, the Market Intelligence and Consulting Institute (2024) estimates that Taiwan's semiconductor output in 2024 will reach NT\$4.17 trillion.

<sup>3</sup> For data sources, please refer to Taiwan's Department of Statistics, Ministry of Economic Affairs (2022).

Group had falsified emissions data for some of its vehicles. Similarly, in April 2022, Toyota's subsidiary, Hino Motors, was implicated in a scandal involving falsified emissions and fuel consumption data.<sup>4</sup> To explain these events, scholars have proposed the concept of "transparency fallacy" (Gold & Heikkurinen, 2018), which suggests that higher corporate does not necessarily lead to increased stakeholder trust in a company. This study also examines whether Taiwan's semiconductor industry supports the "IT hypothesis" or the "transparency fallacy."

In Taiwan, there are two exchanges for publicly listed companies: the Taiwan Stock Exchange (TWSE, larger in scale) and the Taipei Exchange (TPEX, smaller in scale). To investigate the relationship between information transparency and the level of trust among publicly listed companies in Taiwan's semiconductor industry. Consequently, this study explored the association between IT and level of trust among 179 TWSE and TPEX companies (hereafter public companies) in Taiwan's semiconductor sector listed in the *Taiwan Economic Journal* database. This study also conducted a questionnaire survey with 111 senior managers.<sup>5</sup> This study also conducted a questionnaire survey with 111 senior managers. Without providing the transparency scores of the sample companies, a total of 19,869 samples were evaluated.

Recent studies have increasingly recognized information transparency as a fundamental governance mechanism for reducing information asymmetry, enhancing corporate accountability, and strengthening stakeholder trust (He & Chen, 2022). Although prior studies generally report a positive association between corporate transparency and stakeholder trust (He & Chen, 2022; Nguyen et al., 2023), important questions remain unanswered. From a theoretical perspective, existing research largely treats transparency as producing a uniform trust-enhancing effect, overlooking the possibility that its effectiveness may differ across stakeholder trust levels. As a result, the information transparency hypothesis has rarely been examined from a heterogeneous-effect perspective. From an empirical perspective, previous evidence has focused primarily on broad market samples or cross-country settings, with relatively limited attention devoted to high-technology industries where transparency and governance are particularly critical. Furthermore, few studies integrate objective disclosure measures with independently collected stakeholder evaluations, limiting confidence in existing empirical findings. From a practical perspective, regulators and managers continue to debate whether greater disclosure consistently strengthens stakeholder trust or whether excessive transparency may produce the transparency fallacy. Empirical evidence capable of resolving this debate remains limited, especially in strategically important industries such as semiconductors.

This study makes the following contributions to past literature. First, because Taiwan's semiconductor industry occupies a strategically crucial position in the global market, the present study's investigation into the relationship between IT and level of trust in this industry has profound managerial and policy implications for the semiconductor sector. Second, because IT is crucial to corporate governance and environmental, social, and governance (ESG) practices, the present study's findings are a valuable reference for decisions promoting corporate governance and ESG initiatives. Therefore, per Agarwala et al. (2024), a nonlinear relationship may exist between various aspects of ESG, stock returns, and stakeholder trust. Third, this study explored whether a nonlinear association exists between IT and level of trust, using quantile regression to determine the nature of this nonlinear association. Finally, few Chinese-language studies have explored the transparency fallacy hypothesis. The present study tested this hypothesis to fill a gap in past literature.

This study is organized as follows. Section One is the Introduction. Section Two contains a Literature Review and develops hypotheses. Section Three discusses the data and empirical model. Section Four presents empirical analysis and discussion. Section Five provides the Conclusion and recommendations.

## 2. Literature Review and Hypothesis Development

This study integrates sustainable corporate governance, stakeholder theory, and contemporary ESG disclosure research to explain how information transparency influences stakeholder trust. Although these perspectives originate from different research traditions, recent scholarships suggest that they are conceptually complementary. Sustainable corporate governance emphasizes the mechanisms through which firms are directed and controlled to improve accountability and sustainability reporting quality; stakeholder theory places relationships with multiple stakeholder groups at the center of organizational value creation; and ESG disclosure research examines how environmental, social, and governance information enables stakeholders to evaluate corporate conduct and performance (Gerwing et al., 2022; Mahajan et al., 2023; Tsang et al., 2023). Together, these perspectives suggest that credible corporate disclosure can reduce information asymmetry, strengthen accountability, and support organizational legitimacy, thereby providing the theoretical foundation for the information transparency hypothesis (Christensen et al., 2021; Romito & Vurro, 2021).

<sup>4</sup> Anue (2024) reported that TOYOTA and Volkswagen ranked first and second in global car sales in 2023, respectively.

<sup>5</sup> Among the 111 senior executives with industry experience surveyed, 58 held positions at the level of general manager or higher, representing 52.3% of the total.

Corporate governance can therefore be understood as a set of mechanisms for directing and controlling firms in ways that promote responsible oversight, reporting quality, and long-term sustainable value creation. Within this framework, ESG broadens the scope of corporate governance by incorporating environmental and social responsibilities alongside governance considerations. Governance arrangements—including oversight board, sustainability committees, sustainability-linked incentive structures, stakeholder engagement, and external assurance—serve as institutional mechanisms that can improve the quality and credibility of sustainability disclosure (Gerwing et al., 2022; Tsang et al., 2023).

Information transparency refers to organizational disclosure characterized by disclosure, clarity, and accuracy, enabling stakeholders to access and interpret information relevant to corporate decisions, activities, and performance (Schnackenberg et al., 2021). Empirical evidence indicates that broader and more substantive non-financial disclosure reduces information asymmetry between firms and their stakeholders (Romito & Vurro, 2021). From a stakeholder-theory perspective, firms create value through relationships with multiple stakeholder groups rather than focusing exclusively on shareholders. Stakeholder engagement encompasses moral, strategic, and pragmatic activities that facilitate dialogue, shared understanding, and informed organizational decision-making (Kujala et al., 2022; Mahajan et al., 2023). Accordingly, transparent ESG and corporate disclosure can enhance organizational legitimacy and strengthen stakeholder engagement by making corporate conduct more visible and assessable (Christensen et al., 2021; Tsang et al., 2023).

Transparency also supports accountability by enabling stakeholders to scrutinize corporate claims, decisions, and outcomes. Nevertheless, recent research cautions that transparency and accountability are closely related but are not automatically equivalent, making disclosure quality and effective governance mechanisms particularly important (Heimstädt & Dobusch, 2020; Gerwing et al., 2022). Stakeholder trust reflects positive expectations regarding an organization's ability, benevolence, and integrity (Svare et al., 2020). Therefore, transparent, clear, and accurate disclosure, combined with effective accountability mechanisms, can reduce uncertainty and reinforce stakeholder confidence in an organization's competence, integrity, and responsible intentions (Qureshi et al., 2020; Schnackenberg et al., 2021).

Taken together, these perspectives suggest a coherent theoretical framework in which corporate governance provides the institutional foundation, ESG operationalizes responsible governance, information transparency serves as the primary governance mechanism, accountability represents the governance outcome, and stakeholder trust constitutes the ultimate relational outcome. Accordingly, higher information transparency should strengthen accountability and stakeholder trust, providing the theoretical basis for the Information Transparency Hypothesis examined in this study.

### *2.1 Level of Trust*

The dependent variable in this study is the level of trust stakeholders have in a company. Numerous studies have specified the type of trust considered in the present study as social trust. One of the most frequently cited definitions is Gambetta (1988), who describes social trust as “the subjective belief that an individual assigns to the event that a potential counterparty takes an action that is at least not harmful to that individual.” Trust refers to a trustor's willingness to accept vulnerability based on positive expectations regarding another party's intentions and behaviors rather than merely evaluating the other party's trustworthiness (Mayer et al., 1995; Rousseau et al., 1998). Recent reviews continue to conceptualize trust as a relational psychological state characterized by confidence under conditions of uncertainty and risk rather than as an attribute of the trustee (van Rietschoten & van Bommel, 2025; Karikumpu et al., 2024). In organizational settings, stakeholder trust reflects stakeholders' confidence that an organization and its leaders will act responsibly and fulfill their obligations. Because top executives represent the organization and are central to stakeholders' evaluations of firms, stakeholders often develop judgments about organizations through their evaluations of top executives (Recendes et al., 2024). Therefore, stakeholders' trust in the organization is closely associated with their perceptions of top executives.

The following studies have investigated the level of trust in various sectors: corporate misconduct (Dong et al., 2018), financial statement transparency (Garrett et al., 2014; Tee & Rubbaniy, 2025), earnings manipulation (Chen et al., 2021a; Chen et al., 2021b; Pevzner et al., 2015), tax avoidance (Kanagaretnam et al., 2018), corporate pollution (Chen et al., 2021a; Chen et al., 2021b), welfare consumption (Dong et al., 2021), and negative information concealment (Cao et al., 2016; Qiu et al., 2020).

Based on the previous studies, the present study classified the primary factors influencing the level of trust into four major categories to conduct a questionnaire survey. Each survey question was rated on an ascending scale from 1 to 5 representing the level of trust, and the average score was used as the level of trust score for each company. These four categories were (1) the reliability of the company's financial statements (Garrett et al., 2014; Chen et al., 2021a), (2) the likelihood of not engaging in environmentally polluting behavior (Chen et al., 2021b), (3) the likelihood of not

concealing negative information regarding the company (Cao et al., 2016; Qiu et al., 2020), and (4) the commitment to corporate social responsibility (Kong et al., 2023).

## 2.2 IT and Level of Trust

IT is a key component of corporate governance that is crucial to promoting ESG initiatives. According to securities regulations in the United States, IT requires full and fair disclosure to prevent misconduct. The literature suggests that higher IT is associated with reduced earnings manipulation (Lee, 2008) and reduced tax avoidance (Kanagaretnam et al., 2018). The objective of maintaining IT is to reduce information asymmetry and protect investors in the securities market. The principle of IT originates from Louis Brandeis—an associate justice on the Supreme Court of the United States—who famously stated in *Other People's Money and How the Bankers Use It* (1914): “Sunlight is said to be the best of disinfectants, electric light the most efficient policeman” (Lee et al., 2012).

The relation between information disclosure and stakeholder trust has recently received considerable attention in the literature, including studies by Huang et al. (2024), Xu et al. (2024), and Yoo and Cho (2024). Among these, Huang et al. (2024) found that higher levels of information transparency can enhance corporate ESG performance and strengthen stakeholder trust.

Major global exchanges assess IT as a crucial aspect of corporate governance for public companies. For example, the Taiwan Stock Exchange established three major regulations concerning IT: (1) Taiwan Stock Exchange Corporation Procedures for Verification and Disclosure of Material Information of Companies with Listed Securities, (2) Taiwan Stock Exchange Corporation Procedures for Press Conferences Concerning Material Information of Public companies, and (3) Taiwan Stock Exchange Corporation Procedures for Information Reporting by Companies with Listed Securities. These regulations prevent corporate governance misconduct, reduce asymmetrical information, and increase investors' level of trust in public companies. Additionally, the *CG Watch* (Credit Lyonnais Securities Asia, 2023) report released by the Asian Corporate Governance Association included IT as a key evaluation criterion for corporate governance (Credit Lyonnais Securities Asia, 2023). Furthermore, the Organization for Economic Cooperation and Development incorporated “information disclosure and transparency” as one of six key areas in its 2023 revision of the Principles of Corporate Governance (Financial Supervisory Commission, 2023). However, according to Wikipedia (Wikipedia, 2025), the United States EPA uncovered deception regarding emissions claims for the vehicles manufactured by the VW Group in September 2015. Similarly, in April 2022, Toyota's subsidiary, Hino Motors, was involved in a scandal of falsified emissions and fuel consumption data. Both corporate groups are automobile companies with global reputations and have previously held the highest market share in the world.

Some scholars (Gold & Heikkurinen, 2018) have introduced the concept of transparency fallacy, which suggests that high corporate IT does not necessarily increase stakeholder trust in a company, to explain why these high-performing companies would engage in deceptive practices. The transparency fallacy hypothesis is noteworthy for two reasons. First, it contradicts the long-standing belief in a significant and positive relationship between IT and the level of trust of stakeholders in a company. Second, the transparency fallacy has rarely been explored in literature.

A significant and positive relationship has been uncovered between IT and the level of trust in a company (Lee et al., 2012; Kao et al., 2012; Tsang et al., 2023; Luo et al., 2024; Zhu & Wang, 2024). Additionally, Lee et al. (2012) noted that in a questionnaire survey conducted by McKinsey and Company in 2000 targeting public companies in Asia, companies with superior corporate governance, including IT, can command a 20% to 30% premium from institutional investors. For Taiwanese public companies with superior corporate governance, institutional investors are willing to pay a premium of 18% to 27%. Similar findings were also reported by Kao et al. (2012). Tsang et al. (2023) demonstrated that IT can enhance stakeholders' level of trust in a company, whereas Luo et al. (2024) indicated that IT in government departments reduces uncertainty risks among the public or stakeholders, reducing anxiety. Zhu and Wang (2024) uncovered a positive correlation between a company's ESG performance and stakeholders' level of trust. Based on the findings of these studies, this study proposes the following hypothesis.

Hypothesis 1: Greater IT is associated with greater stakeholder trust in a company.

## 2.3 Possibility of a Nonlinear Association between IT and Level of Trust

In addition to the aforementioned positive and negative associations, a nonlinear association may exist between IT and the level of stakeholder trust in a company. For example, Lee et al. (2013), Lee and Li (2022), Pu (2023), and Agarwala et al. (2024) reported the possibility of a nonlinear relationship between corporate research and development expenditures and financial performance. Additionally, Amiraslani et al. (2023) discovered that a nonlinear relationship may exist between ESG and bond spreads. Furthermore, Agarwala et al. (2024) used a sample of 305 companies listed on the National Stock Exchange (NSE) 500 of India (India's largest stock exchange from 2014 to 2022) to explore the association between information transparency and the operational, financial, and market performance of Indian

companies. Their findings suggest that the overall ESG score, and the environmental dimension score may have a nonlinear association with the stock returns of public companies. Based on the findings of the aforementioned studies, the present study proposes that a nonlinear association may exist between IT and the level of trust, suggesting the following hypothesis:

Hypothesis 2: A nonlinear association exists between IT and the level of stakeholder trust in a company.

In the following section, a quantile regression analysis is used to explore whether a nonlinear association exists between IT and the level of trust and determine the nature of this nonlinear association.

#### 2.4 Quantile Regression

Quantile regression analysis has been widely applied across various fields. For example, quantile regression has been applied in the field of educational economics (Vieira et al., 2020), in economic growth theory (Iseringhausen, 2024), in environmental economics (Güney, 2024), in health care management (Su et al., 2022), in valuations of firms' capital structures (Tanin et al., 2024), and in evaluations of labor markets (Andini, 2023). In addition, quantile regression analysis has also been applied to financial market research, including examining the effects of oil price changes and policy uncertainty on G7 stock returns (Nusair & Al-Khasawneh, 2023), analyzing high-frequency data from six major stock markets in the U.S., Europe, the U.K., Japan, China, and India to reveal that volatility spillovers are stronger at the tail quantiles (Bouri & Harb, 2022), and investigating the relationship between investor trading behavior and the dispersion of stock returns (Zhou et al., 2024).

The present study applied quantile regression to explore whether a nonlinear association exists between IT and the level of stakeholder trust in a company. Quantile regression offers two major advantages. First, it does not require the division of samples, enabling the estimation of whether structural changes occur in the influence of explanatory variables on the dependent variable across varying levels of trust (high, normal, low) by controlling quantiles. Second, by using median regression (i.e., the minimum sum of absolute values), the estimated results are more robust and less affected by outliers, reducing the likelihood of changes in the significance of the empirical findings (Lee, 2008).

### 3. Data and Empirical Model

#### 3.1 Basic Empirical Model

This study primarily explored the association between IT and the level of stakeholder trust in public companies in Taiwan's semiconductor industry. The regression model in Equation (1) was constructed by referencing the models used in studies such as those by Kong et al. (2023) as follows: On the basis of the studies by Vu and Tran (2021), Kong et al. (2023), and Qiu et al. (2023), and considering the characteristics of Taiwanese public companies and the availability of data, the present study consolidated the explanatory variables for the level of trust into company size, year of listing, earnings per share, debt-to-asset ratio, and price-to-book ratio. These variable choices were informed by several considerations. First, Kong et al. (2023) observed that a company's founding year is strongly associated with the level of stakeholder trust in the company. However, the present study argues that the year of listing is more closely associated with the level of stakeholder trust because TWSE or TPEx companies are subject to stricter regulations on information disclosure and corporate governance. Thus, companies' year of listing was used instead of their founding years. Additionally, although Kong et al. (2023) included return on equity and earnings per share as independent variables, the analysis conducted by that study demonstrated that the correlation coefficient between these two variables exceeds 70%. Including both return on equity and earnings per share as independent variables could lead to multicollinearity in this study's model; thus, only earnings per share was used. Additionally, Kong et al. (2023) included government ownership as an independent variable. However, the industry examined in this study—Taiwanese semiconductor companies—consists entirely of privately-owned enterprises without government ownership. Therefore, this study did not use government ownership as an independent variable. Finally, although Kong et al. (2023) considered the racial diversity of the board as a significant factor, Taiwanese public companies do not provide data on the racial background of board members, rendering the use of racial diversity as an independent variable impossible.

The present study included IT as the primary independent variable, using the other five independent variables as control variables in Equation (1). The definitions of the variables are presented in table 1. In Equation (1),  $\beta_1$  represents the effect of information transparency on stakeholder trust. A significantly positive  $\beta_1$  would provide support for the information transparency hypothesis, whereas a non-significant or significantly negative  $\beta_1$  would lend support to the transparency fallacy hypothesis.

$$\text{Trust}_{it} = \alpha_{it} + \beta_1 \text{IT}_{it} + \beta_2 \text{Gender}_{it} + \beta_3 \text{Age}_{it} + \beta_4 \text{EL}_{it} + \beta_5 \text{MS}_{it} + \beta_6 \text{Industry}_{it} + \beta_7 \text{Tenure}_{it} + \beta_8 \text{Position}_{it} + \beta_9 \text{Foreign}_{it} + \beta_{10} \text{Chairman}_{it} + \beta_{11} \text{Management}_{it} + \varepsilon_{it} \quad \dots \quad (1)$$

where  $\alpha$  is the constant term;  $\beta$  represents the regression coefficients;  $\varepsilon$  is the error term;  $i$  denotes the observation; and  $t$  represents time.

Table 1. Descriptive statistics of respondents

| Research variable                                                     | Definition and description                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Level of trust (Trust)                                                | Social trust is defined as “the subjective belief held by potential stakeholders that an incident will at least not cause harm to the stakeholders.” The level of trust ranges from 1 to 5, with 1 indicating a low level of trust and 5 indicating a high level of trust.          |
| IT                                                                    | The IT score is provided by the Taiwan ESG (TESG) database of the <i>Taiwan Economic Journal</i> (TEJ). This database assigns disclosure scores based on the extent of a company’s ESG data disclosure. Scores range from 17.96 to 97.53, with higher scores indicating greater IT. |
| Gender                                                                | Provided by the respondents, with “male” coded as 0 and “female” coded as 1.                                                                                                                                                                                                        |
| Age                                                                   | Provided by the respondents, with “under 30 years old” coded as 1, “31–40 years old” coded as 2, “41–50 years old” coded as 3, “51–60 years old” coded as 4, and “more than 61 years old” coded as 5.                                                                               |
| Education level (EL)                                                  | Provided by the respondents, with “senior high school or below” coded as 1, “college” as 2, “master’s” as 3, and “doctorate” as 4.                                                                                                                                                  |
| Marital status (MS)                                                   | Provided by the respondents, with “married” coded as 1, “single” as 2, and “other” as 3.                                                                                                                                                                                            |
| Industry                                                              | Provided by the respondents, with “agriculture, forestry, and fishing” coded as 1, “service industry” as 2, and “manufacturing” as 3.                                                                                                                                               |
| Job tenure (Tenure)                                                   | Provided by the respondents, with “less than 5 years” coded as 1, “5–10 years” as 2, “10–20 years” as 3, “20–30 years” as 4, “30–40 years” as 5, and “more than 40 years” as 6.                                                                                                     |
| Position                                                              | Provided by the respondents, with “Chairperson” coded as 1, “General Manager/CEO” as 2, “Assistant Manager/Department Chief” as 3, “Manager” as 4, and “Director” as 5.                                                                                                             |
| Has the respondent ever studied abroad (Foreign)?                     | Provided by the respondents, with “yes” coded as 0 and “no” as 1.                                                                                                                                                                                                                   |
| Has the respondent ever served as a chairperson (Chairman)?           | Provided by the respondents, with “yes” coded as 0 and “no” as 1.                                                                                                                                                                                                                   |
| Does the respondent have a degree related to management (Management)? | Provided by the respondents, with “yes” coded as 0 and “no” as 1.                                                                                                                                                                                                                   |

1. Source: Compiled by this study. 2. This table provides the definitions and descriptions of the variables.

### 3.2 Research Design and Data Collection

This study focused on all semiconductor firms listed on the Taiwan Stock Exchange (TWSE) and Taipei Exchange (TPEX) that had available information transparency (IT) scores in the Taiwan Economic Journal (TEJ) database. The final sample consisted of 179 publicly listed semiconductor firms, including 86 TWSE firms and 93 TPEX firms. Because the sample covered the population of listed semiconductor firms with available IT data rather than a subset selected by the researchers, selection bias at the firm level was minimized.

Respondents were required to possess substantial managerial experience and familiarity with Taiwan's semiconductor industry. Therefore, only chairpersons, CEOs, directors, managers, assistant managers, and department chiefs were invited to participate. These respondents were expected to possess sufficient professional knowledge to evaluate the trustworthiness of listed semiconductor firms.

The survey was administered through a professional LINE social network group composed of corporate managers. To reduce evaluation bias, respondents completed the questionnaire anonymously and independently. During the first evaluation stage, respondents assessed each firm's trustworthiness without access to the firm's information transparency score. In the second stage, respondents were provided with the transparency score and asked to evaluate the firms again. This two-stage design generated 19,869 firm–respondent observations, allowing us to directly examine whether information transparency influences stakeholders' trust evaluations while reducing potential evaluation bias.

The independent variable (IT) was obtained from the objective TEJ database, whereas stakeholder trust was collected

through an independent survey. Trust in company information was assessed using a single item: "Please rate the extent to which you trust the information provided by this company." Responses were recorded on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). This multi-source research design reduces the likelihood of common method bias and enhances the credibility of the findings. To test the hypotheses, this study employed quantile regression, which is robust to outliers and enables estimation of heterogeneous effects across different levels of stakeholder trust that cannot be identified using conventional mean-based regression models.

To further verify the robustness of the results, we conducted additional analyses using alternative sample classifications, including TWSE versus TPEX firms, high- versus low-transparency firms, and evaluations before and after disclosure of IT scores. The results remained consistent across all specifications, providing strong support for the robustness and reliability of the empirical findings.

### 3.3 Quantile Regression Model

To investigate whether a nonlinear association exists between IT and the level of trust, this study employed quantile regression analysis to understand whether structural changes occur in the influence of IT and other independent variables on the level of trust across varying trust levels. The quantile regression model constructed in this study is presented in Equation (2):

$$\min_{\beta} \left[ \theta \sum_{Y_i \geq \hat{\beta}X} |Y_i - \hat{\beta}X| + (1 - \theta) \sum_{Y_i < \hat{\beta}X} |Y_i - \hat{\beta}X| \right] \quad (2)$$

In Equation (2), the dependent variable is denoted as  $Y$ , which refers to the level of trust. The independent variable vector is denoted as  $X$ . The vector of coefficients—including IT (the primary independent variable) and the other 10 control variables to be estimated—is denoted as  $\beta$ . The quantile  $\theta$  ranges between 0 and 1. When the observed value of the dependent variable is  $Y$ , the estimated value of the dependent variable is  $\hat{Y} = \hat{\beta}X$ . If we select a fixed  $\theta$  value, the quantile regression analysis using Equation (2) can be conducted as follows: Obtain an estimated coefficient  $\hat{\beta}$  that minimizes the sum of the absolute values of the estimated residuals. This sum can be divided into two parts. In the first part, the observed value of the dependent variable is higher than its estimated value, indicating that the residual is positive, and that, on average, the dependent variable's value is higher. In the second part, the observed value of the dependent variable is lower than its estimated value, indicating that the residual is negative and that, on average, the dependent variable's value is lower than its estimated value. The first part accounts for the weight of  $\theta$ , and the second part accounts for the weight of  $(1 - \theta)$ . The quantile regression analysis minimizes the sum of the absolute residuals of the first part multiplied by  $\theta$  and the sum of the absolute residuals of the second part multiplied by  $(1 - \theta)$ , leading to the estimation of the coefficient vector  $\hat{\beta}$ .

The minimization problem in Equation (2) can be solved using linear programming. Buchinsky (1998) and Lee (2009) provide detailed explanations of the solution process. Additionally, when applying quantile regression in the present study, all samples were used in the model estimation, eliminating the possibility of sample selection bias.

The quantile regression model employed in this study enables distinguishing between high and low levels of trust as follows. The empirical results for higher quantiles represent the right tail of the distribution of the dependent variable, which intuitively refers to the results when the dependent variable is a higher value. By contrast, the empirical results for lower quantiles represent the left tail of the distribution of the dependent variable, indicating the results when the dependent variable is a lower value (Kong et al., 2023; Kao et al., 2012; Bouri and Harb, 2022; Chen et al., 2021a, Nusair & Al-Khasawneh, 2023; Zhou et al., 2024). That is, we can interpret the empirical results for quantiles 0.7 to 0.9 as those reflecting a high level of trust, or a "high-trust period." Similarly, the empirical results for quantiles 0.4 to 0.6 and 0.1 to 0.3 reflect a "normal trust period" and a "low trust period," respectively.

### 3.4. Endogeneity Problems in the Quantile Regression Model

In this study's quantile regression model, the independent variable, IT, may be influenced by the dependent variable, the level of trust. This influence suggests that IT may be highly correlated with the model's residual term. Chernozhukov and Hansen (2006), Lee et al. (2010), if endogeneity problems exist within a model's variables and are not addressed, they may bias the empirical results of an analysis. This study adopted the instrumental variable quantile regression (IV-QR) estimator method proposed by Chernozhukov and Hansen (2006), Lee et al. (2010), Ura (2021), Zhu et al. (2023) which is detailed in Equation (3):

$$Y = \alpha + \beta X + \gamma W + \varepsilon \quad (3)$$

where  $Y$  denotes the dependent variable;  $X$  and  $W$  are independent variables.  $X$  is a vector of exogenous variables, and  $W$  is a vector of endogenous variables. The estimated coefficient is biased.  $\varepsilon$  denotes the residual term, and  $\theta$  denotes the quantile ranging between 0 and 1.

The steps for conducting the IV-QR estimation are as follows:

Step 1: For a given quantile  $\theta$ , perform a quantile regression estimation using Equation (3). At this stage, this study obtained a biased estimate  $\gamma_\theta$  of the coefficient vector for  $W$ .

Step 2: Define  $Y_\theta^* = Y - \gamma_\theta W$ . Given a suitable instrumental variable  $Z$  and a quantile  $\theta$ , conduct a quantile regression estimation on the right side of the equation. The present study obtained an estimate of the coefficient vector  $\rho_\theta$  for the instrumental variable  $Z$ .

Step 3: Let vector  $A$  represent the variance-covariance matrix of  $\rho_\theta$  and calculate  $\omega = \rho_\theta' A \rho_\theta$ .

Step 4: Repeat steps 1 to 3 to obtain a different  $\gamma_\theta$ , and select the instrumental variable combination that minimizes  $\omega$ . This combination corresponds to the optimal instrumental variable combination for the given quantile  $\theta$ .

Minimizing  $\omega$  results in the optimal instrumental variable combination, which also minimizes the estimated standard error. The instrumental variables in this study include all the independent variables in the model except for IT, in addition to the lagged values of these independent variables. For quantiles between 0.1 and 0.9, the optimal instrumental variable combinations consist of the 10 control variables, excluding IT, and their lagged values.

Despite its advantages, quantile regression has notable limitations, particularly in time-series applications. Zhu et al. (2022) highlight that time-series data often exhibit autocorrelation, non-stationarity, and complex dynamic dependencies, which can lead to biased or invalid quantile regression estimates. Fortunately, our research relies on cross-sectional data, allowing us to circumvent the specific biases inherent in time-series analysis and providing a more reliable basis for our findings.

## 4. Empirical Analysis and Discussion

### 4.1 Measurement Validity and Reliability

Because the independent variable (information transparency) was obtained from the Taiwan Economic Journal (TEJ), an established third-party financial database widely used in accounting and corporate governance research, its measurement was based on objective archival records rather than respondents' perceptions, thereby minimizing common method bias and enhancing measurement validity.

Stakeholder trust was measured using a single-item scale assessing respondents' overall trust in the information provided by each company. Single-item measures have been considered appropriate for concrete, unidimensional constructs that respondents can evaluate directly and have been widely adopted in organizational and management research (Bergkvist & Rossiter, 2007). Because trust was measured using a single item, internal consistency indices such as Cronbach's alpha are not applicable. Instead, measurement quality was enhanced through expert review prior to data collection, anonymous responses, standardized survey procedures, and the use of experienced senior managers familiar with Taiwan's semiconductor industry, thereby supporting the content validity of the instrument.

Furthermore, the study employed a multi-source research design in which the independent variable was obtained from the TEJ database, whereas stakeholder trust was collected through an independent survey. This design substantially reduces common method variance and strengthens construct validity (Podsakoff et al., 2003).

### 4.2 Descriptive Statistics

Table 2 presents the demographic characteristics of the senior executives who completed the survey. Among the valid responses, 62 (55.9%) were from men and 49 (44.1%) were from women. In terms of age distribution, 2 (1.8%) respondents were less than 30 years old, 8 (7.2%) respondents were between 31 and 40 years old, 30 (27%) respondents were between 41 and 50 years old, 49 (44.1%) respondents were between 51 and 60 years old, and 22 respondents (19.8%) were more than 61 years old. Regarding education level, 11 (9.9%) respondents had a high school degree or below, 48 (43.2%) respondents had a college degree, 46 (41.4%) respondents had a master's degree, and 6 (5.4%) respondents had a doctorate degree. In terms of marital status, 91 respondents (82%) were married, 16 (14.4%) respondents were unmarried, and 4 (3.6%) respondents were categorized as "other." The industries represented in the sample were as follows: 3 (2.7%) respondents were executives from the agriculture, forestry, and fishing industries; 80 (69.4%) respondents were from the service industry; and 31 (27.9%) respondents were from the manufacturing industry. In terms of job tenure, 1 (0.9%) respondent had been employed less than 5 years, 2 (1.8%) respondents had been employed between 5 and 10 years, 22 respondents had been employed between 10 and 20 years, 40 (36%) respondents had been employed between 20 and 30 years, 38 (34.2%) respondents had been employed between 30 and 40 years, and 8 (7.2%) respondents had more than 40 years of work experience. In terms of position, 18 (16.2%) respondents were



chairpersons, 39 (35.1%) were general managers/CEOs, 5 (4.5%) were assistant managers/department chiefs, 48 (43.2%) were managers, and 1 (0.9%) was director. Additionally, 6 respondents (5.4%) had studied abroad, 49 (44.1%) had previously served as a chairperson or president, and 67 (60.4%) held a degree related to management.

Table 2. Demographic characteristics of senior executives who completed the surveys

| Variable                       | Frequency | %    | Variable                                           | Frequency | %    |
|--------------------------------|-----------|------|----------------------------------------------------|-----------|------|
| <b>Gender</b>                  |           |      | <b>Have you ever studied abroad?</b>               |           |      |
| Male                           | 62        | 55.9 | Yes                                                | 6         | 5.4  |
| Female                         | 49        | 44.1 | No                                                 | 105       | 94.6 |
| Total                          | 111       |      | Total                                              | 111       | 100  |
| <b>Age</b>                     |           |      | <b>Position</b>                                    |           |      |
| 30 years or below              | 2         | 1.8  | Chairperson                                        | 18        | 16.2 |
| 31–40 years                    | 8         | 7.2  | General Manager/CEO                                | 39        | 35.1 |
| 41–50 years                    | 30        | 27.0 | Assistant Manager/Department Chief                 | 5         | 4.5  |
| 51–60 years                    | 49        | 44.1 | Manager                                            | 48        | 43.2 |
| 61 years or above              | 22        | 19.8 | Director                                           | 1         | 0.9  |
| Total                          | 111       | 100  | Total                                              | 111       | 100  |
| <b>Education level</b>         |           |      | <b>Job tenure</b>                                  |           |      |
| High school or below           | 11        | 9.9  | >5 years                                           | 1         | 0.9  |
| College                        | 48        | 43.2 | 5–10 years                                         | 2         | 1.8  |
| Master's                       | 46        | 41.4 | 10–20 years                                        | 22        | 19.8 |
| Doctorate                      | 6         | 5.4  | 20–30 years                                        | 40        | 36.0 |
| Total                          | 111       | 100  | 30–40 years                                        | 38        | 34.2 |
| <b>Marital status</b>          |           |      | <40 years                                          | 8         | 7.2  |
| Married                        | 91        | 82.0 | Total                                              | 111       | 100  |
| Unmarried                      | 16        | 14.4 | <b>Have you ever served as a chairperson?</b>      |           |      |
| Other                          | 4         | 3.6  | Yes                                                | 49        | 44.1 |
| Total                          | 111       | 100  | No                                                 | 62        | 55.9 |
| <b>Industry</b>                |           |      | Total                                              | 111       | 100  |
| Agriculture, Forestry, Fishing | 3         | 2.7  | <b>Do you have a degree related to management?</b> |           |      |
| Service                        | 77        | 69.4 | Yes                                                | 67        | 60.4 |
| Manufacturing                  | 31        | 27.9 | No                                                 | 44        | 39.6 |
| Total                          | 111       | 100  | Total                                              | 111       | 100  |

1. Source: Compiled by this study. 2. This table provides information related to the questionnaire.

Table 3 presents descriptive statistics, summarizing the sample size, maximum value, minimum value, mean, standard deviation, and variance for each variable. This result suggests that respondents trusted the IT of Taiwanese semiconductor companies.

Table 3. Descriptive statistics

| Variable                          | Number of Companies | Listed | Sample Size | Minimum Value | Maximum Value | Mean   | Standard Deviation | Variance |
|-----------------------------------|---------------------|--------|-------------|---------------|---------------|--------|--------------------|----------|
| IT                                | 179                 |        | 19869       | 17.960        | 97.530        | 60.160 | 26.902             | 723.724  |
| Public companies                  | 179                 |        | 19869       | 3.144         | 4.505         | 3.538  | 0.205              | 0.042    |
| Public companies -Low Score Group | 60                  |        | 6660        | 3.270         | 3.928         | 3.462  | 0.136              | 0.018    |
| Public companies-High Score Group | 60                  |        | 6660        | 3.144         | 4.505         | 3.576  | 0.236              | 0.056    |
| TWSE                              | 86                  |        | 9546        | 3.333         | 4.505         | 3.650  | 0.215              | 0.046    |
| TWSE_Low-Score Group              | 30                  |        | 3330        | 3.333         | 3.928         | 3.555  | 0.150              | 0.022    |
| TWSE_High-Score Group             | 30                  |        | 3330        | 3.469         | 4.505         | 3.781  | 0.260              | 0.068    |
| TPEX                              | 93                  |        | 10323       | 3.144         | 3.883         | 3.435  | 0.128              | 0.016    |
| TPEX_Low Score Group              | 31                  |        | 3441        | 3.270         | 3.559         | 3.368  | 0.075              | 0.006    |
| TPEX_High Score Group             | 31                  |        | 3441        | 3.144         | 3.784         | 3.477  | 0.137              | 0.019    |

Note: 1. Source: Compiled by this study. 2. This table provides the descriptive statistics of the variables. 3. Public companies refer to both TWSE and Taipei Exchange companies. TWSE denotes Listed companies (listed on the Taiwan Stock Exchange), whereas TPEX denotes companies listed on the Taipei Exchange.

To test for multicollinearity problems, this study conducted Pearson correlation coefficient and variance inflation factor (VIF) analyses. The results reveal that the Pearson correlation coefficients between the independent variables were well below 0.5 and nonsignificant, indicating a low likelihood of collinearity. Furthermore, the VIF values were well below 10, indicating that multicollinearity is unlikely to be a problem in the present study.

#### 4.3 Hypothesis Testing - Basic Empirical Model - Regression Model without Score

To evaluate the association between corporate IT and the level of stakeholder trust in a company, this study conducted regression analysis using a basic empirical model, the results of which are presented in table 4. In table 4, Panels A, B, C, D, E, and F present, respectively, the results for the combined sample of TWSE and TPEX companies (179 companies with 19,869 samples), the combined sample divided by high and low levels of trust (60 companies with 6,660 samples), the sample of public companies (86 companies with 9,546 samples), the listed company sample divided by levels of trust (30 companies with 3,330 samples), the sample of TPEX companies (93 companies with 10,323 samples), and the TPEX company sample divided by levels of trust (31 companies with 3,441 samples).

The empirical results presented in table 4 indicate that in all 18 cases—Panel A (2 results), Panel B (4 results), Panel C (2 results), Panel D (4 results), Panel E (2 results), and Panel F (4 results)—the IT of a company had a significant positive effect on the level of trust. This result supports Hypothesis 1. Using Panel A of table 4 as an example, IT had a significant positive effect on the level of trust in companies under the category of public 179 companies ( $\beta = 0.005$ ,  $p < 0.01$ ). Additionally, among the control variables, gender ( $\beta = 0.070$ ,  $p < 0.05$ ), education level ( $\beta = 0.056$ ,  $p < 0.05$ ), and industry ( $\beta = 0.064$ ,  $p < 0.05$ ) all indicate significant positive effects on the level of trust, whereas the effects of other seven control variables were nonsignificant.

The results of the analysis indicate that the IT hypothesis is supported, indicating a significant positive relationship between IT and the level of trust—and that the transparency fallacy did not apply. That is, the samples from Taiwan's semiconductor industry demonstrate that higher IT leads to higher levels of stakeholder trust.

In terms of managerial and policy implications, this study's results indicate that IT contributes to increasing stakeholders' level of trust in a company. Therefore, according to our research findings, IT appears to enhance a company's brand image, social image, and trustworthiness.

Table 4. Regression results for the association between companies' IT and trustworthiness-without score

| Panel A                  | Public 179 Companies                |                                      |
|--------------------------|-------------------------------------|--------------------------------------|
| Information transparency | 0.005***(0.001)                     |                                      |
| Sample size              | 19,869                              |                                      |
| Adjusted R <sup>2</sup>  | 0.525                               |                                      |
| F-statistic value        | 12.051***                           |                                      |
| Panel B                  | Public Low Score Group 60 Companies | Public High Score Group 60 Companies |
| IT                       | 0.002***(0.001)                     | 0.003***(0.002)                      |
| Sample size              | 6,600                               | 6,600                                |
| Adjusted R <sup>2</sup>  | 0.511                               | 0.425                                |

|                         |                                   |                                    |
|-------------------------|-----------------------------------|------------------------------------|
| F-statistic value       | 5.839***                          | 5.861***                           |
| Panel C                 | TWSE 86 Companies                 |                                    |
| IT                      | 0.004***(0.001)                   |                                    |
| Sample size             | 9,546                             |                                    |
| Adjusted R <sup>2</sup> | 0.385                             |                                    |
| F-statistic value       | 5.839***                          |                                    |
| Panel D                 | TWSE Low Score Group 30 Companies | TWSE High Score Group 30 Companies |
| IT                      | 0.007***(0.002)                   | 0.009***(0.004)                    |
| Sample size             | 3,300                             | 3,300                              |
| Adjusted R <sup>2</sup> | 0.392                             | 0.398                              |
| F-statistic value       | 4.839***                          | 4.841***                           |
| Panel E                 | TPEX 93 Companies                 |                                    |
| IT                      | 0.001***(0.001)                   |                                    |
| Sample size             | 10,323                            |                                    |
| Adjusted R <sup>2</sup> | 0.438                             |                                    |
| F-statistic value       | 6.391***                          |                                    |
| Panel F                 | TPEX Low Score Group 31 Companies | TPEX High Score Group 31 Companies |
| IT                      | 0.002***(0.001)                   | 0.002***(0.002)                    |
| Sample size             | 3,441                             | 3,441                              |
| Adjusted R <sup>2</sup> | 0.335                             | 0.412                              |
| F-statistic value       | 5.291***                          | 5.248***                           |

Notes: 1. Source: Compiled by this study. 2. This table presents the regression analysis results in which the respondents were not provided with the information disclosure score. 3. The numbers in the table represent coefficient values, with the numbers in parentheses indicating p-values; \*, \*\*, and \*\*\* denote significance levels of 5%, 1%, and 0.1%, respectively. 4. Variables description: The primary independent variable is IT, and the dependent variable is the level of trust in TWSE and TPEX companies. Panel A lists the results of analysis for 179 public companies, Panel B lists the results for 60 public companies (low score, and high score groups), Panel C lists the results for 86 TWSE companies (low score, and high score groups), Panel D lists the results for 30 TWSE companies (low score, and high score groups), Panel E lists the results for 93 TPEX companies, and Panel F lists the results for TPEX 31 companies (low score, and high score groups).

#### 4.4 Robust Testing

##### 4.4.1 Robust Testing - Regression Model with Score

The empirical results for Table 5 were similar to those for Table 4. Specifically, IT had a significant positive effect on the level of trust in companies under the category of Listed and Over-the-Counter\_Scored\_179 ( $\beta = 0.006$ ,  $p < 0.01$ ). However, among the control variables, only gender ( $\beta = 0.074$ ,  $p < 0.05$ ) had a significant positive effect on the level of trust, whereas the effects of the remaining nine control variables were nonsignificant.

Table 5. Regression results for the association between companies' IT and trustworthiness with scored

|                          |                                     |                                      |
|--------------------------|-------------------------------------|--------------------------------------|
| Panel A                  | Public 179 Companies                |                                      |
| Information transparency | 0.006***(0.001)                     |                                      |
| Sample size              | 19,869                              |                                      |
| Adjusted R <sup>2</sup>  | 0.521                               |                                      |
| F-statistic value        | 11.898***                           |                                      |
| Panel B                  | Public Low Score Group 60 Companies | Public High Score Group 60 Companies |
| IT                       | 0.001***(0.001)                     | 0.004***(0.002)                      |
| Sample size              | 6,600                               | 6,600                                |
| Adjusted R <sup>2</sup>  | 0.521                               | 0.422                                |
| F-statistic value        | 6.840***                            | 6.421***                             |
| Panel C                  | TWSE 86 Companies                   |                                      |
| IT                       | 0.005***(0.001)                     |                                      |
| Sample size              | 9,546                               |                                      |
| Adjusted R <sup>2</sup>  | 0.394                               |                                      |
| F-statistic value        | 6.016***                            |                                      |

| Panel D                 | TWSE Low Score Group 30 Companies | TWSE High Score Group 30 Companies |
|-------------------------|-----------------------------------|------------------------------------|
| IT                      | 0.004*** (0.002)                  | 0.010*** (0.004)                   |
| Sample size             | 3,300                             | 3,300                              |
| Adjusted R <sup>2</sup> | 0.412                             | 0.423                              |
| F-statistic value       | 4.940***                          | 4.425***                           |
| Panel E                 | TPEx 93 Companies                 |                                    |
| IT                      | 0.002*** (0.001)                  |                                    |
| Sample size             | 10,323                            |                                    |
| Adjusted R <sup>2</sup> | 0.485                             |                                    |
| F-statistic value       | 6.891***                          |                                    |
| Panel F                 | TPEx Low Score Group 31 Companies | TPEx High Score Group 31 Companies |
| IT                      | 0.004*** (0.001)                  | 0.004*** (0.002)                   |
| Sample size             | 3,441                             | 3,441                              |
| Adjusted R <sup>2</sup> | 0.363                             | 0.365                              |
| F-statistic value       | 5.240***                          | 5.812***                           |

Notes: 1. Source: Compiled by this study. 2. This table presents the regression analysis results in which the respondents were provided with the information disclosure score. 3. Other notes are the same as those in Table 4.

#### 4.4.2 Robust Testing - Quantile Regression Model

To investigate whether the association between corporate IT and the level of trust exhibits nonlinear characteristics, this study further conducted a quantile regression analysis, the results of which are presented in table 6. In the quantile regression, the data were divided into three trust levels: low (quantiles are 0.1, 0.2 and 0.3), normal (quantiles are 0.4, 0.5 and 0.6), and high (quantiles are 0.7, 0.8 and 0.9). Each trust level was analyzed across three quantiles, resulting in nine quantiles of empirical results for both the first and second phase samples. Based on the characteristics of quantile regression, a quantile increases from 0.1 to 0.9 reflects an increase in the dependent variable, the level of trust, from low to high. However, this study demonstrated that the primary independent variable, IT, positively affects the level of trust. Therefore, a quantile increases from 0.1 to 0.9 can also be interpreted as an increase in IT from low to high.

The results of the quantile analysis are presented in table 6. The analysis yielded several notable results. First, the empirical results from all nine quantiles in both the first and second phases support Hypothesis 1, indicating that higher IT leads to higher stakeholder trust in companies within Taiwan's semiconductor industry. Additionally, the coefficient values of the primary independent variable, IT, were consistently positive and significant across all nine quantiles.

Second, the results of the quantile regression analysis reveal that the positive effect of IT on stakeholder trust is characterized by an increasing nonlinear association. That is, as IT increases, its positive effect on stakeholder trust also increases. Specifically, the empirical findings reveal that as the quantile increases—indicating higher levels of IT—the coefficient values for IT also increase. This study also employed the cross-quantile coefficient difference test detailed by Lee et al. (2013), which verified that the coefficient values for IT gradually increased. Therefore, in Hypothesis 2, which proposes a nonlinear association between IT and the level of trust, the nonlinear association is such that as IT increases, its positive effects on stakeholder trust also increase, forming an upward-sloping curve.

Table 6. Empirical results of quantile regression

| Item                    | Public179          |                 |                 |                       |                 |                 |                     |                 |                 |
|-------------------------|--------------------|-----------------|-----------------|-----------------------|-----------------|-----------------|---------------------|-----------------|-----------------|
|                         | Low level of trust |                 |                 | Normal level of trust |                 |                 | High level of trust |                 |                 |
|                         | 0.1                | 0.2             | 0.3             | 0.4                   | 0.5             | 0.6             | 0.7                 | 0.8             | 0.9             |
| IT                      | 0.001*** (0.001)   | 0.001*** (0.01) | 0.002*** (0.01) | 0.002*** (0.01)       | 0.003*** (0.01) | 0.003*** (0.01) | 0.004*** (0.01)     | 0.005*** (0.01) | 0.006*** (0.01) |
| Sample Size             | 19,869             | 19,869          | 19,869          | 19,869                | 19,869          | 19,869          | 19,869              | 19,869          | 19,869          |
| Adjusted R <sup>2</sup> | 0.325              | 0.331           | 0.345           | 0.394                 | 0.411           | 0.435           | 0.441               | 0.442           | 0.451           |
| F-statistic value       | 8.051***           | 8.152***        | 8.253***        | 8.305***              | 9.045***        | 10.061***       | 10.107***           | 10.338***       | 10.691***       |

Public179

|                         | Low level of trust  |                    |                    | Normal level of trust |                    |                    | High level of trust |                    |                    |
|-------------------------|---------------------|--------------------|--------------------|-----------------------|--------------------|--------------------|---------------------|--------------------|--------------------|
| Item                    | 0.1                 | 0.2                | 0.3                | 0.4                   | 0.5                | 0.6                | 0.7                 | 0.8                | 0.9                |
| IT                      | 0.001***<br>(0.001) | 0.002***<br>(0.01) | 0.003***<br>(0.01) | 0.003***<br>(0.01)    | 0.004***<br>(0.01) | 0.005***<br>(0.01) | 0.006***<br>(0.01)  | 0.006***<br>(0.01) | 0.007***<br>(0.01) |
| Sample Size             | 19,869              | 19,869             | 19,869             | 19,869                | 19,869             | 19,869             | 19,869              | 19,869             | 19,869             |
| Adjusted R <sup>2</sup> | 0.435               | 0.441              | 0.455              | 0.453                 | 0.521              | 0.545              | 0.556               | 0.562              | 0.571              |
| F-statistic value       | 9.021***            | 9.142***           | 9.233***           | 10.365***             | 10.145***          | 11.611***          | 11.137***           | 12.358***          | 12.713***          |

Notes: 1. Source: Compiled by this study. 2. This table presents the empirical results of the quantile regression (without providing the information disclosure score to the respondents). 3. The numbers in the table represent coefficient values, with the numbers in parentheses indicating p-values; \*, \*\*, and \*\*\* denote significance levels of 5%, 1%, and 0.1%, respectively. 4. Variables description: The independent variable is IT, whereas the dependent variable is the level of trust in TWSE and TPEx companies.

#### 4.5 Advanced Robustness Test: Endogeneity Problems in the Quantile Regression Model

In this study's model, the independent variable, information transparency (IT), may be influenced by the dependent variable, the level of trust. This relationship suggests that IT is highly correlated with the model's residual term. Therefore, following the methodologies of Chernozhukov and Hansen (2006), Lee et al. (2010), Ura (2021), and Zhu et al. (2023), the instrumental variable quantile regression (IV-QR) approach was employed for analysis. The IV-QR results indicate that the coefficient values and significance levels of the primary independent variable, IT, do not exhibit substantial structural changes; thus, the empirical results of the quantile regression demonstrate considerable robustness.

To ensure the robustness of our findings, we further partitioned the sample into sub-groups based on firm size and listing seniority. Empirical analyses across these diverse sub-samples yielded results consistent with our primary estimations, indicating that the observed relationship remains stable regardless of these critical corporate characteristics.

## 5. Conclusion and Suggestions

### 5.1 Main Finding

This study proposes the "IT hypothesis," which asserts that there is a significant and positive relationship between IT and the level of trust, focusing on TWSE and TPEx semiconductor companies in Taiwan.

The main findings reveal that the IT hypothesis is valid, meaning there is a significant and positive relationship between IT and the level of trust. That is, the so-called transparency fallacy does not hold in this study. The research results from Taiwan's semiconductor industry indicate that higher IT leads to higher stakeholder trust. Robustness tests—conducted on all listed and TPEx company samples for differentiation between without scored and scored samples, segmentation between listed and TPEx company samples, distinction between high and low transparency samples, and quantile regression—yield consistent empirical results. Additionally, the quantile regression results further reveal that the positive impact of IT on stakeholder trust follows an increasing nonlinear relationship, meaning that as level of trust rises, the positive effect of IT on stakeholder trust also increases.

Our findings are broadly consistent with prior studies documenting a positive association between corporate transparency and stakeholder trust (e.g., He & Chen, 2022; Lobo et al., 2021). However, unlike previous studies that generally assumed homogeneous linear relationship, the present study demonstrates that the magnitude of transparency benefits varies systematically across trust levels. At the same time, our findings differ from Nguyen et al. (2023), who suggested that excessive disclosure may generate information overload and reduce stakeholder trust in certain emerging markets. One possible explanation is contextual differences. Taiwan's semiconductor industry operates within a highly regulated, export-oriented environment characterized by strong corporate governance requirements and intensive international scrutiny. Under these institutional conditions, stakeholders may interpret additional transparency as a credible signal of governance quality rather than as excessive information, thereby strengthening rather than weakening trust.

These findings suggest that IT contributes to higher levels of stakeholder trust in companies. Therefore, enhancing IT can improve a company's brand image, social image, and trustworthiness. Gaining customer trust supports the sustainable operation of companies.

### 5.2 Managerial and Policy Implications

Upon the request of securities regulatory authorities, Taiwan's listed and TPEx companies must ensure adequate IT. The IT requirements have progressively tightened over time, evolving from the periodic disclosure of prospectuses to corporate social responsibility reports to the requirement for sustainability reports and accountability to the Task Force on Climate-related Financial Disclosures, marking a shift from voluntary to mandatory disclosure. Because the IT hypothesis proposed in this study holds, the present study suggests that the policy direction of Taiwan's securities regulatory authority is prudent. Requiring more information (higher IT) from a listed company helps stakeholders understand disclosures, enabling them to make more informed investment decisions.

While our results align with the "transparency-trust" nexus identified by He and Chen (2022) in China and Lobo et al. (2021) in the U.S., we further uncover an increasing nonlinear relationship where the marginal benefit of transparency intensifies at higher trust levels. This stands in contrast to findings by Nguyen et al. (2023), who suggested that information overload in emerging markets like Vietnam could undermine trust. These conflicting perspectives highlight a critical gap: future research should explore whether the transparency-trust dynamic eventually encounters a "too-much-of-a-good-thing effect", potentially leading to diminishing or even negative returns beyond a certain threshold.

#### Sustainability Implications and SDG Alignment:

This study contributes to the growing body of sustainability research by examining the role of information transparency in enhancing stakeholder trust within the semiconductor industry. From a sustainability perspective, transparency is a fundamental mechanism that supports accountability, reduces information asymmetry, and promotes responsible corporate behavior. These functions are essential for maintaining stable economic systems and ensuring long-term sustainable development.

From a policy perspective, the results suggest that regulatory frameworks promoting higher levels of information disclosure can serve as effective tools for advancing sustainable development. Policymakers can leverage transparency requirements to foster more accountable and trustworthy corporate environments, thereby supporting sustainable economic growth. From a managerial perspective, firms are encouraged to enhance transparency practices not only to improve market trust but also to align with global sustainability standards and expectations.

Overall, this study extends the literature by integrating corporate governance, stakeholder trust, and sustainability into a unified analytical framework. It demonstrates that information transparency is not only a governance mechanism but also a strategic driver of sustainable development within complex socio-economic systems.

### 5.3 Theoretical Contribution

This study makes the following contributions to past literature. First, because Taiwan's semiconductor industry occupies a strategically crucial position in the global market, the present study's investigation into the relationship between IT and level of trust in this industry has profound managerial and policy implications for the semiconductor sector. Second, because IT is crucial to corporate governance and environmental, social, and governance (ESG) practices, the present study's findings are a valuable reference for decisions promoting corporate governance and ESG initiatives. Therefore, per Agarwala et al. (2024), a nonlinear relationship may exist between various aspects of ESG, stock returns, and stakeholder trust. Third, this study explored whether a nonlinear association exists between IT and level of trust, using quantile regression to determine the nature of this nonlinear association. Finally, few Chinese-language studies have explored the transparency fallacy hypothesis. The present study tested this hypothesis to fill a gap in past literature.

### 5.4 Practical Implications

For managers, transparency should not merely be viewed as a regulatory compliance requirement but as a strategic governance resource capable of generating trust-based competitive advantages. Firms with strong stakeholder relationships may obtain even greater returns from continued improvements in disclosure quality. For policymakers, the findings support continued enhancement of mandatory disclosure requirements because increased transparency appears to improve stakeholder confidence without evidence supporting the transparency fallacy. Therefore, regulators should encourage firms to improve both the quantity and quality of corporate disclosure in order to enhance corporate transparency and strengthen market trust.

### 5.5 Limitations and Future Research

Despite its contributions, this study has several limitations that provide opportunities for future research. First, the empirical analysis focuses exclusively on Taiwan's semiconductor industry. Although this industry plays a globally significant role and provides an ideal context for examining information transparency, institutional environments, governance systems, and stakeholder expectations differ substantially across industries and countries. Future studies

should replicate the analysis in other sectors and cross-country settings to examine the generalizability of the present findings.

Second, the cross-sectional research design limits our ability to establish causal relationships between information transparency and stakeholder trust. Although robustness analyses provide consistent evidence, longitudinal panel data would enable researchers to investigate how changes in transparency influence stakeholder trust over time and whether reciprocal relationships exist.

Third, stakeholder trust was measured using questionnaire responses from senior executives. Although anonymous data collection was implemented to reduce evaluation bias, perceptual measures may still be affected by common method bias, respondent subjectivity, or social desirability bias. Future studies could combine perceptual evaluations with objective market-based indicators, such as analyst forecasts, investor reactions, or customer satisfaction measures.

Finally, future studies may integrate organizational characteristics, institutional environments, ESG performance, and digital disclosure practices as moderating factors to develop a more comprehensive understanding of how information transparency contributes to stakeholder trust and sustainable corporate governance across different contexts.

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### **Author contributions**

Lee was responsible for the innovative design of the study, the construction of the empirical model, the analysis of the empirical results, the writing of the managerial and policy implications, and the revision and modification of the manuscript. Kuo was responsible for research design, literature review, questionnaire collection, implementation of empirical analysis, and manuscript writing.

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### **Data availability statement**

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

### **Data sharing statement**

No additional data are available.

### **Open access**

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