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Sustainability-Driven Financial Stability: Empirical Insights from the Iranian Listed Manufacturing Companies

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ABSTRACT

Sustainability performance has gained considerable attention in recent years as corporations increasingly highlight their environmental, social, and economic (ESE) achievements to demonstrate their dedication to sustainable practices. However, the impact of such performance on corporate financial performance remains a topic of debate, especially in emerging economies. This study examines the link between ESE sustainability practices and financial stability among manufacturing companies listed on the Tehran Stock Exchange from 2015 to 2022. Using Global Reporting Initiative (GRI) indicators, a dataset from 130 listed manufacturing companies was analyzed through multivariate regression. Financial stability, represented by the possibility of bankruptcy, is measured using the Z-Score index. Results show that sustainability performance, encompassing environmental, social, and economic aspects, significantly mitigates bankruptcy risk and enhances financial stability. These findings support the importance of sustainability performance for investors, encourage management to prioritize sustainability, and guide regulatory bodies and stock exchanges in improving sustainability disclosures and practices.

Keywords: Sustainability, disclosure, reporting, bankruptcy risk, financial stability.

1. Introduction

The world currently grapples with multifaceted challenges, encompassing global ethics, technology, energy, crime, gender equality, peace, education, health, wealth disparity, IT convergence, decentralization, population dynamics, clean water, and *Sustainable Development (SD)*. These global issues necessitate collaborative efforts across governments, international bodies, NGOs, corporations, universities, and individuals. SD aims to harmonize environmental, human, and economic interests to ensure that present needs are met without compromising future generations. It emphasizes environmental health, social equity, and economic vitality to foster resilient communities. Achieving SD necessitates transformative changes across global norms, technologies, behaviors, and societies. Recent corporate scandals and global financial and environmental challenges have intensified stakeholder demands for enhanced transparency and regular disclosure of non-financial corporate activities. Modern firms, recognizing the global public's heightened awareness of environmental, social, and economic issues, emphasize their commitment to SD and performance (Ehnert et al., 2016)

Companies address these challenges by informing stakeholders about their environmental, social, and economic performances (De Villiers et al., 2014; Dissanaik et al., 2016). For firms, SD presents challenges and requires innovative management, production, and reporting systems. Initiatives like OHSAS, ILO, ISO14001, HSE standards, Green Supply Chains, Expert Systems, Artificial Intelligence, and *Sustainability Reporting (SR)* exemplify corporate commitment to SD (Anvary Rostamy & Rajabzadeh Ghatari, in press). Companies employ SR to enhance transparency and their brand value, reduce information asymmetry, motivate staff, and secure a competitive advantage. SR aligns company interests with stakeholders' needs and facilitates informed decision-making (Kılıç et al., 2015). SD significantly bolsters economic stability and growth, and explains the growing interest in SR concepts in recent years (Lozano & Huizing, 2011).

While many companies currently pursue sustainability initiatives, their widespread adoption hinges on aligning these efforts with improved financial performance. This alignment calls for empirical investigations and evidence about the impacts of SR on firms' financial outcomes and investor wealth. Some researchers such as Grinblatt and Hwang (1989), Campbell and Hentschel (1992), Preston and O'Bannon (1997), Petrovits (2006), Brine et al. (2007), Hutton et al. (2009), Servaes and Tamayo (2013), Krüger (2015), Lys et al. (2015), Breuer et al. (2018), Yoon and Chung (2018), and Lin et al. (2020) argue that despite SR's growing significance and understanding, the effects of SR on corporate financial performance, particularly in emerging economies, remain ambiguous, even conflicting

This study investigates the influence of environmental, social, and economic SR on the financial stability of firms listed on the Iranian Stock Exchange. The findings aim to enlighten investors, regulators, companies, and other stakeholders about the significance of transparency and sustainable practices, fostering a more informed and responsible society. The article is structured into six sections: Section 2 covers theoretical foundations, backgrounds, and research hypotheses, Section 3 details materials and methods, Section 4 presents results, and Section 5 concludes with limitations, recommendations, and future research directions.

2. Theoretical Foundations, Backgrounds, Hypotheses

Agency Theory posits that ethical managers engage in *Social Responsibility and Ethics (SRE)* activities to enhance transparency, reduce information asymmetry, encourage philanthropy, and minimize financial risk (Jensen & Meckling, 1976). Managers act as moral agents fulfilling societal obligations. SRE encompasses the commitment and attention of business to the quality of life of employees, customers, the local community, and the whole society in the direction of sustainable economic development duties and obligations to preserve and benefit society, driving wealth creation, competitive advantage, and societal wealth maximization (Wood, 1991). Allen and Peloza (2015) have divided SRE into four categories.

1) Philanthropic responsibility; supporting community betterment,
2) Ethical responsibility; societal contributions without legal mandate,
3) Legal responsibilities; mandatory societal protection, and,
4) Balancing societal needs with investor benefits.

SRE creates challenges for companies as the most influential actors and requiring innovative management, production, and *SR systems* (Anvary Rostamy & Rajabzadeh Ghatari, in press). Rajgopal and Venkatachalam (2011), Gupta and Krishnamurti (2016), and Sun & Cui (2014) showed that increased corporate transparency reduces information asymmetry and financial risk.

Legitimacy Theory suggests that firms reporting social and environmental performance build societal trust. Such companies tend to act ethically, comply with regulations, face fewer penalties, and enjoying higher customer and employee support (Cheung et al., 2010; Benlemlih & Gired Potin, 2017). Consequently, socially responsible firms exhibit lower financial risk, better credit ratings and performance (Godfrey, 2005; Goss & Roberts, 2011; Jo & Na, 2012). For these advantages, countries like China, Denmark, and the US are moving towards mandatory sustainability disclosures (Ioannou & Serafeim, 2017; Brooks & Oikonomou, 2018).

Despite of increasing attentions to SR, global research on SR needs more attention (Endrikat et al., 2014; Alshehhi et al., 2018). Todays, many firms still remain unaware of voluntary disclosure's importance, especially in emerging markets (Orazalin & Mahmoud, 2018). Despite challenges, SR offers numerous *benefits*. For example, Wang Verrecchia et al. (2001) highlight SR's role in reducing information asymmetry and boosting stock liquidity by making private information costly. Leuz and Wysocky (2006) argue that SR enhances price discovery and market liquidity. Dehaliwal et al. (2011) highlight improve in transparency and quality of reporting. Ng and Rezaee (2012) show that disclosing sustainability lowers debt and equity costs. Brockett and Rezaee (2012) and Lozano et al. (2015) believe that efficient and effective management, including sustainability activities, maximizes shareholder values and welfare. Trisnawati et al. (2016) found that SR negatively correlates with earnings management and suggesting its influence on earnings forecasting accuracy. Hummel and Schlick (2016) indicate that top sustainability performers offer high-quality disclosures. Sustainability performance reduces information asymmetry (Diebecker & Sommer, 2017) and enhances the quality of analysts' risk and performance assessments (Ferrer et al., 2020). According to Höck et al. (2020) and Habek (2014), eenvironmental, social, and governance (ESG) dimensions of sustainability reporting, ethical practices, and disclosed earnings improve corporate efficacy by addressing stakeholder concerns. Chae et al. (2020) and Harmadji et al. (2020) showcase that financial reporting transparency and SR quality reduce stock price crash risk. Al-Banna and Jannah (2023) show how environmental, social, and cultural benefits influence tourism sustainability. Pahlavan et al. (2023) confirms that environmental SR affects stock crash and liquidity risks, with comparability mediating. Al-Banna and Jannah, 2023 report that socially and environmentally oriented investments, along with religiosity, boost SRE investment intentions. In summary, a robust SR system improves financial reporting quality, management ethics, price discovery, market liquidity, and deters confidential information transfer and earnings management (Leuz & Wysocky, 2006; Nekhili et al., 2017; Kim et al., 2021).

Companies may report their sustainability activities for various *reasons and motivations*. Although ccompanies report sustainability activities to enhance competitive priorities like cost efficiency and supply chain reliability. Improved sustainability disclosure reduces information asymmetry, boosts customer loyalty, employee support, and stakeholder relationships during financial instability. Such reporting increases transparency, brand value, and competitive advantage, however the intentions of all companies are not the same. For example, Wang Verrocchio et al. (2001) argue that managers may engage in over-investment activities and employ SR and sophisticated financial disclosures to conceal adverse details or pursue individual motives. Roberts (2004) believe that corporations adopt sustainability as an exemplary standard. Tilling (2004) and Hutton et al. (2009) believe that managers adopt strategies to mitigate information asymmetry and agency costs. One of such strategies mitigate information asymmetry and agency costs is SR. Jin and Myers (2006) indicate that agency costs decline stock price and potentially increases stock price crash risk. Lys et al. (2015) explains that companies promote their sustainability practices to enhance their reputation and brand. Rezaee (2017) state that companies fulfill social and political contracts to maintain legitimacy and gain stakeholder support through financial and non-financial sustainability activities. Orazalin et al. (2019) link sustainability indicators to financial stability in the Russian oil and gas sector, influenced by company-

specific factors. Jebran et al. (2020) point out that agency costs decline stock price and increases the probability of stock price crash risk and SR prevents this crash. Hock et al. (2020) show that improved sustainability reduces credit risk in European firms and that a firm's credibility can moderate this effect negatively.

Beyond economic performance, companies impact society and the environment, not always reflected in firms' executive compensation plans. *Sustainable Business Models* (SBMs) employ a triple-bottom-line approach, considering environmental, social, and economic sustainability to cater to stakeholder interests. *Stakeholder Theory* emphasizes corporate governance, social responsibility, ethics, and environmental initiatives, not just profits (Brockett & Rezaee, 2012). Thus, a comprehensive corporate SR analysis encompasses environmental, social, and economic dimensions and reducing financial insolvency and bankruptcy risks (Torjai et al., 2015). For this reason, in the next section, we will deal with each of the environmental, social, and economic aspects of SR, separately.

GRI defines sustainability reporting as the practice of companies disclosing the most significant environmental, social, and economic impacts that arise from their corporate activities, and thereby being held accountable for these impacts and responsible for managing them. The GRI Standards focus on the environmental, social, and economic impacts of the activities of a company, and hence its contributions – positive or negative – towards sustainable development. It is the underlying assumption that if not already financially material at the time of reporting, these impacts may become financially material over time. The GRI reporting framework guides organizations to select topics that reflect their most significant economic, environmental, and social impacts in consultation with its stakeholders (CRI and SASB, 2021).

2.1. Environmental Sustainability

In recent decades, financial scandals and growing awareness of corporate *environmental responsibilities* have driven companies to enhance their environmental and social accountability (Hackston & Milne, 1996; Gianarakis, 2014; Qiu et al., 2016). In the strong model of sustainability, environmental services are the foundation of socio-economic development and human systems (social dimension) because they are contained within the limitations of the biosphere and limited natural resources. Environmental efforts range from conserving natural resources to waste reduction and renewable energy use. In the strong sustainability model, environmental services underpin socio-economic development, constrained by biosphere limits and natural resources.

Corporate environmental reporting emerged in the 1980s, to reflect the significant influence of environmental performance on stakeholder interests (Ceurstemont et al., 2001). Disclosure of environmental responsibilities aids in preventing managerial misinformation (Petrovits, 2006). Herva et al. (2011) differentiated between process and product-oriented environmental indicators and note their complementary nature and limitation. Environmental strategies can boost company performance and supported by a coherent theoretical framework (Brockett & Rezaee, 2012). To support and facilitate measuring sustainability process at corporate level, Rahdari and Anvary Rostamy (2015) designed a general set of sustainability indicators at the corporate level. Surprisingly, they found that environmental indicators account for almost half of the extracted most common indicators. Akrout and Ben Othman (2016) showcase that increased environmental disclosure correlates with reduced bid-ask spreads and improved market liquidity. Carroll (2016) indicates that enhanced environmental sustainability represents superior managerial ethics (Ioannou & Serafeim, 2017), and improves disclosure quality. Harmadji et al. (2020) shows that environmental sustainability reduces stock price crash risks by reducing information asymmetry and enhancing liquidity. However, environmental sustainability disclosures may be undervalued by investors, especially in financially constrained firms (Alsahlawi et al., 2021). Pahlavan et al. (2023) highlights the influence of environmentally sustainable performance reporting on stock price crashes and liquidity risks, and finding that it boosts earnings comparability and reduces crash and liquidity risks.

Drawing from theoretical foundations and prior (Hackston and Milne, 1996; Ceurstemont et al., 2001; Gianarakis (2014); Petrovits (2006); Herva et al. (2011), Brockett and Rezaee (2012), Pissourios (2013), Akrout and Ben Othman (2016), Trisnavati et al. (2016), Carroll (2016), Ioannou and Serafeim

(2017), Fernando et al. (2019), Harmadji et al. (2020), Alsahlawi et al. (2021), and Pahlavan et al. (2023), this research posits the first hypothesis as:

H₁: *Environmental Sustainability Performance Positively Affects the Manufacturing Companies' Financial Stability*.

2.2. Social Sustainability

The European Commission (2002) defines *Corporate Social Responsibility (CSR)* as the voluntary integration of environmental and social concerns into business operations and stakeholder interactions. Key CSR characteristics include voluntariness, managing externalities, multi-stakeholder orientation, balancing economic and social responsibilities, adhering to social values, and extending beyond mere humanitarian projects (Becchetti et al., 2014; Jha & Cox, 2015; Allen and Peloza, 2015; Poplawska et al., 2015). Various *CSR models* exist. Some of them are as follows:

- Carroll's CSR Pyramid (2016) encompasses economic, legal, ethical, and philanthropic responsibilities;
- The Social Anchored Competencies (SAC) model focuses on leveraging core competencies for social responsibility (Lin Wu et al., 2016);
- Lantos (2001) model, categorizes CSR into ethical, philanthropic, and strategic type;
- A five-dimensional model integrates elements from Carroll, Lantos, and SAC, emphasizing societal commitment, stakeholder orientation, rule of law, social-economic responsibility, and strategic alignment

CSR effects both *positively and negatively* on financial performance (Lin et al., 2020). The positive aspect improves financial performance, while the negative aspect of SR is harmful to the financial performance. Vaddock and Graves (1997) found a positive association between CSR and both past and future financial performance. In real world, challenger firms benefit from SR initiatives (Du et al., 2011) through reducing their earrings management and information asymmetry (Kim et al., 2012; Cho et al., 2013). Servaes and Tamayo (2013) revealed a positive SR-firm value link in firms with high customer awareness, however they observed a reversed effect for firms with a poor corporate citizenship reputation. Frundlieb and Teuteberg (2013) analyzed 97 online SR reports to identify shifts in their focus and investigate their potential as marketing tools. Jiraporn et al. (2014) shows how SR improves credit ratings. SR enhances stakeholder engagement and analyst forecasts (Garrido-Miralles et al., 2016), influences investment decisions (Bhandari & Javakhadze, 2017), and modulates firm life cycles (Mustafa Monzur & Ahsan, 2017). Matthiesen and Salzmann (2017) link SR with equity costs in culturally oriented countries. Gong and Ho (2017) find that SR associated with financial stability, moderated by product market competition. Benlemlih and Potin (2017) reveal SR's risk-reducing impact in countries with low governance scores. Breuer et al. (2018) note reduced capital costs in supportive SR environments. Yoon and Chung (2018) find external SR boosts market value, while reduces operational profitability. Carp et al. (2019) see minimal SR impact on company growth. Kamalirezaei et al. (2020) associate SR with reduced bankruptcy risk especially and found that when the market structure moves to a monopoly, due to high market entry costs for other companies, bankruptcy risk reduces. Wang Verrocchio et al. (2020) indicate SR improves financial statement comparability, reduces capital costs, enhances company value, managerial monitoring, and resource utilization.

Based on theoretical foundations and previous studies (Vaddock and Graves (1997), Dehaliwal et al. (2011), Du et al. (2011), Kim et al. (2012), Cho et al. (2013), Servaes and Tamayo (2013), Frundlieb and Teuteberg (2013), Garrido-Miralles et al. (2016), Bhandari and Javakhadze (2017), Monzur and Ahsan (2017), Matthiesen and Salzmann (2017), Gong and Hu (2017), Benlemlih and Potin (2017), Breuer et al. (2018), Yoon and Chung (2018), Carp et al. (2019) Orazalin et al. (2019), Kamalirezaei et al. (2020), Wang et al. (2020), this research posits the second research hypothesis as:

H₂: *Social Sustainability Performance Positively Influences the Manufacturing Companies' Financial Stability*.

2.3. Economic Sustainability

Economic sustainability (ES) underpins all sustainability reporting dimensions and emphasizing profitability and productivity essential for organizational survival and societal benefit. ES

involves assessing environmental impacts of economic activities and setting sustainability goals for a sustainable future. ES focuses on achieving economic growth without compromising environmental well-being and by promoting capital profitability through quality production and fair pricing (Pallet, 2013). GRI pay attention to promoting economic development in local communities, while maximising the tax benefits of local sourcing (GRI and SASB, 2021). Companies balance shareholder expectations for returns, employee safety and fairness, and customer demand for quality at fair prices (Carroll, 2016). ES strategies can reduce ecological footprints by minimizing environmental depletion, waste, carbon emissions, and by harnessing solar energy, rejecting short-term wasteful processes for long-term planetary well-being.Based on the literature, GRI and SASB report (2021) and the findings of Pallet (2013) and Carroll (2016), the third research hypothesis expressed as:

H_3: *Economic Sustainability Performance has a Positive effect on the Manufacturing Companies' Financial Stability*.

2.4. Ambiguty and Conflicting Results

Despite SR benefits, concerns arise. Empirical studies reveal varied views on CSR's positive impact on performance. For example, Grinblatt and Hwang (1989) find unclear impacts of voluntary SR. Campbell and Hentschel (1992) demonstrate asymmetric market reactions to positive and negative news, extending to SR.Preston and O'Bannon (1997) suggest investing in social and environmental initiatives may strain resources and increase market vulnerability. Petrovits (2006) and Hutton et al. (2009) warn that expanding sustainability dimensions can confuse report users. Brine et al. (2007) found no significant CSR-financial performance link in Australia. Servaes and Tamayo (2013) report negative CSR-firm value associations for firms with poor corporate citizenship. Krüger (2015) argues that managers emphasizing social responsibility may benefit personally at shareholders' expense, eliciting negative investor reactions. Lys et al. (2015) note that non-financial sustainability aspects may diverge from shareholder interests. Breuer et al. (2018) find CSR reduces capital costs in supportive environments but increases them when misused for personal gain. Yoon and Chung (2018) show external CSR boosts market value but reduces operational profitability, while internal CSR improves operational profitability without impacting market value, reflecting financial market reactions to the news. Lin et al. (2020) highlights the dual impact of sustainability programs on financial performance.

Based on the extensive evidence presented in the preceding sections of this article, which highlights both the positive impact of various dimensions of SR on company performance and the neutral to negative outcomes observed, along with existing concerns, it can be argued that the relationship between SR and performance is complex, contradictory, and often ambiguous. While the influence of SR on corporate financial performance continues to be debated, particularly in emerging economies, this study examines the contributions of environmental, social, and economic aspects of SR to reducing bankruptcy risk and bolstering financial stability among firms listed on the Tehran Stock Exchange from 2015 to 2022, employing a multivariate regression model.

Table 1 presents a summary of Literature on Sustainability Reporting

Table1. Summary of literature on sustainability reporting

	No.	Researcher(s)	Year	Results/Findings
Sustainability Performance Disclosure and Reporting Advantages and Impacts	1	Jensen & Meckling	1976	SRE enhances transparency, reduces information asymmetry, encourage philanthropy, and minimize financial risk.
	2	Wang Verrecchia et al.	2001	highlight SR's role in reducing information asymmetry and boosting stock liquidity by making private information costly
	3	Godfrey	2005	Socially responsible firms exhibit lower financial risk, better credit ratings and performance
	4	Leuz & Wysocky	2006	SR improves financial reporting quality, management ethics, price discovery, market liquidity, earnings management
	5	Cheung et al.	2010	Firms reporting social and environmental performance build societal trust, tend to act ethically, comply with regulations, face fewer penalties, and enjoying higher customer and employee support.
	6	Rajgopal &Venkatachalam	2011	Increased corporate transparency reduces information asymmetry and financial risk
	7	Lozano & Huizing	2011	SD significantly bolsters economic stability and growth, and explains the

	No.	Researcher(s)	Year	Results/Findings
				growing interest in SR concepts in recent years
	8	Goss & Roberts	2011	Socially responsible firms exhibit lower financial risk, better credit ratings and performance
	9	Dehaliwal et al.	2011	Top sustainability performers offer high-quality disclosures
	10	Jo & Na	2012	Socially responsible firms exhibit lower financial risk, better credit ratings and performance
	11	Ng & Rezaee	2012	SR lowers debt and equity costs.
	12	Brockett & Rezaee	2012	Sustainability activities and reporting maximizes shareholder values and welfare
	13	De Villiers et al.	2014	SR informs stakeholders about their environmental, social, and economic performances
	14	Sun & Cui	2014	Increased corporate transparency reduces information asymmetry and financial risk
	15	Endrikat et al.	2014	Global research on SR needs more attention.
	16	Habek	2014	ESG reporting improve corporate efficacy by addressing stakeholder concerns.
	17	Kılıç et al.	2015	SR aligns company interests with stakeholders' needs and facilitates informed decision-making
	18	Lozano et al.	2015	Sustainability activities and reporting maximizes shareholder values and welfare
	19	Ehnert et al.	2016	Environmental, social, and economic issues, emphasize corporates' commitment to SD
	20	Dissanaik et al.	2016	SR informs stakeholders about their environmental, social, and economic performances
	21	Gupta & Krishnamurti	2016	Increased corporate transparency reduces information asymmetry and financial risk
	22	Hummel & Schlick	2016	Top sustainability performers offer high-quality disclosures
	23	Trisnawati et al.	2016	SR negatively correlates with earnings management and influence on earnings forecasting accuracy
	24	Benlemlih & Gired Potin	2017	Firms reporting social and environmental performance build societal trust, tend to act ethically, comply with regulations, face fewer penalties, and enjoying higher customer and employee support.
	25	Ioannou & Serafeim,	2017	Countries like China, Denmark, and the US are moving towards mandatory sustainability disclosures
	26	Diebecker & Sommer	2017	Sustainability performance reduces information asymmetry
	27	Nekhili et al.	2017	SR improves financial reporting quality, management ethics, price discovery, market liquidity, earnings management
	28	Brooks & Oikonomou,	2018	Countries like China, Denmark, and the US are moving towards mandatory sustainability disclosures
	29	Alshehhi et al.	2018	Global research on SR needs more attention.
	30	Orazalin & Mahmoud	2018	Todays, many firms still remain unaware of voluntary disclosure's importance, especially in emerging markets
	31	Orazalin et al.	2019	Link sustainability indicators to financial stability
	32	Höck et al.	2020	ESG reporting improve corporate efficacy by addressing stakeholder concerns.
	33	Chae et al.	2020	SR quality reduces stock price crash risk.
	34	Harmadji et al.	2020	SR quality reduces stock price crash risk.
	35	Kim et al.	2021	SR system improves financial reporting quality, management ethics, price discovery, market liquidity
	36	Al-Banna and Jannah	2023	Environmental, social, and cultural benefits influence tourism sustainability
	37	Pahlavan et al.	2023	Environmental SR improves comparability of statements and mitigates stock price crash risk and liquidity risks
	38	Anvary Rostamy & Rajabzadeh Ghatari	In press	SD presents challenges and requires innovative management, production, and reporting systems.
Motivations for SR	39	Wang Verrocchio et al.	2001	Managers engaged in over-investment employ SR to conceal adverse details or pursue individual motives.
	40	Roberts	2004	corporations adopt sustainability as an exemplary standard
	41	Tilling	2004	Managers adopt SR as a strategy to mitigate agency costs
	42	Jin & Myers	2006	Agency costs decline stock price and potentially increases stock price crash risk
	43	Hutton et al.	2009	Managers adopt SR as a strategy to mitigate agency costs
	44	Lys et al.	2015	Companies promote their sustainability practices to enhance their reputation

	No.	Researcher(s)	Year	Results/Findings
				and brand
	45	Rezaee	2017	Companies maintain legitimacy and gain stakeholder support through financial and non-financial sustainability activities
	46	Jebran et al.	2020	Agency costs decline increases the probability of stock price crash risk and SR mitigates such probabilities.
	47	Hock et al.	2020	SR reduces credit risk
Environmental SR	48	Ceurstemont et al.	2001	Corporate environmental reporting reflects significant influence of environmental performance on stakeholder interests
	49	Petrovits	2006	Disclosure of environmental responsibilities aids in preventing managerial misinformation
	50	Brockett & Rezaee,	2012	Environmental initiatives, governance, social responsibility, and ethics not just profits
	51	Brockett & Rezaee,	2012	Environmental strategies can boost company performance and supported by a coherent theoretical framework
	52	Torjai et al.	2015	Corporate SR reducing financial insolvency and bankruptcy risks
	53	Akrout & Ben Othman	2016	increased environmental disclosure correlates with reduced bid-ask spreads and improved market liquidity
	54	Carroll	2016	Enhanced environmental sustainability represents superior managerial ethics and improves disclosure quality
	55	Ioannou & Serafeim	2017	Enhanced environmental sustainability represents superior managerial ethics and improves disclosure quality
	56	Harmadji et al.	2020	Environmental sustainability reduces stock price crash risks by reducing information asymmetry and enhancing liquidity
	57	Alsahlawi et al.	2021	Environmental sustainability disclosures may be undervalued by investors, especially in financially constrained firms
	58	Pahlavan et al.	2023	Environmentally sustainable performance reporting boosts earnings comparability and reduces crash and liquidity risks
Social SR	59	Vaddock and Graves	1997	Found a positive association between CSR and both past and future financial performance
	60	Du et al. Kim et al. Cho et al.	2011 2012 2013	Challenger firms benefit from CSR initiatives through reducing their earrings management and information asymmetry
	61	Servaes & Tamayo	2013	Found a positive CSR-firm value link in firms with high customer awareness
	61	Frundlieb & Teuteberg	2013	CSR used to identify shifts in their focus and investigate their potential as marketing tools
	62	Jiraporn et al.	2014	CSR improves credit ratings
	63	Garrido-Miralles et al.	2016	CSR enhances stakeholder engagement and analyst forecasts
	64	Bhandari & Javakhadze	2017	CSR influences investment decisions
	65	Mustafa Monzur & Ahsan	2017	CSR modulates firm life cycles
	66	Matthiesen & Salzmann	2017	CSR affects equity costs in culturally oriented countries
	67	Gong & Ho	2017	Find an associated between CSR and financial stability
	68	Benlemlih & Potin	2017	CSR's risk-reducing impact in countries with low governance scores
	69	Breuer et al.	2018	CSR reduces capital costs
	70	Yoon and Chung	2018	CSR boosts market value but reduces operational profitability
	71	Carp et al.	2019	CSR found a minimal CSR impact on company growth
	72	Kamalirezaei et al.	2020	Found that CSR reduces bankruptcy risk
	73	Lin et al.	2020	CSR effects both positively and negatively on financial performance
	74	Wang Verrocchio et al.	2020	CSR improves financial statement comparability, reduces capital costs, enhances company value and managerial monitoring and resource utilization.
Economic SR	75	Pallet	2013	ES focuses on achieving economic growth without compromising environmental well-being and by promoting capital profitability through quality production and fair pricing
	76	Carroll	2016	Companies balance shareholder expectations for returns, employee safety and fairness, and customer demand for quality at fair prices
	77	GRI and SASB	2021	GRI pay attention to promoting economic development in local communities, while maximising the tax benefits of local sourcing
or uncl ear	78	Grinblatt & Hwang	1989	Find unclear impacts of voluntary SR
	79	Campbell & Hentschel	1992	Demonstrate asymmetric market reactions to positive and negative news, extending to SR

	No.	Researcher(s)	Year	Results/Findings
	80	Preston &O'Bannon	1997	Suggest investing in social and environmental initiatives may strain resources and increase market vulnerability
	81	Petrovits	2006	Warn that expanding sustainability dimensions can confuse report users
	82	Brine et al.	2007	Found no significant CSR-financial performance link in Australia.
	83	Hutton et al.	2009	Warn that expanding sustainability dimensions can confuse report users
	84	Servaes & Tamayo	2013	Report negative CSR-firm value associations for firms with poor corporate citizenship.
	85	Krüger	2015	Managers emphasizing CSR may benefit personally at shareholders' expense, eliciting negative investor reactions.
	86	Lys et al.	2015	Note that non-financial sustainability aspects may diverge from shareholder interests.
	87	Breuer et al.	2018	Find CSR reduces capital costs in supportive environments but increases them when misused for personal gain.
	88	Yoon & Chung	2018	External CSR boosts market value but reduces operational profitability, while internal CSR improves operational profitability without impacting market value, reflecting financial market reactions to the news.
	89	Lin et al.	2020	Highlights the dual impact of sustainability programs on financial performance.

3. Materials and Methods

3.1 Data and Sample

Data from firms audited financial statements, board of directors' reports, and the Tehran stock Exchange website was analyzed using statistical regression method in Excel and EViews 9. The study encompassed all companies listed on the Tehran Stock Exchange from 2015-2022, with a sample of 130 manufacturing companies.

3.2 Statistical Models

Equations were employed to test the research hypotheses:

$$FSBT_{it} = \beta_0 + \beta_1.EN_{it} + \beta_2.Fsiz_{it} + \beta_3.LEV_{it} + \beta_4.FCFAT_{it} + \beta_5.FAge_{it} + \varepsilon_{it} \quad (1)$$

$$FSBT_{it} = \beta_0 + \beta_1.SO_{it} + \beta_2.Fsiz_{it} + \beta_3.LEV_{it} + \beta_4.FCFAT_{it} + \beta_5.FAge_{it} + \varepsilon_{it} \quad (2)$$

$$FSBT_{it} = \beta_0 + \beta_1.EC_{it} + \beta_2.Fsiz_{it} + \beta_3.LEV_{it} + \beta_4.FCFAT_{it} + \beta_5.FAge_{it} + \varepsilon_{it} \quad (3)$$

Here

FSBT: Financial stability

EN: Environmental dimension of sustainability reporting

SO: Social dimension of sustainability reporting

EC: Economic dimension of sustainability reporting

Size: Firms' size

LEV: Firms' Financial leverage

FCFAT: Financial capacity

Age: The age of firm.

3.3 The Variables

In this research, like Laeven and Levin (2009), Kuranchie-Pong et al. (2016), Gong and Hu (2017), and Orazalin et al (2019), financial stability represented by the possibility of bankruptcy was the dependent variable, measured using the Z-Score index. A higher Z-index indicates lower risk and greater financial stability. The Z index formula is provided as equation (4). The Z index formula is provided as equation (4).

$$Corporate\ stability_{it} = ln(Z - Score_{it}) = ln\left(\frac{\overline{ROA}+\overline{CAR}}{\sigma(ROA)_{it}}\right) \quad (4)$$

Where:

ROA: Rate of return on assets (net profit to total assets).

CAR: Capital adequacy ratio (total equity to total assets).

σ (ROA): Standard deviation of *ROA*.

Independent variables considered environmental, social, and economic dimensions of corporate SR. In this research, as Fonseca et al. (2012), Sartori et al. (2014), Kılıçet al. (207), and Pahlavan et al. (2023), the Global Reporting Initiative (GRI) framework was adopted as a base for sustainability disclosure assessment. Initially, 72 indicators were identified based on theoretical literature and GRI guidelines. Data from the past five years determined the average and standard deviation of ROA and CAR, as per Gong and Ho (2017).

Like Orazalin et al. (2019), ccontrol variables included:

- Company size: Natural logarithm of company's book value to total assets.
- Financial leverage: Total liabilities divided by total assets.
- Financial capacity: Free cash flow divided by total assets.
- Company life: Years listed on the Tehran Stock Exchange.

Considering Iran's environmental, economic, social, and political context and referencing studies by Williams (1999), Gao et al. (2005), and McCarthy et al. (2017), checklists were devised for SR dimensions. Content analysis scored companies based on disclosed sustainability items, with one point awarded for each disclosed item. Table 2 details the environmental, social, and economic reporting components and indicators.

Table 2. The components and indicators of environmental, social, and economic sustainability reporting

	Components	Indicators
Environmental Dimension	Raw materials, water and energy	• Raw materials consumed (separate direct and indirect) • Total water harvested by source • Volume of water recycled and reused • Energy consumption (direct and indirect by source) • Renewable energy production and consumption programs
	Greenhouse Gases and waste disposal	• Greenhouse gas emission reduction actions, removal methods, and outcomes • Procedures for reducing hazardous and safe waste, and compliant waste disposal • Total weight of waste by type and disposal method
	Environmental effects of products and services	• Environmental impact reduction of products/services (soil, forest, etc.) • Compliance activities with environmental standards for customers, consumers, and supply chain • Design of eco-friendly facilities, equipment, and products • Customer advice for eco-conscious consumption
	Compliance with environmental laws and regulations	• Company's environmental ID, regulations, and charts • Lawsuits related to environmental matters
Social Dimension	Labor, employees and human rights	• Employee demographics (employment type, age, geography, gender, etc.) • Benefits exclusive to full-time employees according to important locations of operations • Sports and employee welfare programs • Employee loan and insurance programs • Health and safety issues in the workplace • Average annual training hours per employee by gender and rank • Scholarship and related gift programs • Reporting system for violations, criticisms, and suggestions
	Community participation and development	• Support for small industries and local entrepreneurs • Awards and certificates received related to social, cultural, environmental, educational and sports activities • Resources and financial aid for social, educational, and cultural and artistic activities • Charitable and public benefit donations • Recruiting/using students on a part-time basis for interns • Support for educational conferences and art exhibitions • Social, cultural and religious activities involvement • Membership in sustainability and social responsibility associations • Financial aid for natural disaster victims
	Product support and business ethics	• After-sales service quality • Customer needs satisfaction and response • Product R&D programs • Company ID, ethical, and social charters
Economic Dimension	Economic Performance	• Economic value added • Alignment with company's goals and plans • Return on assets • Financial consequences and other risks and opportunities for the organization's activities due to changing weather conditions • Value added statement

	Components	Indicators
	Presence in the market	• Industry and regional market share • Growth or changes in market share and its forecast in the future • Market share trends, growth or change predictions according to products/regions/customers, etc. • Technological and regulatory trends and changes affecting the market and products in the region or local environment • Market and competitors changes in the industry and region (competitive advantages and disadvantage and its vision
	Indirect economic effects & responsible investment	• Indirect economic effects, including foreign exchange savings • Social costs and investment breakdown by type and area • Human and production productivity ratios

4. Results

4.1 Descriptive Statistics

Table 3 displays descriptive statistics for research variables, encompassing minimum, maximum, median, mean, and standard deviation.

Among the variables, the age of the company and financial capacity exhibit the highest and lowest dispersion levels, respectively. The mean sustainability variable stands at 0.26 and the average financial leverage is 0.54, indicating 54% of companies utilize external financing. The average financial capacity, age of companies, and company size are 0.12, 19.2 years, and 14.38, respectively. The sustainability reporting average across examined listed companies in financial reports is notably low at 25%.

Table 3. Descriptive statistics of research variables

Variables Type	Variables' Names	St. Deviation	Min	Mean	Max	Median
Independent	Environmental sustainability reporting (EN)	0.82	0.06	0.23	0.53	0.21
	Social sustainability reporting (SO)	0.69	0.04	0.33	0.73	0.34
	Economic sustainability reporting (EC)	0.74	0.15	0.21	0.69	0.26
	Corporate's sustainability	0.55	0.05	0.25	0.54	0.26
Dependent	Financial stability of the company	0.71	0.36	2.39	4.45	2.42
Control	size of the company	1.54	10.51	14.38	19.77	14.19
	Financial Leverage	0.18	0.01	0.54	0.94	0.55
	Financial capacity	0.12	-0.46	0.12	0.65	0.11
	Age of company	8.88	6	19.2	51	17.5

4.2. Results of Pre-estimation Tests

4.2.1. Heterogeneity of Variance

The modified parent test confirms the homogeneity of variance for residuals in the fixed effects regression model, as the F statistic is insignificant at a 5% level (Table 4).

4.2.2. Model Estimation Method

This study employs the panel data method for model estimation. Results from the F-limer and Husman tests in Table 5 affirm the fixed effects regression model.

4.2.3 Stationarity of Variables

Levin, Lin, and Chu's method (Levin et al., 2002) was used to assess variable stationarity. Stationarity, a statistical property ensuring time series consistency over time, is crucial for forecasting models. Table 6 indicates all variables exhibit significance at a 5% level.

4.3. Results of Hypotheses Testing

Table 7 showcases research hypotheses testing outcomes.

The Durbin-Watson statistic at 2.161772 suggests no autocorrelation. An adjusted coefficient of determination value of 0.73619 implies 73.619% of financial stability changes in companies' financial stability are explained by the model's variables. An F value of 58.31628 confirms the model's adequacy and goodness. Significant t-statistic values for EnvSR, SSR, and ESR (0.0082, 0.00238, and 0.0314,

respectively) below 5% indicate their impactful roles on financial stability at a 95% confidence level. Their coefficients (0.211163, 0.603251, and 0.423606) show a positive influence on financial stability.

Company size (significance value 0.0196, coefficient 4.514177) and company life (significance value 0.0216, coefficient 2.749884) significantly and positively influence financial stability. Conversely, financial leverage and capacity show no significant impact.

Table 4. Heterogeneity of variance

	Statistics	Significance
F-statistic	1.815447	0.095
OBSR-squared	5.619209	0.095

Table 5. Results of F-limer and Husman tests

Results of F Limer test			
	Statistics	**d.f**	**Significance**
Cross-section F	1.475102	129	0.000
Cross-section Chi-square	132.846137	129	0.000
Results of Hausman tests			
	Statistics	d.f	Significance
Cross-section F	6.300141	63	0.018

Table 6. The results of stationary test

	Statistics	Significance
Environmental Sustainability Reporting (EN)	-5.6136	0.0048
Social Sustainability Reporting (SO)	9.6168	0.0048
Economic Sustainability Reporting (EC)	7.8154	0.0006
Sustainability of companies	5.8174	0.0096
Financial stability of companies	2.3461	0.0061
Size of companies	-5.6032	0.0074
Financial Leverage	-3.0024	0.0015
Financial capacity	7.1511	0.0039
Life of the company	-3.9154	0.0019

Table 7. The results of research hypotheses testing

	Coefficients	Estimation errors	t statistics	Significance
Constant	0.917480	0.32154	3.036518	0.0489*
Environmental Sustainability Reporting (EnvSR)	0.211163	0.030625	7.033628	0.0082*
Social Sustainability Reporting (SSR)	0.603251	0.131417	4.603512	0.00238*
Economic Sustainability Reporting (E)	0.423606	0.092516	4.597002	0.0314*
Size of companies	4.514177	0.891875	5.066014	0.0196*
Financial Leverage	-0.082606	0.362518	-2.988154	0.0795
Financial capacity	0.305377	0.221011	1.521623	0.1036
Life of the company	2.749884	0.551874	4.989153	0.0216*
Coefficient of Determinant (R2) =0.748015		Adjusted (R^2) =0.736159		
Durbin-Watson statistic=2.161772		F statistic=58.31628		
Significance = 0.000		* denotes significant at a 5% level		

5. Conclusions

Recent sustainability research predominantly emphasizes the economic aspects, emphasizing managers' responsibility to maximize shareholder wealth. However, societal and regulatory expectations now demand that corporate reporting encompasses environmental and social dimensions of sustainability alongside economic concerns. This study examines the influence of these sustainability dimensions on corporate financial stability using a

multivariate regression model and data from the Tehran Stock Exchange (2015-2022). Sustainability dimensions were based on GRI standards and other literature indicators, while financial stability was gauged using the Z-Score index.

Results indicate that companies adhering to environmental, social, and economic SR, consistent with theoretical foundations and prevailing literature, exhibit enhanced financial stability. Company size and age significantly influence financial stability, with larger, older firms possessing stronger organizational structures to bolster stability and minimize financial distress. Given these findings, stakeholders and investors should prioritize sustainability-related activities when assessing financial stability. In transparent reporting environments, this aids in identifying companies with financial risk, facilitating informed decision-making.

Confirming hypothesis 1 aligns with findings from studies prior (Hackston and Milne, 1996; Ceurstemont et al., 2001; Gianarakis (2014); Petrovits (2006); Herva et al. (2011), Brockett and Rezaee (2012), Pissourios (2013), Akrout and Ben Othman (2016), Trisnavati et al. (2016), Carroll (2016), Ioannou and Serafeim (2017), Fernando et al. (2019), Harmadji et al. (2020), Alsahlawi et al. (2021), and Pahlavan et al. (2023).

Confirming hypothesis 2 supports the findings of studies (Vaddock and Graves (1997), Dehaliwal et al. (2011), Du et al. (2011), Kim et al. (2012), Cho et al. (2013), Servaes and Tamayo (2013), Frundlieb and Teuteberg (2013), Garrido-Miralles et al. (2016), Bhandari and Javakhadze (2017), Monzur and Ahsan (2017), Matthiesen and Salzmann (2017), Gong and Hu (2017), Benlemlih and Potin (2017), Breuer et al. (2018), Yoon and Chung (2018), Carp et al. (2019) Orazalin et al. (2019), Kamalirezaei et al. (2020), Wang et al. (2020),

Confirming hypothesis 3 is in line with the findings of Pallet (2013) and Carroll (2016).

The results of this study demonstrate a positive correlation between SR and reduced bankruptcy risk, subsequently enhancing financial stability in companies. This finding contrasts with the conclusions drawn by Grinblatt and Hwang (1989), Campbell and Hentschel (1992), Preston and O'Bannon (1997), Petrovits (2006), Brine et al. (2007), Hutton et al. (2009), Servaes and Tamayo (2013), Krüger (2015), Lys et al. (2015), Breuer et al. (2018), Yoon and Chung (2018), and Lin et al. (2020).

Based on the results of this research, recommendations include:

- Managers should prioritize sustainability activities, disclosure, and reporting to manage risks effectively, reducing information asymmetry and financial failure probabilities.
- Stakeholders and investors should consider a company's sustainability engagement to minimize conflicts of interest and optimize resource use for financial stability.
- Companies should adhere to GRI guidelines for transparent disclosure and risk control, surpassing traditional reporting methods.
- Given the growing global importance of sustainability and Iran's relatively low sustainability reporting, accounting standards setters should devise standards to enhance corporate SR.

5.1 Limitations

Despite its contributions, this study has limitations. A sample size n=130 and caution is advised regarding population representation. An adjusted R^2 value of 0.736159 indicates unexplained variance (26.3841%), and the temporal and Iranian economic context may limit generalizability.

5.2 Scope for Future Work

Future research could explore industry-specific effects of SR on financial stability, leveraging comparative studies across industries. Examining other SR standards like Dow Jones and KLD and contrasting results could offer valuable insights. With AI's rapid growth affecting business and society, investigating CSR in the AI era and its impact on CSR and its various dimensions presents a promising research avenue. Another topic is to examine the spillover of knowledge and sustainability reporting skills in different regions of global markets.

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