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ESG Transparency and Firm Valuation in the Palm Oil Sector

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List of Abbreviations

ACOP	Annual Communication of Progress (ACOP)
ANOVA	Analysis of Variance
ASEAN	Association of Southeast Asian Nations
CBP	Customs and Border Protection
CPO	Crude Palm Oil
CRR	Chain Reaction Research
CSPO	Certified Sustainable Palm Oil
CSR	Corporate Social Responsibility
EBIT	Earnings Before Income Tax
E	Environmental
ESG	Environmental, Social, Governance
FLA	Fair Labor Association
FPIC	Free Prior Informed Consent
G	Governance
GAR	Golden-Agri Resources
GCN	Global Compact Network
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GRI	Global Reporting Initiative
GSIA	Global Sustainable Investment Alliance
GWP	Global Warming Potential
HCS	High Carbon Stock
HCV	High Conservation Value
ILO	International Labour Organisation
IIRC	International Integrated Reporting Council

IPCC	Intergovernmental Panel on Climate Change
ISPO	Indonesian Sustainable Palm Oil
IUCN	International Union for Conservation of Nature
KLPI	Kuala Lumpur Plantation Index
MPOB	Malaysian Palm Oil Board
MSCI	Morgan Stanley Composite Index
MSPO	Malaysian Sustainable Palm Oil
NDPE	No Deforestation, No Peat, No Exploitation
NGO	Non-Governmental Organisation
P/E	Price-to-Earnings Ratio
PM	Particulate Matter
PSI	Pollution Standard Index
POME	Palm Oil Mill Effluent
RED II	Renewable Energy Directive II
REDD+	Reducing Emissions from Deforestation and Forest Degradation
ROA	Return on Assets
ROC	Return on Capital
ROE	Return on Equity
RSPO	Roundtable on Sustainable Palm Oil
S	Social
S&P	Standard and Poor
SDGs	Sustainable Development Goals
SFDR	Sustainable Finance Disclosure Regulation
SME	Small and Medium-Sized Enterprise
SPOTT	Sustainability Policy Transparency Toolkit
SSE	Sustainable Stock Exchanges

UN	United Nations
UNEP	United Nations Environment Programme
UNPRI	United Nations Principles for Responsible Investment
WRI	World Resources Institute
WRO	Withhold Release Orders
WWF	World Wide Fund for Nature Inc.
ZSL	Zoological Society of London

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Executive Summary

The palm oil sector's rapid expansion has subjected palm oil companies to environmental, social and governance (ESG) risks with financial implications. Palm oil companies are increasingly pressured to address ESG risks by adopting sustainable practices and disclosing ESG efforts to improve access to financing.

This study seeks to broaden the existing body of research relating to ESG transparency and firms' financial indicators by using firm valuation as a financial indicator in the palm oil sector and by investigating the moderating role of firm size in the sector. It first investigates whether ESG transparency has a direct positive or negative effect on firm valuation. Transparency is measured by using the total, environmental, social and governance disclosure scores on the Zoological Society of London's (ZSL) Sustainability Policy Transparency Toolkit (SPOTT) 2021 assessment of palm oil companies. Firm valuation is measured by the price-to-earnings ratio (P/E), a popular ratio that investors use which is defined by its share price divided by earnings per share. The study then explores if accounting-based measures of firm size such as revenue and assets play a moderating role in strengthening the direct relationship.

The results find statistically significant negative relationships between ESG transparency and firm valuation. Companies with stronger ESG transparency are valued at a discount relative to companies with less ESG transparency. The results also highlight that firm size plays a moderating role such that larger firms strengthen the negative relationships between all transparency measures and firm valuation. These findings encourage constructive action for various stakeholder groups and provide implications for future research that can support mainstreaming sustainable palm oil.

1 Introduction

1.1 The Palm Oil Sector

Palm oil is the world's most produced, consumed and traded vegetable oil. The oil palm crop (scientific name *Elaeis guineensis Jacq.* (Meijaard, et al., 2018)) is a commodity widely used across products such as cooking oil, processed food, cosmetics, cleaning products, animal feed and biofuel (Segi Enam Advisors Pte Ltd, 2021). Originating as a staple food in Africa, it expanded across the globe for its cosmetic, medicinal, and preservative benefits pushing competitors to fade (Robins, 2021). It became cheaper than whale oil in the 1960s, healthier than trans fat in the 1990s, and was perceived as a greener option to fossil fuels. Almost half the world's population depends on palm oil for their diets (IUCN, 2018). Based on 2021 estimates, Asia accounted for two-thirds of global consumption, with Indonesia, India and China contributing to 45% of global demand mostly for cooking oil, partly due to growing affluence in India and China (Gregory, Hewitt, Ozinga, Fournier, & Brasier, 2022). Developed regions such as the European Union (EU) accounted for 9% largely for biofuel while the US only accounted for 2%.

Palm oil is produced in tropical countries across Southeast Asia, Africa and South America, where it thrives in humid conditions with high rainfall near the equator (Wahid, Abdullah, & IE, 2005). The sector is dominated by developing countries such as Indonesia and Malaysia which account for 83% of global production, with 59% by Indonesia (44.7 million tonnes) and 24% by Malaysia (18.1 million tonnes) (EPOA, IDH, RSPO, 2022). This is followed by 4% by Thailand, 2% by Colombia and 2% by Nigeria and 9% by other countries. Amongst vegetable oil crops, palm oil is the most favoured crop because its high yield makes it the most productive, cheapest and lucrative. It is the most land use efficient crop, where a hectare of land produces about 2.9 tonnes of palm oil, almost four times more than sunflower or rapeseed oil, and 10 to 15 times higher than coconut or groundnut (Our World In Data, 2019). The crop utilises only 6% of cultivated land for vegetable oils globally but contributes over a third of the total output (Hong, 2021), making it difficult to substitute. Between 1980 and 2014, global production of palm oil grew 15-fold, from 4.5 million tonnes to 70 million tonnes (IUCN, 2018), growing its significance towards economic development. The crop has alleviated poverty for millions of people (Pandjaitan, 2018), created jobs, developed rural infrastructure (Meijaard, et al., 2018) and strengthened exports for producing countries (Russell, 2018). In Malaysia, the sector represents 2.7% of Malaysia's Gross Domestic Product (GDP) (Statista Research Department, 2022), making it the fourth largest contributor to the economy (Bernama, 2022). In Indonesia, the sector represents 3.5% of Indonesia's GDP (Investor Daily, 2021).

However, palm oil's growing importance to global economies has placed companies in the sector under more scrutiny than any other agricultural commodity for their involvement with unsustainable practices. Linking sustainability to the Environmental, Social and Governance (ESG) context, the sector generates several negative externalities to society. Clearing land for expansion has resulted in environmental concerns from deforestation and peatland degradation which significantly accounts for the 23% of greenhouse gas (GHG) emissions attributed to agriculture, forestry and other land uses (Shukla, et al., 2019). This has resulted in recurring transboundary haze in Southeast Asia, causing respiratory issues and fatalities, leading to billions of dollars in damage. Furthermore, palm oil production impacts the highest number of threatened species when compared to other oil crops (Meijaard, et al., 2020). Social issues such as forced labour have led to the United States (US) placing sanctions on companies, while governance issues such as corruption and incomplete traceability have raised greenwashing risks. These issues have eroded investor and consumer confidence in the sector. With the world population estimated to grow from 8.0 billion in 2022 to 9.7 billion by 2050 (The United Nations, 2022), future demand for palm oil is forecasted to grow further. Production could rise four to six times from 73.8 million metric tonnes in 2020 to 264 to 447 million metric tonnes by 2050 (Afriyanti, Kroeze, & Saad, 2016), creating opportunities for producers to expand production capacities. With few productive oil crop substitutes, it is therefore critical for palm oil companies to expand their involvement with sustainable practices such as those that protect forests and peatlands, optimise land use efficiency, improve grievance mechanisms, and strengthen transparency. Regulations and engagement efforts from several stakeholder groups in society have also emerged to mainstream sustainable palm oil.

1.2 Sustainability and Firm Valuation

Globally, sustainability has become an increasingly important priority to provide for the needs of present and future generations. ESG was coined as a framework for sustainability in a financial sector initiative to integrate non-financial indicators in financial markets (UN Global Compact, 2004). Companies with better ESG management can raise shareholder value by better managing ESG risks, foreseeing regulatory changes or consumer trends, and entering new markets or lowering costs. In other words, companies concerned with ESG would thrive by satisfying shareholders and societal stakeholders such as regulatory bodies and consumers. If ESG risks are left unaddressed, companies can incur financial risks through compliance and reputational risks, higher operational costs, lower revenues (CRR, 2018), lower equity value of shares, and reduced access to financial resources to maintain and grow

their operations. This can consequently reflect poor growth opportunities and investment returns which are embedded in firm valuation measures that investors use for analysis.

Since 2019, the value of sustainability-themed investment products grew more than 80% to $3.2 trillion in 2020 (UNCTAD, 2021). The Global Sustainable Investment Alliance's (GSIA) 2020 report shows that ESG integration (USD 25.2 trillion) has overtaken negative and exclusionary screening (USD 15.9 trillion) as the most common sustainable investment strategy (GSIA, 2021), where ESG integration is defined by the United Nations Principles for Responsible Investment (UNPRI) as "the systematic and explicit inclusion of material ESG factors into investment analysis and decisions" (UNPRI, 2016). It evidences the need for a sustainable transition through better investor engagement. Investors are increasingly seeking non-financial benefits by focusing on ESG transparency, which is commonly associated with sustainability reporting, corporate social responsibility (CSR) and ESG disclosures. These can help firms and investors unlock a significant pool of untapped financial resources to catalyse the transition toward a more sustainable world. Sustainable finance thus plays a vital role in achieving sustainable palm oil production. The World Wide Fund for Nature Inc. (WWF) warned that divestment could erode the sustainability of the sector (WWF, 2019). Instead, institutional investors need to improve their capacity to engage with palm oil companies such as by enhancing policy disclosures. The UNPRI Investor Working Group on Sustainable Palm Oil also engaged with palm oil companies, banks and shareholders to instil stewardship efforts to transform the palm oil sector to become more sustainable (Pretorius, 2020). Additionally, several supporting initiatives are being developed to encourage companies to step up on ESG transparency. As such, in addition to improving their practices, palm oil companies are increasingly stepping up on ESG transparency to gain stakeholder trust towards their efforts for sustainable palm oil. While production continues to grow, deforestation for the commodity decreased by 82% in the last decade to 45,285 hectares annually from 2018 to 2020, contributing only 18% of its highest from 2008 to 2012 (Jong, 2022), evidencing that sustainable palm oil is attainable.

Research outside the palm oil sector shows linkages between ESG transparency and financial indicators of firms to justify the case for ESG integration. ESG transparency can improve stakeholder trust, minimise reputational risk, avoid compliance costs, reduce operational risks and create long-term value for stakeholders. Yet, there remains a degree of scepticism as to whether the relationship between ESG transparency and financial indicators is positive or negative. Some studies also found that individual environmental, social and governance components could have more influence than overall ESG on financial indicators. Few studies used firm valuation that was measured by the price-to-earnings ratio (P/E) as a financial indicator, despite being the most popular valuation tool used by investors. Additionally, some

studies found that larger firms are equipped with more resources and capacity to engage in ESG, suggesting that firm size has a moderating role in strengthening the relationship. Within the palm oil sector, only a handful of direct relationships were found using financial indicators such as stock performance. Research on the moderating role of firm size in the sector was absent. However, a growing body of evidence in the sector suggests that ESG transparency can influence firm valuation, and that firm size has a moderating effect. Hence, this study seeks to contribute to the existing literature by investigating the relationships between ESG transparency and firm valuation, and the moderating role of firm size in the palm oil sector.

1.3 Objective and Research Question

Given the notable improvements in company ESG practices, an empirical study of 36 palm oil companies was conducted to identify where the sector stands in terms of firm valuation using P/E. Companies with high ESG transparency could be valued at a premium, as the rising trend of ESG integration supports companies' efforts and perceive these companies as less risky. This would infer a positive relationship between ESG transparency with firm valuation. Alternatively, companies with high ESG transparency could be valued at a discount with the potential for higher returns, or because ESG risks in the sector have led to aversion and divestment towards higher performers. This would infer a negative relationship between ESG transparency and firm valuation. The direction of the direct effect could hence be either positive or negative. Also noting how larger firms had more resources to engage in ESG, the direct relationship could be further defined by considering if firm size has a moderating role in strengthening the positive or negative relationship. Through this study, recommendations are made for businesses, financial institutions, investors, regulators, non-governmental organisations (NGOs), consumers, and researchers on how they can better support the transition to sustainable palm oil. Therefore, the research questions for this paper are:

- Do palm oil companies with higher ESG transparency have a positive or negative relationship with firm valuation?
- If so, does firm size have a positive or negative moderating role in strengthening the relationship between ESG transparency and firm valuation?

Secondary data on scores and financial data were collected from established online platforms to understand the relationship between ESG transparency, firm size and firm valuation. A deductive approach was used to perform a multiple regression analysis to identify the relationship patterns between the variables.

1.4 Report Structure

The structure of this empirical study begins with Chapter 1 introducing the problem statement concerning ESG in the palm oil sector, an overview of the objectives and research questions followed by the paper's structure. Chapter 2 will review existing literature to contextualise the basis for the author's research questions, methodology, analysis and discussion. Chapter 3 develops the conceptual framework and the subsequent hypotheses for the study. Chapter 4 details the methods adopted for conducting the research study, including the justifications for data sources, variables used and the model tests that are conducted. Chapter 5 presents the results of the study and analyses whether the hypotheses in question can be accepted or rejected. Chapter 6 discusses the interpretation of the study and provides recommendations for various stakeholder groups and acknowledges the limitations of the study which present opportunities for future research. Chapter 7 concludes the study by summarising the paper and discussing how this study contributes to existing literature.

2 Literature Review

This chapter examines the considerations for ESG integration by first classifying the material ESG issues that plague the palm oil sector and the initiatives established to document the sector's progress to sustainability. The literature review then explores the applications of existing organisational theories to justify how providing stakeholder transparency on ESG practices translates to financial benefit. The literature review then draws inspiration from similar studies between ESG performance and financial indicators conducted beyond the palm oil sector, and spotlights on research that uses variables such as firm valuation and firm size which can be considered for the palm oil sector.

2.1 Palm Oil's Material ESG Factors

The palm oil sector introduces a wicked problem. The sector's rapid expansion and contribution to economic development are threatened by controversies for unsustainable production practices raising ESG concerns. The following material ESG factors are not exhaustive but convey negative externalities to society which incur financial costs. They highlight considerations for stakeholders in the value chain which support qualitative analysis for ESG integration. Existing literature finds that these issues are most prevalent in Indonesia and Malaysia, which account for the majority of global production. High levels of inspection on these issues in the sector have triggered several initiatives from the public and private sectors to quicken the transition to sustainable palm oil. While leakage from weak implementations still exists, research finds that efforts addressing ESG issues have been progressive and receptive to feedback, highlighting the sector's willingness to strengthen its practices to adhere to sustainability standards.

2.1.1 Environmental

Palm oil is called out more often than other forest-risk commodities (Thomson & Long, 2020), especially for its environmental impacts. These impacts stem mainly from deforestation and degradation of peatlands which have cascading effects of biodiversity loss, land subsidence, GHG emissions and transboundary haze. Deforestation and peatland degradation account for most of the 23% of anthropogenic GHG emissions attributed to agriculture, forestry and other land uses in the Intergovernmental Panel on Climate Change (IPCC) report (Shukla, et al., 2019), making it a major contributor of climate change. Protecting these carbon sinks can significantly reduce GHG emissions by almost a third, making it an effective mitigation measure (Forests & Finance, 2021).

Deforestation and Biodiversity Loss

Tropical deforestation in the sector impacts Southeast Asia the most. About 45% of Southeast Asia's oil palm plantations were classified as forested areas in 1989 (Barthel, et al., 2018). Expansions between 1972 and 2015 contributed to 47% of deforestation in Malaysia, and 16% in Indonesia (Meijaard, et al., 2018). Borneo, which is geographically part of Indonesia and Malaysia, lost 50% of its old-growth forest, the equivalent of 2.1 million hectares between 2005 and 2015 (Gaveau, et al., 2016).

Deforestation destroys habitats such as peatlands and causes biodiversity loss, especially in species-rich tropical forests. Southeast Asia contains the most diversity with high endemism (Whitemore, 1988) and is estimated to lose 75% of its original forests by 2100, including 42% of its biodiversity (Sodhi, Koh, Brook, & Ng, 2004). At least 321 threatened species on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species are impacted by palm oil production, such as orangutans, gibbons and tigers (Meijaard, et al., 2020).

Land Subsidence, Water Pollution and Flood Risks

Water removal via drainage of peatland causes land subsidence, which lowers the soil surface and creates flood risk. Subsidence happens from consolidation and compaction (Hooijer, et al., 2012), and oxidation. The soil loses its capacity to hold peat water (Lupascu, Varkkey, & Tortajada, 2020), making the landscape vulnerable to floods. Drinking water can also become polluted with organic carbon and pollutants that were previously absorbed in the peatland (IUCN, 2021). Moreover, young oil palm plantations have low water demand which reduces evapotranspiration rates on peatland (Manoli, et al., 2018), consequently raising flood risk and reducing crop productivity. Peatlands in Malaysia and Indonesia have subsidence rates averaging about 5cm a year (Hooijer, et al., 2012), and subsidence during El Niño years can be larger than that of a normal year (Wakhid, 2022; Evans, et al., 2022). With drained Southeast Asian peatlands located on low-lying coastal areas, subsidence could expose plantations and nearby villages to flood risk during wet seasons (Lupascu, Varkkey, & Tortajada, 2020), and result in production losses (Ahamad, Ali, Zakaria, Ghani, & Chang, 2011). Studies in Sabah (Abram, et al., 2014) and Central Kalimantan (Sumarga, Hein, Hooijer, & Vernimmen, 2016) found that flood mitigation measures were expensive and ineffective because of the irreversible nature of peat subsidence. Coupled with climate change causing sea level rise and extreme weather patterns, the cultivation of degraded peatlands threatens livelihoods and imposes significant financial risks for companies.

GHG Emissions

The destruction of peatland habitats through land use change is the biggest contributor to GHG emissions in palm oil production. For comparison, an unlogged Asian tropical forest retains up to 400 tonnes of carbon per hectare (Lucey, et al., 2014), while the oxidation of peat soil retains up to 1,550 tonnes of carbon per hectare, and a fully mature oil palm retains around 91 tonnes per hectare. Additional forest burning could emit 207 to 650 tonnes per hectare (Germer & Sauerborn, 2007). As a carbon sink, waterlogged peatlands store more carbon than all other vegetation types in the world combined (IUCN, 2021). When peat soils are drained, they become flammable and can burn for months or years (Barthel, et al., 2018), turning into an emission source. Land use change thus has the highest global warming potential (GWP) due to high carbon dioxide (CO_2) emissions from drained sites and high nitrous oxide (N_2O) emissions from the young oil palm sites (Cooper, et al., 2020). Annual emissions from drained peatlands are estimated to equal 5% of global anthropogenic GHG (IUCN, 2021). As such, biofuel is no longer perceived as a greener option than fossil fuels. The conversion of rainforest for palm oil biofuels from peatland was found to release more GHG emissions than the biofuels saved from replacing fossil fuels (Fargione, Hill, Tilman, Polasky, & Hawthorne, 2008). This resulted in the EU revising the Renewable Energy Directive II (RED II) to ban the use of biofuels by 2030 from sources that pose high indirect land use change risks (Bartunek, Carbonnel, & Hudson, 2018).

The next biggest GHG emissions in the production process stem from the treatment of palm oil mill effluent (POME) (Chase & Henson, 2010) where they emit GHG methane (CH_4), which has a GWP of 27 to 30 over 100 years (EPA, 2022). This is followed by GHG emissions of nitrous oxide in fertilisers, which have a GWP of 273 over 100 years (EPA, 2022), and are used more intensively during the earlier stages of land use change for young palm oil sites (Kusin, Akhir, F., & Awang, 2016).

Deforestation through burning occurs yearly (Barthel, et al., 2018). Its effects are magnified on flammable drained peatland and further exacerbated by droughts associated with El Niño events, contributing to significant GHG emissions. Global GHG emissions from vegetation fires accounted for 2,000 million tonnes of carbon annually between 1997 and 2009, where 10% originated from equatorial Asia. In the El Niño year 1997, this contribution grew to 40%, largely from Indonesia (Van der Werf, et al., 2010). Peat forest fires that year emitted between 810 and 2,570 million tonnes of carbon into the atmosphere, approximately 13-40% of the average annual global carbon emissions from fossil fuels (Page, et al., 2002). In 2015, El Niño amplified over 100,000 manmade fires that burned 2.6 million hectares of Indonesian

land (The World Bank, 2016) where 33% of the total area was peatland. Indonesia's emissions tripled to around 1.75 billion tonnes of GHG.

Transboundary Haze

Burning also results in transboundary air pollution through the haze which releases toxic microscopic particulate matter (PM_{10} and $PM_{2.5}$) into the atmosphere that causes respiratory issues and worsens existing heart and lung conditions (Kunii, et al., 2002; Barthel, et al., 2018). Monsoon winds carry smoke into neighbouring countries, threatening the health, lifestyle, biodiversity, and economies of Southeast Asia (Forsyth, 2014). In its most intense years, it reached hazardous levels in 1997 with over 40,000 people hospitalised, costing the Association of Southeast Asian Nations (ASEAN) $9 billion in damage (Mayberry, 2019). In 2015, the Pollution Standard Index (PSI) hit record highs of 2,300 in Central Kalimantan, Indonesia (Soeriaatmadja, 2015) and peaked at 340 in Singapore, where 300 is considered hazardous (SASPO, 2018). This led to approximately 100,300 excess deaths in Indonesia, Malaysia, and Singapore (Koplitz, et al., 2016), costing Indonesia $44 billion and Singapore $700 billion (SASPO, 2018). Many plantations in Indonesia were found to be managed by Singaporean and Malaysian companies (Ho, 2019), however, transparency, traceability and accountability in the sector remain ambiguous. While it is evident that fires on peatlands for agriculture are the main cause of haze, the proportion of fires attributed to the palm oil sector is uncertain (Barthel, et al., 2018).

Initiatives Addressing Environmental Concerns

The Indonesian government raised its GHG emission reduction targets, to reduce emissions by 31.89% alone or 43.2% with international assistance by 2030 (Reuters, 2022), where effective land use, spatial planning and sustainable forest management are among its top focus to attain net-zero emissions by 2060. The government also developed regulations and moratoria aimed at protecting primary forests and peatlands (CRR, 2021-a). They permanently banned peatland exploitation, land clearance of primary forests and peatland for agricultural activities, and temporarily banned issuing new oil palm licenses from 2018 to 2021. In 2018-2020, deforestation accounted for only 18% of its peak in 2008-2012 (Trase, 2022). The improvements in deforestation and emissions reductions enabled Indonesia to secure result-based payments from Norway (through a bilateral partnership for reducing emissions from deforestation and forest degradation (REDD+)) and The Green Climate Fund. As for Malaysia, the government aims to reduce carbon intensity against GDP by 45% by 2030

against 2005 levels (Dhaartshini, Lim, Zhai, & Goon, 2021). The country established the Malaysian Palm Oil Board (MPOB) which controls the research and development and regulation of the industry (Potter, 2015) with over 100 laws that govern the palm oil sector (Barthel, et al., 2018). In Europe, the EU Deforestation Regulation prohibits both legal and illegal deforestation for products consumed and produced in the EU, raising legal and reputational risks for operators and traders that breach new rules (CRR, 2022-a).

Among companies, market leader Wilmar responded to pressures from NGOs and set an exemplary model to become the first company to commit to a “No Deforestation, No Peat, No Exploitation” (NDPE) policy in 2013 (CRR, 2020). Companies increasingly began adhering to the NDPE policy to affirm their stance on climate change and social injustice, minimising reputational and compliance risks. As of 2020, nearly all large companies in the global palm oil supply committed to NDPE. Effective coverage of refiners in Indonesia and Malaysia committing to NDPE reached 78% in 2020, reflecting commendable progress in the past decade. Companies are also involved in forest conservation or restoration projects (SIIA, 2020). By addressing deforestation and peatland management, the cascading effects of land subsidence, flood risks, water pollution and haze are also mitigated.

Ongoing efforts from the public and private sectors to avoid peatland and deforestation have also increased pressures to rely less on land expansion and focus more on increasing yields. For example, Sime Darby Plantation Bhd introduced an oil palm genome, the GenomeSelect, that can almost double crop yields by 2050 on existing plantations, to improve productivity and land management strategies (Yap, 2022). The MPOB also rolled out seedlings of the Clonal Palm Series 2 (CPS2) dwarf tree which increases yield and lengthens the economic life of a plantation by a decade (Raghu, 2018). Its shorter height also lowers fatality risk and improves workplace safety conditions. Although deemed a costlier seedling, it simultaneously tackles environmental and social issues, making it a sustainable investment. Producers can improve yields to future-proof themselves against growing demand and depleting land resources.

POME can be a source of biogas and biofuels that enables a close-looped production system. As a waste from palm oil that can be repurposed for constructive economic use, POME is eligible for double accounting of GHG savings under the EU RED II (Hong, 2021). More mills have developed systems to capture emitted methane for flaring, boiler fuel or electricity generation. In Malaysia, biogas plants are installed in mills under the Economic Transformation Programme (Loh, et al., 2017). This helps to reduce GHG emissions by improving circularity within the production process.

2.1.2 Social

The social issues in palm oil extend to other commodity sectors to varying degrees. These issues include land use conflicts, labour challenges such as forced labour and coercive practices, and the exclusion of smallholders. Unlike the environment, data is limited as these issues are less easily detected and based on reported cases. It remains possible that incidents are under-reported, but recurring themes were discussed in the existing literature. Chain Reaction Research (CRR), a coalition of Aidenvironment, Profundo and Climate Advisers, finds that staff costs for addressing conflicts accounted for 13% of costs associated with social conflict across five plantations in Indonesia (CRR, 2019).

Land Use Conflicts and Cultural loss

Disputes over land rights have occurred across large-scale plantations when local and indigenous communities lose their customary land, traditional livelihoods, and cultural reference (Barthel, et al., 2018). Evidence of disagreements is most prevalent in Indonesia, compared to other countries. In 2016, an estimated 75% of incidences of conflicts in mainland Kalimantan were linked between communities and oil palm producers. Conflicts arose in 187 villages, where 48% opposed oil palm expansion (Verite, 2016). Throughout 2020, 101 conflicts out of 200 new agrarian conflicts in Indonesia were related to palm oil, making the sector the leading contributor to land conflicts (CRR, 2021-c). Conflicts and violence occur mainly over the legality of land acquisition and perceived compensation fairness. Compensation can be challenging to measure as it includes intangible losses in social and cultural values, linked with the loss of community needs and cultural values (CRR, 2019). These are considered in the High Conservation Value (HCV) assessment which is required by various commodity certification systems and increasingly by financial institutions' due diligence. Estimates for the loss of social and cultural values in Indonesia are projected between USD 0.4 billion to USD 5.9 billion. In Malaysia, similar conflicts exist between indigenous groups and the government's interpretations of Native Customary Rights (NCR) in Sarawak (Dayang Norwana, et al., 2011). Forty land rights cases in Sarawak involved the palm oil sector (Colchester, Pang, Chuo, & Jalong, 2007).

Labour Challenges

The Fair Labor Association (FLA) found different types of forced labour indicators in the palm oil sector in Indonesia and Malaysia. In Indonesia where workers are local, forced labour involves unrealistic production targets pressuring families (and children) to work with hired

workers. They received low wages, lacked freedom of movement due to remote working locations at plantations, and lacked contractual agreements mostly for casual workers who are usually female (FLA, 2018). In Malaysia, migrant workers are employed, and they come mainly from countries such as Bangladesh, Nepal, India, Indonesia and Myanmar. Forced labour thus involved recruitment agencies engaging with irresponsible practices such as document retention (e.g., passport), deceiving communications about working conditions, expensive recruitment fees which resulted in debt bondage, and poor living and working conditions. In both countries, coercive practices such as threats and violence were also observed. Barthel, et al. (2018) who found similar evidence in oil-producing countries, mostly in Malaysia and Indonesia, concluded that these issues may even be under-reported as there was limited access to a systematic information source.

The credibility of sustainable certifications was questioned as companies certified by the Roundtable on Sustainable Palm Oil (RSPO) were associated with labour abuse. In 2016, Wilmar, which controlled over 43% of the global palm oil trade, was found to have human rights abuses on its plantations and suppliers (Amnesty International, 2016). In 2020, the US Customs and Border Protection (CBP) department issued Withhold Release Orders (WRO) for two of Malaysia's biggest palm oil planters – FGV Holdings and Sime Darby (Lim, 2022). They were sanctioned over forced labour allegations. More recently, Brazil's largest exporter Agropalma SA faced legal and reputational impacts, having to pay fines due to poor working conditions (CRR, 2022-b). These examples of certified players in the palm oil sector reflect weak enforcement in the certification scheme such as weak auditing criteria with little focus on labour standards.

These labour challenges are heightened by workers lacking education and awareness of workers' rights thus having little capacity to engage in collective bargaining and remaining vulnerable to abuse. While FGV eventually found no evidence of forced and child labour (FGV Holdings Berhad, 2022), the firm had already suffered reputational damage despite demonstrating efforts to improve gaps in practices.

Exclusion of Smallholders

Smallholders, who contribute substantially to palm oil production, are often overlooked in ensuring sustainable production of palm oil. Companies can have scheme smallholders who work on a company's plantations and sell produce to a partner mill (SIIA, 2020). Alternatively, companies without smallholder schemes can purchase from independent smallholders. In Indonesia, less than one per cent of independent smallholders were certified sustainable (Suhada, Bagja, & Saleh, 2018) while Malaysia's smallholders (organised and independent)

accounted for 22% of all certified planted areas despite cultivating over 30% of planted land (Kong, 2021). In general, smallholders have limited access to financial resources and technical expertise to achieve good agricultural practices. They commonly rely on cheap methods of buying low-yield seedlings and “slash-and-burn” methods for clearing land, leading to low productivity levels alongside unsustainable practices. Additionally, they tend to fall prey to exploitation from fruit brokers between mills and farmers who charge exorbitant rates and pocket significant proportions of profits from farmers’ sales. Moreover, sustainable certification is a costly premium to achieve and maintain. Upfront costs can range from 16% to 39% of mean annual incomes, while annual costs take up 12% of annual incomes. With prices set by the intermediaries, smallholders have little bargaining power as price takers.

Initiatives Addressing Social Concerns

To address land use conflicts, companies are increasingly involved in participatory mapping initiatives with communities, that consider communities’ livelihood and food security needs (SIIA, 2020). Companies also adopt Free, Prior and Informed Consent (FPIC), to allow local communities to provide or withhold consent to a project that affects them or their territories.

To address labour issues, companies consciously hire more females as permanent workers and established committees for occupational health and safety (SIIA, 2020). Separately, Wilmar adopted several International Labour Organisation (ILO) conventions in their operations to address labour issues. Sime Darby also reviewed their Malaysian operations based on the findings from the US CBP and reimbursed workers who paid recruitment agents to secure employment (Yap, 2022). They developed new procedures and controls to eliminate debt bondage for migrant workers. With stronger internal channels, the company received an increase in grievances and concerns. Sime Darby also established an ESG scorecard and new social welfare and services department for managing policies and procedures related to worker safety and well-being.

To support smallholders, the RSPO established a Smallholder Support Fund and a Smallholder Standard to provide equitable access to certifications (Sagar, et al., 2019). Furthermore, companies also engage smallholders in capacity-building, to provide technical expertise and resources to increase their yields, improve land and waste management, eliminate child labour and gain access to local and international certifications (SIIA, 2020).

2.1.3 Governance

The abovementioned environmental and social issues reflect weaknesses in the governance of the palm oil sector. The absence of good governance, law enforcement, and clarity of tenure rights in producing countries are challenged by issues such as corruption as well as weak traceability and transparency.

Corruption

Corruption has afflicted the palm oil sector. Given the sector's contribution to economic development, companies were hinted to have lobbying power with provincial and local leaders (Mayberry, 2019). Local leaders were found involved with illegal extensions of business permits and forest clearance along with tax evasion (Suryadi, 2021). Even Golden-Agri Resources (GAR), one of the top three traders by volume (SASPO, 2018), was embroiled in land use violations and bribery charges against its employees (OFI, 2020). Although GAR claims that the individuals' actions breached the company's code of conduct, reputational and compliance costs were already incurred. Bumitama Agri Ltd (Bumitama), one of Indonesia's leading producers, also suffered multiple allegations for knowingly engaging in deals with illegal plantations that were linked with deforestation, and orangutan habit destruction (Parker, 2013). Additionally, companies guilty of burning and contributing to the haze from a decade ago still had not paid penalties by 2019 (Wright, 2019). More recently, companies Permata Hijau Group, Wilmar, and Musim Mas were implicated when a trade ministry official and three palm oil executives were charged with underhand tactics (CRR, 2022-c). These examples weaken confidence in the sector to mainstream sustainable palm oil.

The Corruption Perceptions Index reveals perceived levels of public sector corruption by ranking 180 countries and assigning them a score from 0 to 100, where 0 is the most corrupt. For 2021, the top-producing countries of palm oil are ranked mostly in the second and third quartiles, except Nigeria in the last quartile: Malaysia 62, Colombia 87, Indonesia 96, Thailand 110, and Nigeria 154 (Transparency International, 2021). The index finds that the leading producing nations face dishonest cultures with power abuse that benefit few elites at the expense of the masses (Transparency International, 2022). Perceptions hold that weak institutional voids exist, calling the need for political leaders who use power for the common good and companies to adopt strong private governance stewardship.

Weak Traceability and Transparency

Palm oil's supply chains remain obscure and difficult to trace (Meijaard, et al., 2018) which impedes the credibility of deforestation commitments and creates room for greenwashing. Within the supply chain, mills and refineries often source palm oil from suppliers with traceability reports lacking information on volumes, creating challenges for mapping the supply chain (Trase, 2020). External stakeholders are unable to quantify the amount of palm oil sourced from their main suppliers. The lack of transparency cascades down the value chain, compromising the ability to implement and monitor deforestation commitments, concurrently obscuring consumers in identifying deforestation-free products (Thomson & Long, 2020). Similarly, companies active in biofuels do not publish palm oil mill lists, blurring the feedstock supplies that may link with deforestation (CRR, 2021-b). The lack of traceability weakens transparency and creates a leakage market for palm oil originating from deforestation. Companies have continually been called to achieve 100% traceability by improving transparency and policies to strengthen the implementation of deforestation commitments. Estimates suggest that the cost of implementing zero-deforestation policies and monitoring verification systems would amount to only a fraction of global operating profits (Rijk, Wiggs, & Piotrowski, 2020) from biofuels estimated at USD 1.4 billion in 2020 (Rijk, Wiggs, & Piotrowski, 2021).

Initiatives Addressing Governance Concerns

In attempts to address corruption, Indonesia established a presidential regulation in 2018 requiring legal entities to declare beneficial owners (Global Business Guide Indonesia, 2018). This aims to minimise cases of misappropriating financial capital from bribes and tax evasion in the top-producing country.

To address traceability, companies have taken strides in strengthening palm oil's traceability to the mill (Barthel, et al., 2018). Companies have developed policies that monitor suppliers and assist with time-bound commitments while obeying guidelines on responsible sourcing (SIIA, 2020). For example, IOI operates an online platform that suppliers can use to compare their operational systems against NDPE best practices and detect improvement areas with customised solutions.

2.2 Stakeholder Transparency

The earlier findings demonstrate that ESG risks call for stronger regulation, penalties and transparency to prevent companies from behaving unsustainably and minimise externalities conveyed. Companies are expected to internalise sustainability into their strategy and culture to reduce risks (Kurucz, Colbert, & Wheeler, 2008) such as legal, reputational and financial risks that can divert resources away from main businesses. With ESG considerations embedded into their practices, companies should communicate their ESG efforts by establishing a comprehensible metric of externalities involving the ecosystem and stakeholders (Jensen, 2020), which improves stakeholder transparency.

The treatment of ESG transparency overlaps with that of sustainability reporting, corporate social responsibility (CSR) reporting and ESG disclosures in the literature. Commonality exists in that both reporting and disclosure aim to address transparency to stakeholders. While sustainability addresses a broader definition, CSR and ESG cover aspects of sustainability. Through ESG, sustainability is categorised into three components – environmental, social and governance, and has become the most extensively used measurement of sustainability standards in current practice to hold companies accountable (Howard-Grenville, 2021).

The percentage of Fortune Global 250 firms allocating portions of their annual reports and CSR reporting to CSR activities grew from 44% in 2011 to 78% in 2017 (KPMG, 2017), showcasing the growing norms of communicating sustainability among businesses. High ESG performance can provide “insurance-like” protection as they gain stakeholder trust and experience less criticism from stakeholders such as investors and regulatory bodies (Godfrey P. C., 2005; Godfrey, Merrill, & Hansen, 2009). Clark, Feiner, & Viehs (2015) notes that the future of sustainable investing will involve active ownership by multiple stakeholder groups, which aligns with the growing trend of ESG integration.

Companies providing stakeholder transparency on ESG practices can be rationalised by existing organisational theories. In this paper’s context, there also exist various supporting initiatives to encourage palm oil companies to communicate their efforts.

2.2.1 Theoretical Underpinnings

Providing transparency about ESG efforts draws on existing organisational concepts of agency theory, legitimacy theory, stakeholder theory, and signal theory for substantiating the relationship between ESG transparency and firm valuation.

Legitimacy theory suggests that companies are operating in ways accepted by society to attain a social licence to operate (Deegan, 2002). Corporations will legitimise their actions through

ESG transparency to ensure their continuing existence. Society may penalise firms for their negligence or reluctance towards ESG activities which can threaten firm survival. This theory is most cited among research papers exploring the relationship between sustainability and financial indicators.

Similarly, stakeholder theory originated from R. Edward Freeman in 1984 who argued that companies should consider other members of society who have connections to business activities to influence the success of products and services (Freeman, 1984). This is backed by other studies (Buchholz & Rosenthal, 2005; Laplume, Sonpar, & Litz, 2008) where other stakeholders in society include employees, customers, suppliers, financiers, communities, and government. Societal stakeholders are thus key motivators for companies to engage in ESG practices (Diez-Cañamero, Bishara, Otegi-Olaso, Minguez, & Fernández, 2020). By doing so, ESG practices could increase shareholder value by improving reputation which attracts more customers, improving productivity for trained employees (Abdi, Li, & Càmara-Turull, 2022), and minimising regulatory costs.

The agency theory is based on two main pillars, the principal-agent relationship and the separation between ownership and control (Fama & Jensen, 1983). The principal, otherwise the company owner or shareholder, delegates the managing power to the agent to act in the best interests of the principal (Oh, Chang, & Martynov, 2011; De Villiers, Naiker, & Van Staden, 2011). However, agents may pursue their own interests at the expense of the principal, resulting in agency cost and conflict (Carnini Pulino, Ciaburri, Magnanelli, & Nasta, 2022). Principals are more focused on the long-term while agents are more focused on short-term benefits. For this paper, ESG disclosures are perceived to reduce agency costs via information asymmetry which arises from the separation between ownership and control (Morris, 1987). The stronger the disclosure, the greater the transparency. ESG transparency can thus help reduce compliance costs, which can influence the risk profile and valuation of the firm (Cormier, Magnan, & Van Velthoven, 2005; Tagesson, Blank, Broberg, & Collin, 2009).

The signalling theory suggests that companies will reduce information symmetry present in imperfect markets by sharing information with stakeholders. ESG transparency hence signals their credibility and commitment towards sustainability to external stakeholders (Spence, 1973; Connelly, Certo, Ireland, & Reutzel, 2010).

Therefore, these theories provide the basis for why ESG transparency signals to stakeholders the extent to which the company is operating sustainably. ESG transparency can be used to legitimize corporate activities towards creditors and shareholders, thus incentivising efforts to engage in sustainability (Haniffa & Cooke, 2005). This implies that higher ESG transparency

reduces agency costs, and signals legitimacy to various stakeholder groups that they have low compliance risk, and minimal reputational risk and hence deserve stronger firm valuation. Companies that behave less responsibly will be punished by the market (Connelly, Ketchen, & Slater, 2011; Alon & Vidovic, 2015; Ching & Gerab, 2017), and this can be reflected by a decrease in performance, such as sales and earnings, which are linked to their valuations.

2.2.2 Supporting Initiatives

To facilitate transparency, there exist several regulations and initiatives by different stakeholder groups in society that can be applied across sectors, with some scoped for the palm oil sector itself. These include regulations, mandates by public exchanges, voluntary initiatives, certification schemes, and data and reporting platforms that enable stakeholders to access information about companies' practices.

Regulations

Reporting regulations have been on the rise to motivate companies to strengthen their sustainability disclosures (Ioannou & Serafeim, 2016). An exemplary form of regulation is the EU Taxonomy Regulation which aims to develop a classification system for economic activities which are environmentally sustainable (Shapiro, 2021). It is critical in unifying standards on sustainability and promoting more transparent and credible ESG data and disclosures for stakeholders. Additionally, the EU's Sustainable Finance Disclosure Regulation (SFDR) addresses ESG reporting obligations by requiring financial market participants to share how sustainability risks are managed.

Public Exchanges

Public exchanges help foster market confidence by strengthening governance to promote ESG disclosures through listing requirements. This helps to protect companies' reputations and facilitates competition among companies (Grayson & Stampe, 2012). In 2015, when the UN Sustainable Stock Exchanges (SSE) initiative launched its Model Guidance, less than a third of stock exchanges in the world provided ESG guidance, and by mid-2020 more than half of SSE's members published ESG guidance (SSE, 2020). Public exchanges have mandated sustainability reporting for listed companies across Singapore, Hong Kong, Indonesia, Malaysia, Thailand (Jones, et al., 2022), and large listed companies in Europe and

the United Kingdom (UK) (VinciWorks, 2022). For India, it will be mandated for the top 1,000 largest companies from fiscal years 2022 to 2023 (Jones, et al., 2022).

Voluntary Initiatives

To address information asymmetry about non-financial concerns between companies and investors (Doh, Howton, Howton, & & Siegel, 2010), there exists a wide range of standards and frameworks available for assessing ESG transparency through sustainability reporting and ESG disclosures. These include the UN Global Compact Network (GCN), the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the International Integrated Reporting Council (IIRC). There are also several data providers such as Bloomberg, Sustainalytics, Standard and Poor (S&P) and Morgan Stanley Composite Index (MSCI) which have their ESG metrics. These frameworks and databases have comprehensive guidelines covering ESG considerations but are not consistently used across industries and firms. Despite enabling transparency, the inconsistency makes the extent and quality of ESG disclosure heterogeneous (Almeyda & Darmansyah, 2019), creating challenges for stakeholders to assess and compare ESG performance.

Principle-based voluntary ESG initiatives have progressively been established to strengthen private investments, such as the UNPRI, UN Environment Programme (UNEP) Finance Initiative, Equator Principles, and Principles for Sustainable Insurance (UN Global Compact, n.d.). In response to managing heterogeneous disclosures, the UNPRI, GSIA and the CFA Institute formed a collaboration to create an authoritative resource that harmonises the different terms and definitions towards ESG investment to make ESG disclosures more comparable and enhance the investors' decision-making while minimising legal, compliance and reputation risks (RIA Canada, 2022).

Certification

In the palm oil sector, certification is commonly used for companies to transparently communicate commitments to ESG. The most globally recognised is the Roundtable on Sustainable Palm Oil (RSPO), a voluntary certification set up in 2004 to promote sustainable palm oil (McInnes, 2017). Its members comprise stakeholder groups in the value chain from producers, processors, traders, manufacturers, retailers, investors, and NGOs (Schouten & Glasbergen, 2011). The RSPO collaborates with government bodies to formulate legislative frameworks. However, its high visibility and association with greenwashing have highlighted

weaknesses and garnered doubts about the certification's credibility (EPOA, IDH, RSPO, 2022) as observed in the earlier examples of labour challenges. RSPO certification is also costly to adopt, as it excludes smaller companies and smallholders to be recognised as sustainable. Nonetheless, its Principles and Criteria (P&C) have continually been revised and strengthened over time (Barthel, et al., 2018), reflecting its progressive nature. Certification is still beneficial in demonstrating a commitment to sustainability and improved branding. Since its inception, approximately 20% of palm oil produced globally is certified sustainable by RSPO (RSPO, 2021).

At a national level, the top-producing countries of Indonesia and Malaysia established the Indonesian Sustainable Palm Oil (ISPO) and Malaysian Sustainable Palm Oil (MSPO) in their respective countries. Compared with RSPO, studies consistently found RSPO to be the most robust, comprehensive and ambitious in criteria, followed by MSPO, and ISPO the least (Efeca, 2015; McInnes, 2017; Barthel, et al., 2018; IUCN, 2019; Wulandari & Nasution, 2021). As such, some studies do not count MSPO and ISPO as certified sustainable palm oil (CSPO) (Barthel, et al., 2018; Segi Enam Advisors Pte Ltd, 2021; EPOA, IDH, RSPO, 2022). Indirectly, they demonstrate that the stringent nature of RSPO and its high costs make it challenging to attain. Instead, ISPO and MSPO are perceived more as providing stepping stones for smaller companies and smallholders in the top two producing countries to adopt sustainable practices (Kong, 2021).

Data and Reporting Platforms

The rise in data and reporting platforms boosts transparency and traceability for the palm oil sector. These include satellite-based deforestation monitoring systems such as the World Resources Institute's (WRI) Global Forests Watch programme, Suitability Mapper, Forest Cover Analyzer, Trase, and RSPO PalmTrace. These platforms enhance supply chain mapping and enable better planning of land use strategies and sustainable palm oil production.

Moreover, data platforms such as the Zoological Society of London's (ZSL) Sustainability Policy Transparency Toolkit (SPOTT) and WWF's Palm Oil Buyer's Scorecard go beyond the requirements of certification to rank companies on their sustainability disclosures over the years. For example, the SPOTT initiative is an annual assessment of soft commodity producers, processors and traders on their ESG-related public disclosure of their organisation, policies and practices. They produce separate assessments for palm oil, timber and pulp, and natural rubber. They actively collaborate with industry players including the RSPO (Fanning & Spencer, 2021) and all members of the value chain – governments, financiers, producers,

consumers, investors, and NGOs to adopt strategic measures to improve the sustainability of palm oil while achieving supply chain transparency (ZSL, n.d.-b). Since its inception in 2014, only large publicly listed companies were initially assessed (Oppenheimer, et al., 2021), as they were perceived to have the largest environmental impact, greater access to resources and more pressure to improve compared to smaller companies. However, smaller and privately owned companies were subsequently added as stakeholders sought to ensure holistic efforts of transparency in the sector. Smaller companies have shown improvement rates similar to larger companies due to increased pressure on the sector throughout SPOTT assessments from 2014 to 2018. The indicator framework has also been revised and expanded to have indicators beyond "Environmental" considerations to a comprehensive scope of ESG and is considered to have reached a point of maturity.

2.3 Integrating Sustainability with Finance

Several studies beyond the palm oil sector find that transparency on ESG can have a relationship with various financial indicators. These relationships conducted across sectors and countries extend support for ESG integration. Common variables such as firm valuation and firm size are studied further to rationalise the relationships. Drawing inspiration from these studies, the literature links back to the palm oil context by reviewing existing research in the sector to identify gaps and opportunities that this paper can help to address.

Since 1970, over 2,000 studies were conducted (Friede, Busch, & Bassen, 2015) to marry the relationship between the non-financial indicators of sustainability with financial indicators. This demonstrates the push for ESG integration into financial considerations, building the foundations for sustainable investments. However, the findings of prior research have been mixed. There could be significant positive, negative or no significant relationships. In Friede, Busch, and Bassen's (2015) analysis, most studies found a positive relationship between ESG and firms' financial indicators, a quarter had a neutral relationship, while a tenth reflected a negative relationship. These studies are scoped differently using inconsistent measures for sustainability (Jitmaneeroj, 2018) as well as financial indicators. Moreover, results were also mixed as to whether total ESG or isolated Environmental (E), Social (S) or Governance (G) components held more weight in determining financial indicators. Isolating the components also helped to remove the effects of netting as a negative indicator in one component could be negated by a strength in another (Nofsingera, Sulaeman, & Varma, 2019).

Many studies found a positive relationship between ESG and organisations' financial indicators (Clark, Feiner, & Viehs, 2015; Friede, Busch, & Bassen, 2015; Loh, Thomas, & Wang, 2017) such as lowered cost of capital, better operational performance, improved stock price performance, and market value. Higher ESG performance inherently protects firms by portraying a positive reputation to shareholders (Godfrey P. C., 2005). An analysis of 52 studies based on 33,878 observations finds that corporate social performance is positively correlated with corporate market value (Orlitzky, Schmidt, & Rynes, 2003), suggesting that the S component holds more weight. A global study of 44 countries concluded with statistical significance that ESG scores were heterogeneous, where overall ESG scores and E scores had positive effects, while S and G scores had negative effects (Lam, Zhang, & Chien, 2018). In Germany, a significantly positive relationship was found between ESG and accounting-based firm performance, and G was found to be the strongest determinant factor (Velte, 2017) possibly due to the German Corporate Governance Code introduced in 2002 where firms are obligated to report CSR. This demonstrates how regulating authorities have a positive influence over companies' actions. At the industrial level, a study of large manufacturing companies in the US during the 1980s found that those with higher profits tended to be more socially responsible with reduced risk (Herremans, Akathaporn, & McInnes, 1993). Another study on the real estate sector in developed countries found a positive relationship between ESG disclosure with financial performance, where E was also significant in influencing return on capital (ROC) (Almeyda & Darmansyah, 2019). As for the pharmaceutical industry in Italy, G was positively related to financial performance (Paolone, Cucari, Wu, & Tiscini, 2022), where good corporate behaviours through compensation, management of fraud, ethics and values, transparency and anti-corruption could be linked with companies' operations and relative market performance.

Amongst those with neutral relationships, it is possible that the costs for demonstrating ESG were net off by financial benefits (McWilliams, Siegel, & Teoh, 1999; Lahouel, Gaies, Zaied, & Jahmane, 2019). Similarly, no significance was found in another study on Italian blue-chip companies between ESG scores and abnormal returns, evidencing that social responsibility was not a reliable indicator for leverage (Landi & Sciarelli, 2019). These examples suggest that ESG disclosures have no relevance in determining any financial benefit.

Of those with negative relationships, a study on Northern European firms also found a negative relationship between ESG and P/E (Svensson, 2020), with a weak correlation suggesting that investors interested in ESG were not necessarily concerned with the high returns. In terms of risk, a negative relationship was found between E and S disclosures on total risk, as corporate transparency increased the reputation and trust of stakeholders (Benlemlih, Shaukat, Qiu, &

Trojanowski, 2018). Similarly, the ESG performance of textile and apparel firms helped to reduce volatility and market risk (Shakil, 2022).

As opposed to a linear relationship, Nofsinger, Sulaeman, and Varma's (2019) study on E and S components found that institutional investors demonstrated an asymmetric preference for strong and weak CSR attributes. Investment portfolios that avoided or had few weak ES stocks generated higher alphas than those with a greater fraction of weak ES. Institutional investors were averse to ES weaknesses through divestment but appeared ambivalent towards ES strengths because CSR was also linked with agency costs that eroded economic benefit (Nofsingera, Sulaeman, & Varma, 2019). This was in line with Krüger (2015) that the stock market responds weakly negatively to positive ESG news (Krüger, 2015) and that firms with strong CSR records had more liability due to greater scrutiny of negative events (Luo, Meier, & Oberholzer-Gee, 2011). In this regard, minimising risk through divestment appeared to dominate investors' decision-making process.

Amongst the literature review, few studies were on the palm oil sector using other financial indicators. Those conducted in palm oil either had only an environmental focus or were exclusive to RSPO certification rather than overall ESG transparency that could be reflected in other measures that were more inclusive of smaller firms. For studies with an environmental focus, markets were found to be sensitive to negative environmental events as the 2015 haze crisis had significantly negative impacts on abnormal stock returns for palm oil companies in Southeast Asia (Erian, 2016). Separately, a positive relationship was found between environmental disclosure and return on assets (ROA) for Malaysian companies, which were explained to have a larger firm size than Indonesian companies (Abdullah, Hamzah, Ali, Tseng, & Brander, 2020). For studies exclusive to RSPO certification, nine Indonesian RSPO-certified companies were found to have a 2.28 times appreciation in share price between 2005 and 2016 than uncertified companies (Morgans, et al., 2018). Climate Advisers also established a palm oil index that found 18 RSPO-certified firms outperforming noncertified counterparts by about 25% over 6.5 years (Climate Advisers, 2019). Mixed results were observed in another study of 64 palm oil firms, where Malaysian RSPO-certified firms had poorer risk-adjusted performance than their respective non-certified peers, while Indonesian RSPO-certified portfolio fared better than its peers, implying RSPO had limited influence on stock performance (Tey & Brindal, 2020). Tey and Brindal (2020) identified that RSPO certification requires economies of scale that are more suited for larger farm operations and that palm oil investors may benefit more from small-cap companies in Malaysia. They also raised the need for an easily understood and accepted ESG framework, as opposed to RSPO certification, to provide a more robust view for developing the basis of investing for growth

through a sustainability standard. This spurs further investigation into the palm oil sector that goes beyond certification and assesses overall ESG transparency. It will also respond to Godfrey and Hatch (2007) who called for industry-specific research, as differences among industries can become obscured when ranked by the same criteria (Godfrey & Hatch, 2007). Comparisons within industries provide more clarity on relevant and meaningful sustainability considerations.

2.3.1 Firm Valuation

Studies in previous literature have used various financial indicators such as market value, ROA, ROC, P/E, stock returns and dividend yield. This study will focus on the valuation of a company to be given by P/E because far fewer studies have used P/E despite it being the top-used measure for valuing companies (Fernandez, 2001). It is calculated by its share price divided by earnings per share. Earnings per share is the net income over a certain period, typically a fiscal year, divided by the total number of shares outstanding at the point in time.

The rationale for using P/E is that investors can apply ESG investing principles to guide their decisions to purchase company shares, which are reflected by the share price. As a ratio, P/E standardises stocks of different prices and earning levels, making it useful for comparing against its performance across time, or with competitors in the same industry (CFI, 2022).

Future value creation is a key component in firm valuation (Miller & Modigliani, 1961). It is a reflection of growth, characterised by the size of a company's investments, the excess investment returns relative to the cost of capital, and for how long a company can find value-creating investment opportunities (Mauboussin & Callahan, 2014). It is unlikely for a company's P/E to revert to historically higher levels unless growth prospects and return on incremental capital remain consistent with historic levels, which is difficult to maintain. This explains why high P/E are growth stocks that signify overvaluation, as fast growth and high volatility are expected.

Meanwhile, a low P/E represents value stocks, which typically represent companies that have slowed in growth. Value stocks indicate modest expectations of future value creation and if the company is stable, they can present opportunities for attractive returns. A low P/E could signify undervaluation or that the company has slowed in growth with low volatility. Investors prefer to invest in company stocks with low P/E because it also represents a low price for a high earning, deeming it a value stock with higher returns anticipated (Basu, 1977). Therefore, P/E ratios help to identify valuation premiums or discounts, as well as risk and growth

opportunities. Studies show that portfolios with low ratios tend to provide abnormal or higher risk-adjusted returns (Basu, 1983; Tseng, 1988; Fama & French, 1992).

Conversely, high P/E ratios can also be associated with slow growth (Shen, 2000). Investors could change perspectives and view investments as less risky, causing demand and hence prices to increase. Such an example was when the Covid-19 virus impacted global economies in 2020, companies with the highest ESG rankings were found to be trading at a 30% premium relative to poor performers by referencing their forward P/E (Temple-West, 2020). This was due to high capital inflows into ESG funds causing an ESG bubble, suggesting that the P/E of ESG investments were overvalued. Within the short period from April to June 2020, more than $70 billion was poured into ESG equity funds, surpassing annual flows (Howard-Grenville, 2021). Markets viewed ESG funds as less risky than non-ESG funds during Covid-19 when uncertainty was high, and demand for ESG funds grew, raising the P/E despite market conditions which implied slowed growth. Separately, Goldman Sachs Equity Research also hinted at a positive relationship, where global companies highly aligned with the EU Taxonomy were valued at a 37% P/E sector-relative premium, while low carbon-emitting companies in the Asia Pacific were trading at a 28% P/E premium over their high carbon-emitting peers (Jones, et al., 2022).

The rise of ESG presents many opportunities for sustainable investments. Studies remain inconclusive about the relationship between ESG transparency and P/E. Jitmaneeroj (2018) found a positive relationship between the governance component and P/E in US companies, as companies focused on corporate governance practices during the 2008-2009 financial crisis and less on environmental and social factors. Almeyda and Darmansyah (2019) and Junius, Adisurjo, and Rijanto (2020) found no statistical significance between ESG with P/E in the real estate sector and four ASEAN countries respectively. Meanwhile, Svensson (2020) found a negative relationship with P/E in Northern Europe companies. Hence, ESG could be suggested to have a neutral, positive and negative relationship with P/E.

Therefore, by recognising that ESG performance is linked with providing stakeholders with transparency on high performers, companies with high ESG transparency could have low P/E as they are expected to have higher returns than companies with low ESG transparency. Alternatively, high ESG transparency could also be associated with high demand and hence high P/E, as they are viewed as relatively low risk.

2.3.2 Firm Size

Firm size is frequently found to be related to firms' sustainability-related decisions. Larger firms are usually more involved with CSR compared to smaller firms (Lerner & Fryxell, 1988). Many studies commonly use market capitalisation, assets and revenue as a control variable to control for the effect of size (Velte, 2017; Levicharova, Steinweg, & Thoumi, 2017; Sánchez-Infante Hernández, Yañez-Araque, & Moreno-García, 2020; Carnini Pulino, Ciaburri, Magnanelli, & Nasta, 2022; Abdi, Li, & Càmara-Turull, 2022). They imply that larger firms have a greater influence on societal stakeholders (e.g., larger consumer outreach and more employees) and are thus more closely monitored by the public, incentivising them to better disclose their sustainability efforts (Udayasankar, 2008; Krueger, Sautner, Tang, & Zhong, 2021). They are also better positioned to reduce regulatory pressures from governments via the legitimacy theory (Watson, Shrives, & Marston, 2002) which explains why some public exchanges have stricter reporting requirements for larger firms. Carnini Pulino, Ciaburri, Magnanelli, and Nasta (2022) note that bigger firms are intuitively related to better firm performance, such as higher earnings before income tax (EBIT), which could explain why expenditure on CSR was found to increase with firm size (Chauhan, 2014). Larger firms are characterised by economies of scale (Roberts & Dowling, 2002) and are financially solvent, with more monetary, intellectual and physical resources available to invest in ESG and set exemplary models as market leaders (Shakil, 2022). Larger firms that invest in ESG can thus reduce firm risk, create a positive reputation for the firm and gain stakeholder trust. However, the direction of the relationship between firm size, CSR performance and financial indicators can be positive or negative (Velte, 2017).

While benefits outweigh the costs for larger firms, the case is the opposite for smaller firms. ESG disclosure raised the cost of capital for listed small and medium-sized enterprises (SMEs) (Gjergji, Vena, Sciascia, & Cortesi, 2021) as their firm characteristics differ from large firms by having simpler reporting structures, limited financial and human resources and hence limited sustainability management tools (Gallo & Christensen, 2011). They relied more on informal social communication (Baumann-Pauly, Wickert, Spence, & Scherer, 2013) which changes the effectiveness of ESG disclosure.

To a lesser extent, studies also consider interaction effects between firm size with disclosure to explore firm-level heterogeneity since larger firms had more propensity to attain better ESG performance. Krueger, Sautner, Tang, and Zhong (2021) found a negative interaction between firm size and mandatory disclosure, indicating that smaller firms had less availability of ESG reporting, and were thus associated with poorer ESG performance than larger firms. Sánchez-Infante Hernández, Yañez-Araque, and Moreno-García (2020) found that firm size had a significant moderating effect, where larger firms had stronger relationships between CSR and

economic performance (Sánchez-Infante Hernández, Yañez-Araque, & Moreno-García, 2020). On the other hand, Lin, Cheah, Azali, Ho and Yip (2019) had a counterintuitive finding that smaller firms in the automotive industry had higher efficiency with higher green innovation investments returns and generated more profits than large firms that were too aggressive in investments and had lower financial performance (Lin, Cheah, Azali, Ho, & Yip, 2019). Meanwhile, Shakil (2022) finds that firm size presents no significant moderating effect between ESG and stock price volatility among textile and apparel firms, due to the unique nature of the industry's operations.

As for firm size in the palm oil sector, empirical studies on the moderating role of firm size were not found. However, research finds that larger firms are perceived similarly to have greater propensity and hence expectations to adopt sustainable practices. The 2020 Annual Communication of Progress (ACOP) reports submitted by RSPO members found that the progress of the biggest players across the supply chain is considered too slow, especially for processors and traders where nine of the ten biggest players are less than 30% certified (WWF, ZSL, 2022). Amongst growers, only three of the top ten achieved at least 80% certification. Companies with the largest land area and volumes of palm oil handled still fell short of certification. These companies are expected to have significant leverage with more responsibility to take up RSPO certification and were called to take urgent action to close the certification gap, as larger players have added responsibility to raise their uptake of sustainable palm oil.

Current literature commonly polarises palm oil producers as large or small, without distinguishing medium-sized companies or smallholders (SIIA, 2020). Thus, policies and initiatives rarely target medium-sized companies. They may also lack the capacity to adopt ESG commitments given the numerous frameworks and guidelines for companies to adhere to. Some smaller companies can also have sustainable practices in place not incorporated into the policy framework, or they may only sell to the domestic market, hence not requiring an RSPO certification. The MSPO and ISPO certifications and standards like the SPOTT framework help to be more inclusive, as they look beyond the price premium and stringent criteria associated with RSPO certification to assess companies on their sustainability efforts. Efforts are still being called for more inclusive support toward smaller companies, including strengthening the acceptance for MSPO and ISPO to be recognised by international stakeholders.

2.3.3 Valuation for Palm Oil Companies

The valuation of palm oil companies was previously found to be positively influenced by economic indicators such as inflation, exchange rate and world crude palm oil (CPO) price. (Suroso, Tandra, Najib, & Syakat, 2020). In recent years, however, the correlation between companies' share prices and CPO prices began to show a disconnect due to rising ESG concerns. The correlation between CPO prices and the Bursa Malaysia Plantation Index, which tracks 43 listed planters, weakened from 0.75 in 2020 to 0.22 in early 2021 when CPO prices rose beyond RM 3,500 per tonne (Surendran, 2021). Similar observations were found between the CPO and the Kuala Lumpur Plantation Index (KLPI) up until August 2021 (Kumar, 2021). The portrayal of weak ESG practices, through US CBP's ban on FGV Holdings Bhd and Sime Darby Plantation for forced labour, were cited to have eroded the share price of Malaysian planters. Investors' growing ESG concerns appear to have overtaken economic indicators in influencing the valuation of palm oil companies.

A descriptive study performed by a global financial institution on 15 palm oil companies in 2021 identified similarly that ESG risks have rendered the sector to trade at a record low P/E, which is a 72% discount below peak P/E (Foo, Glover, Chang, & Pratama, 2021). This is wider than other ESG-excluded names in tobacco and thermal coal sectors. In other words, the palm oil sector was valued at a discount despite efforts to improve practices. Even with volatile market movements from the Russia-Ukraine war and Indonesia's temporary export ban on palm oil in 2022, another study by Foo on 5 palm oil companies in 2022 suggested that the sector was still valued at 13-year lows (Foo, 2022) since the Global Financial Crisis in 2009. This was reaffirmed by Rijk, Miraningrum, and Piotrowski (2022) who found that Wilmar, the largest company in the palm oil supply chain, reached its lowest P/E in history as of March 2022 due to reputational impacts caused by poor transparency relating to forest and sustainability risks, calling for better transparency of NDPE execution and uptake of certified palm oil (Rijk, Miraningrum, & Piotrowski, 2022). As these studies are mainly descriptive, they inspire an opportunity to conduct empirical research to validate if there is any statistical significance between ESG transparency and the P/E valuation discount of palm oil companies, instead of looking at stock returns or ROA conducted by previous studies.

3 Conceptual Development

This chapter derives from the literature review to build the conceptual framework and develop the testable hypotheses.

The growing adoption of ESG integration and the rise in stakeholder initiatives such as regulations, certifications and reporting platforms have pressured companies to address the ESG risks of the palm oil sector and become more transparent by communicating their efforts towards sustainable palm oil production. Theoretical applications can be applied as companies achieve their social license to operate via the legitimacy theory, address stakeholder concerns on ESG risks via the stakeholder theory, act as agents on behalf of their shareholders via the agency theory and reduce information asymmetry via the signalling theory to signal their commitment towards sustainability, all of which are expected to have an impact on firm valuation.

3.1 Direct Relationship

The literature review references studies outside the palm oil sector that suggests a possible direct relationship between ESG transparency and financial indicators, but the results were inconclusive as to whether the relationship was positive or negative. With firm valuation as a popular indicator used by investors, ESG transparency could have a positive relationship with firm valuation. Firms with higher ESG transparency could be valued at a premium compared to firms with less transparency. They could be high in demand and viewed as relatively low in risk. This is demonstrated by the ESG bubble in 2020 (Temple-West, 2020) and the need to align with regulations such as the EU Taxonomy (Jones, et al., 2022) which are relevant to the palm oil sector. On the other hand, it is also possible that ESG transparency could be negatively related to firm valuation. Firms with higher ESG transparency could instead be undervalued stocks relative to those with lower ESG transparency. They would be preferred by investors as they potentially present a higher return for their low price relative to earnings (Basu, 1977; Tseng, 1988). The conceptual framework is first developed by hypothesising that the construct of ESG transparency could have a direct effect on firm valuation where the direction is either a) positive or b) negative.

Most studies investigate overall ESG, with the view that the management of environmental, social and governance issues are intertwined. For example, the absence of corruption in governance could ensure strong enforcement of penalties towards environmental and social compliance. Alternatively, good governance that signals 100% traceability can mitigate the negative impacts of deforestation (environmental) and land use conflicts (social). By

addressing all three aspects, companies benefit financially as they are protected against compliance and reputational risks. Initiatives such as certification, where RSPO-certified companies outperformed noncertified counterparts (Climate Advisers, 2019), help to address such risks. This derives the first hypothesis that total ESG transparency has a direct positive or negative relationship with firm valuation.

H1a: *Total ESG transparency will have a positive relationship with firm valuation.*

H1b: *Total ESG transparency will have a negative relationship with firm valuation.*

Studies also find that the direct relationship could be observed for individual environmental, social and governance components as they can have netting effects on one another (Nofsingera, Sulaeman, & Varma, 2019) or even be heterogeneous, providing a mix of positive and negative relationships (Lam, Zhang, & Chien, 2018). Therefore, each component should be considered for influencing firm valuation.

In the palm oil sector, the environmental (E) component could be directly related to firm valuation. Research on the environmental effects received more attention given increasing regulations relating to deforestation, transboundary haze and the urgency of climate-related risks such as declaring GHG emissions as part of the 2015 Paris Agreement. Erian (2016) found that the 2015 haze crisis had significant negative impacts on abnormal stock returns on listed palm oil companies, suggesting that markets are sensitive to the knowledge of environmental events. Environmental indicators are also based on various scientific tools, that ease data collection and facilitate extensive scientific research. Furthermore, the earlier years of SPOTT assessments entailed only environmental considerations before including social and governance (Oppenheimer, et al., 2021), evidencing that there exist more inquiry and research on environmental impacts than on social or governance. Thus, transparency about environmental efforts is suggested to have more influence on firm valuation than social and governance. This derives the second hypothesis that environmental transparency has a direct positive or negative relationship with firm valuation.

H2a: *Environmental transparency will have a positive relationship with firm valuation.*

H2b: *Environmental transparency will have a negative relationship with firm valuation.*

It is also possible that financial indicators in the palm oil sector could be driven by the social (S) component or even both environmental and social components found in other studies (Orlitzky, Schmidt, & Rynes, 2003; Nofsingera, Sulaeman, & Varma, 2019). Social issues have

gained traction in recent years. HCV assessments now require the classification of intangible losses in social and cultural values through land conflicts (CRR, 2019) and the palm oil sector is recognised as the largest contributor to land conflicts (CRR, 2021-c). Additionally, the sanctions on FGV Holdings and Sime Darby over forced labour allegations highlight the increasing consideration of social issues, as the sanctions were key in influencing the share prices of Malaysian planters (Kumar, 2021). This derives the third hypothesis that social transparency has a direct positive or negative relationship with firm valuation.

H3a: *Social transparency will have a positive relationship with firm valuation.*

H3b: *Social transparency will have a negative relationship with firm valuation.*

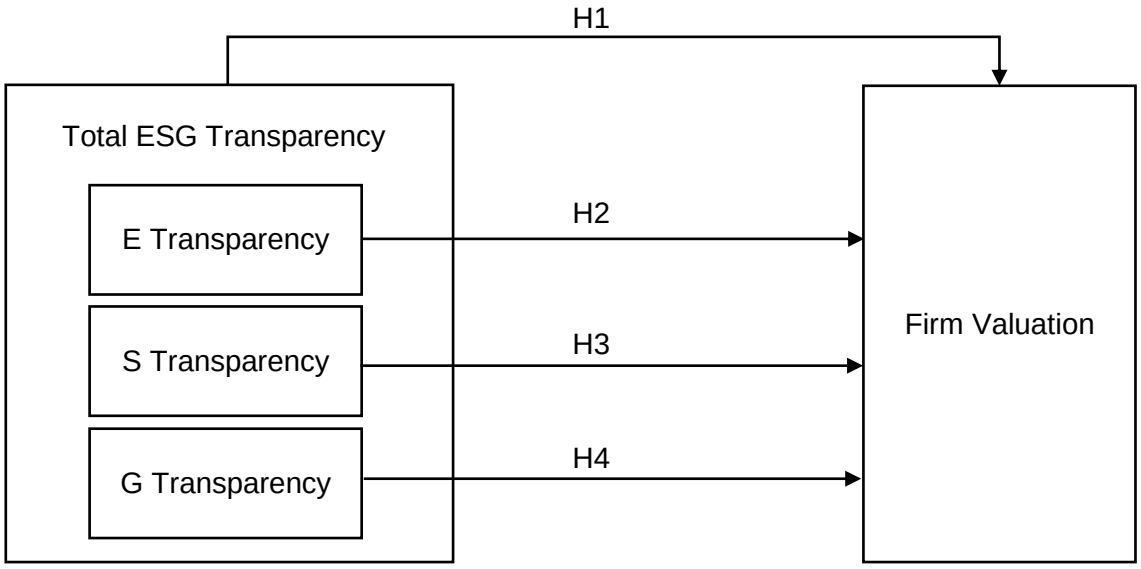
Governance (G) can also be a key driver of firm valuation. Velte (2017) notes that the introduction of legislation such as the Corporate Governance Code possibly resulted in governance being the strongest driver for firm performance. Jitmaneeroj (2018) also found a positive relationship between governance and P/E in US companies, as companies focused on corporate governance practices during the 2008-2009 financial crisis. Similarly, the introduction of Indonesia's regulation in 2018 to declare beneficial owners could help minimise corruption in the country, where the majority of palm oil production is based, and influence companies to focus on governance practices. This could raise the influence of governance in the sector. Initiatives such as increased regulations, improvements to certifications, and companies disclosing their commitments highlight efforts for more transparency and better governance. The rise of data and reporting platforms to promote 100% traceability and improve transparency also reflects the emerging importance of governance in the sector. Greenwashing claims and investor aversion can hence be reduced by improving the credibility of deforestation commitments. This derives the fourth hypothesis that governance transparency has a direct positive or negative relationship with firm valuation.

H4a: *Governance transparency will have a positive relationship with firm valuation.*

H4b: *Governance transparency will have a negative relationship with firm valuation.*

Figure 3.1 summarises the conceptual framework for the direct relationship between transparency and firm valuation in hypotheses 1 to 4.

Figure 3.1 Conceptual Framework for the Direct Relationship



3.2 Moderating Role of Firm Size

The literature review also observes that firm size could be another construct which moderates the relationship between ESG and financial indicators (Sánchez-Infante Hernández, Yañez-Araque, & Moreno-García, 2020; Krueger, Sautner, Tang, & Zhong, 2021). Compared with smaller companies, larger companies are more cost-effective and have greater capital to address ESG concerns. They also face more pressure to be more sustainable. This is reiterated by how some public exchanges mandate sustainability reporting for larger listed companies (e.g., Europe, UK, India). In palm oil's context, EU's imports from RSPO-certified companies tend to be larger, with capabilities to adhere to higher sustainability standards, and have less ESG risk associated with traceability and compliance as compared to smaller companies. Large companies have also been responsive to efforts to perform better. Wilmar initiating the first NDPE policy among companies reflect that large companies are best positioned to set exemplary standards. The analysis of ACOP reports also singled out larger players to increase their uptake of sustainable palm oil. Thus, the earlier conceptual framework can be expanded upon, to derive the fifth hypothesis that firm size plays a moderating role in the relationship between total ESG transparency and firm valuation.

H5a: *Firm size will moderate the positive effect of total ESG transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H5b: *Firm size will moderate the negative effect of total ESG transparency on firm valuation such that when firm size increases, the negative effect is larger.*

Firm size could also have significant interaction with individual ESG components. In assessing sector valuation, Abdullah, Hamzah, Ali, Tseng, & Brander (2020) found a significantly positive relationship between environmental disclosure and ROA in Malaysian companies that were larger in firm size relative to Indonesian companies. This derives the sixth hypothesis that firm size plays a moderating role in the relationship between environmental transparency and firm valuation.

H6a: *Firm size will moderate the positive effect of environmental transparency such that when firm size increases, the positive effect is larger.*

H6b: *Firm size will moderate the negative effect of environmental transparency on firm valuation such that when firm size increases, the negative effect is larger.*

In the social aspect, the penalties on forced labour allegations and poor working conditions were also imposed on large companies such as Sime Darby, which impacted their share prices linked to firm valuation. However, Sime Darby engaged the necessary resources to review their operations and reimbursed workers, put in place controls to eliminate debt bondage for migrant workers, and established a new social welfare and services department for managing worker safety and well-being (Yap, 2022). This evidences that large firms have capacities to respond to regulatory pressures and right their wrongs. This derives the seventh hypothesis that firm size plays a moderating role in the relationship between social transparency and firm valuation.

H7a: *Firm size will moderate the positive effect of social transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H7b: *Firm size will moderate the negative effect of social transparency on firm valuation such that when firm size increases, the negative effect is larger.*

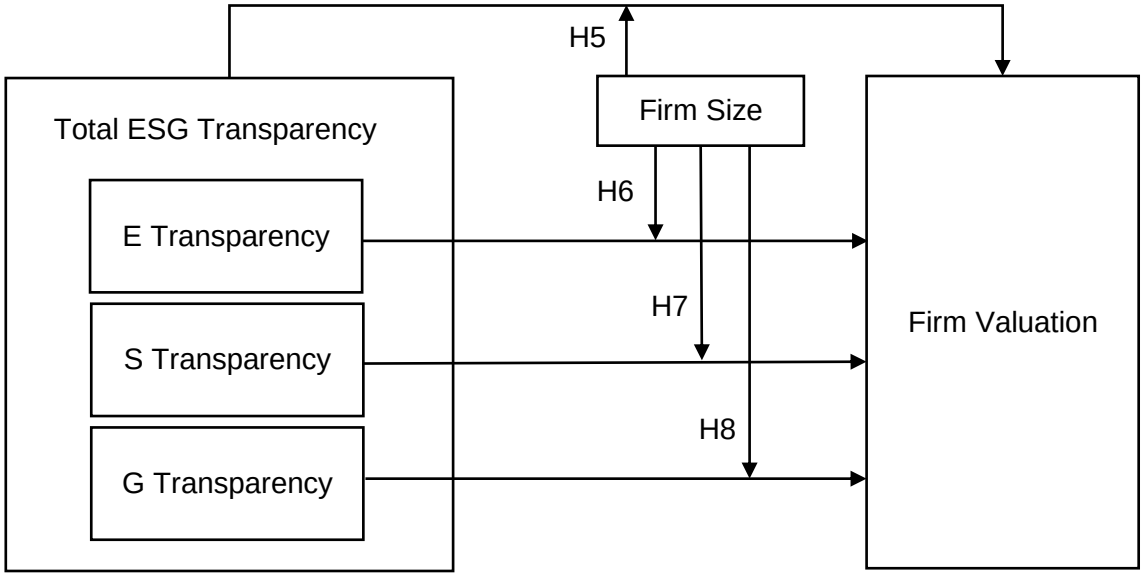
As for governance, large companies are expected to have the resources to adopt sustainability management tools to uphold strong governance standards. However, due to Wilmar's governance issues relating to poor transparency and weak uptake of certified palm oil, the industry leader reached its lowest P/E in history (Rijk, Miraningrum, & Piotrowski, 2022). This derives the eighth hypothesis that firm size plays a moderating role in the relationship between governance transparency and firm valuation.

H8a: *Firm size will moderate the positive effect of governance transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H8b: *Firm size will moderate the negative effect of governance transparency on firm valuation such that when firm size increases, the negative effect is larger.*

Figure 3.2 summarises the conceptual framework for the moderating role of firm size on the relationship between transparency and firm valuation in hypotheses 5 to 8.

Figure 3.2 Conceptual Framework for the Moderating Role of Firm Size



4 Research Methodology

This chapter describes the methods adopted for designing the research, including the data sources and variables used for conducting the model tests to investigate the hypotheses developed in Chapter 3.

4.1 Methodology

This study adopts a deductive approach to test the eight hypotheses that (i) examine the direct relationships that total ESG, environmental, social and governance transparency have on firm valuation and (ii) understand the moderating role of firm size on the direct relationships that total ESG, environmental, social and governance transparency have on firm valuation. The paper then evaluates the findings for the hypotheses.

The hypotheses are formulated by defining the measures used for each construct shown in Table 4.1. The construct of ESG transparency will be defined by the ESG disclosure scores in ZSL's SPOTT 2021 assessment. Overall ESG transparency will be defined by the total score, while environmental, social and governance transparency are defined by Environmental (E), Social (S) and Governance (G) scores respectively. The construct of firm size as moderator will be defined by revenue, or assets in the robustness test, while firm valuation is defined by P/E.

Table 4.1 Mapping Constructs to Measures

Construct	**Measure**
Total ESG Transparency	Total Score
Environmental Transparency	E Score
Social Transparency	S Score
Governance Transparency	G Score
Firm Size (Moderator)	Revenue
Firm Size (Moderator)	Assets
Firm Valuation	P/E

The investigation will be a cross-sectional study of 36 palm oil companies, that compares four categories of ESG disclosure scores – total score, and independent E, S and G scores to isolate netting effects from other scores. Subsequently, the study will explore if firm size (revenue or assets) plays a moderating role by strengthening the relationship between ESG scores and P/E. To test the hypotheses, a multiple regression analysis was performed using the Analysis of Variance (ANOVA) test on Microsoft Excel based on an ordinary least squares regression method.

4.2 Data

ESG disclosure scores were retrieved from the total, E, S and G scores in the SPOTT assessment of 100 palm oil companies released in November 2021. SPOTT has a niche focus on commodity producers, processors and traders and assesses public disclosure of their organisation, policies and practices towards ESG issues. These companies are closer to the upstream supply chain with greater exposure and control over plantation activities that dominate the ESG issues highlighted earlier. Referencing the SPOTT assessment will respond to Tey and Brindal (2020) who acknowledged RSPO certification was exclusive to larger companies and called for a more easily understood and accepted ESG framework. The SPOTT assessment framework addresses this by going beyond the requirements of certification to assess ESG performance, having attained a point of maturity (Oppenheimer, et al., 2021), making it more inclusive towards smaller companies. The framework also responds to Godfrey & Hatch's (2007) call for more industry-specific criteria that increase the relevance of criteria for the sector.

The SPOTT 2021 palm oil assessment adopts a comprehensive framework with 182 ESG indicators across 10 categories, developed with consideration of the UN SDGs (ZSL, n.d.-a). Table 4.2 presents the 10 categories and the corresponding number of ESG indicators for each category. These categories include themes that are tailored to the palm oil sector, such as traceability, deforestation, certification and labour rights. Among the total of 182 indicators, an indicator can fulfil two or all three categories of E, S and G. Thus, there are 136 E indicators, 120 S indicators, and 52 G indicators. For each indicator, points of 0 to 1 are assigned, where 0 is given for no disclosure, a partial point (e.g., 0.5 or 0.01 to 0.99) can be given for partial disclosure, and 1 point for clear disclosure (e.g., 100% traceability). The scores are then converted to percentages ranging from 0 to 100, where higher scores are associated with more transparent disclosure.

Table 4.2 Categories and Indicators in the SPOTT 2021 Palm Oil Assessment

#	Categories	Count of ESG indicators	Count of E indicators	Count of S indicators	Count of G indicators
1	Sustainability Policy and Leadership	**12**	8	9	10
2	Landbank, Maps and Traceability	**24**	24	24	7
3	Certification Standards	**17**	17	17	17
4	Deforestation and Biodiversity	**17**	17	3	
5	High Conservation Value (HCV), High Carbon Stock (HCS) and Impact Assessments	**15**	15	15	
6	Peat, Fire and GHG Emissions	**18**	18	1	
7	Water, Chemical and Pest Management	**21**	21		
8	Community, and Labour Rights	**35**		35	
9	Smallholders and Suppliers	**16**	16	16	11
10	Governance and Grievances	**7**			7
	Total	**182**	**136**	**120**	**52**

Companies' financial data were sourced from Thomson Reuters, a professional platform for financial data. Data were sourced based on the latest available in July 2022, to account for a lagged effect within a year of SPOTT's score release. Fiscal year-end numbers and reported currencies for revenue and assets were also verified on companies' annual reports and websites to ensure accuracy. As palm oil companies are listed across multiple stock exchanges globally, financial data was reflected in different reporting currencies. For standardisation, numbers were converted to USD based on exchange rates in Xe.com which is an established platform for global exchange rates. The dates of exchange rates used for conversion were based on the latest fiscal year reporting date (for assets and revenue) and share price closing date (for market capitalisation), where applicable.

4.3 Sample

The sample aims to represent the global population of publicly listed palm oil companies with a score from the SPOTT assessment. The reason for scoping publicly listed companies is because their data are more easily accessible to the wider group of public investors who can make investment decisions that contribute to enabling sustainable production. Among SPOTT's 2021 assessment of 100 companies, 45 companies were publicly listed. Due to missing financial data on Thomson Reuters (e.g., delisted, restructured), 9 companies were omitted from the study. This narrows the final sample to 36 companies. They include dominant players in Southeast Asia such as Wilmar International, Sime Darby Plantation, IOI Corporation, Kuala Lumpur Kepong Bhd, QL Resources Bhd, Golden Agri-Resources Ltd, and

FGV Holdings. Other global players such as Itochu Corporation, Archer-Daniels-Midland Co, Bunge Ltd and AAK AB listed in Japan, New York and Sweden are also included. Of the 36 companies, at least 31 have operations in Indonesia and Malaysia, and 29 of them (including subsidiaries) are RSPO members. This sample size is larger than the sample sizes in some of the earlier studies conducted. The sample also provides a global representation of palm oil companies, as opposed to earlier studies that mostly focused on companies in Indonesia and Malaysia only.

4.4 Variables

With the sample size of 36 companies, three independent variables are considered to align with the norms of regression analysis by having at least 10 observations per variable (Kleinbaum, Kupper, & Nizam, 1998) to avoid overfitting. The first four hypotheses will have one direct and two control variables to examine the direct relationship, while the remaining four will have a direct, interactive and control variable to examine the interactive relationship.

The direct variables of ESG disclosure scores are the total, E, S and G scores which will be used to assess the direct relationships in hypotheses 1 to 4. They are also used to assess the interactive relationships in hypotheses 5 to 8.

To test the direct relationship in hypotheses 1 to 4, two control variables for firm size will be used – market capitalisation and revenue. In this study, the natural logarithm is applied to both attributes to reduce skewness.

To test the interactive relationship in hypotheses 5 to 8, there will be one interactive variable and one control variable. The interactive variable considers firm size as a moderator where total revenue is multiplied by the sustainability score. It assesses if firm size moderates the relationship between ESG scores and the P/E ratio. Meanwhile, the control variable retains the natural logarithm of market capitalisation.

In all hypotheses, the dependent variable references the P/E ratio as a measure for firm valuation that is commonly used by investors. This is based on the share price divided by the normalised annual earnings per share. Normalised earnings will exclude unusual expenses or revenue that are not typical of the companies' main businesses.

For robustness, each test is replicated by replacing the revenue with assets as the firm size proxy in the control variable for hypotheses 1 to 4, and in the interactive variable for hypotheses 5 to 8.

Table 4.3 4.3 summarises the description of each variable.

Table 4.3 Variable Description

	Description
Independent Variables	
Direct: **Total Score, Environmental Score, Social Score Governance Score**	Scores retrieved from ZSL's SPOTT 2021 assessment of palm oil companies. Of the 100 names, firms with missing data were omitted (private, de-listed, restructured), reducing the sample size to 36 companies.
Interactive: **Score * Revenue, Score * Assets**	Companies' total revenue and assets retrieved from Thomson Reuters are based on the latest fiscal year reporting available as of July 2022. Values were converted to USD from xe.com based on the exchange rate used at the reported fiscal-year end. Values were multiplied by each score (direct variable) to test for interaction.
Control: Market Capitalisation	Market capitalisation retrieved from Thomson Reuters based on the latest available market share price multiplied by the total number of the company's outstanding shares as of July 2022. Values were converted to USD from xe.com based on the exchange rate based on the share price closing date in July 2022. The natural logarithm of market capitalisation was used in the study.
Control: Revenue, Assets	Companies' total revenues and assets retrieved from Thomson Reuters are based on the latest fiscal year reporting available as of July 2022. Values were converted to USD from xe.com based on the exchange rate used at the reported fiscal-year end. The natural logarithm of each measure was used separately in the study.
Dependent Variables	
P/E Ratio	Share price divided by normalised (annual) earnings per share. P/E retrieved from Thomson Reuters based on the share price in July 2022.

To evaluate the impact of ESG transparency on firm valuation of palm oil companies, the equation for the direct relationship will be as follows:

$$P/E_{i,t} = \beta_0 + \beta_1 ESG_{i,t-1} + \beta_2 Control(FS_{i,t-1}) + \beta_3 Control(MC)_{i,t} + \varepsilon_i$$

Where:

- $P/E_{i,t}$ is the valuation of company i at time t
- $ESG_{i,t-1}$ is a measure of the total, E, S, or G disclosure score of the company i at time t-1
- $Control(FS)_{i,t-1}$ is the control variable of firm size (revenue or assets) at time t
- $Control(MC)_{i,t}$ is the control variable of market capitalisation at time t
- ε_i is the error term

To evaluate the moderating role of firm size on the relationship between ESG transparency and firm valuation of palm oil companies, the equation for including the interaction effect will be as follows:

$$P/E_{i,t} = \beta_0 + \beta_1 ESG_{i,t-1} + \beta_2 (ESG_{i,t-1} * FS_{i,t-1}) + \beta_3 Control(MC)_{i,t} + \varepsilon_i$$

Where:

- $P/E_{i,t}$ is the valuation of company i at time t

- $ESG_{i,t-1}$ is a measure of the total, E, S, or G disclosure score of the company i at time t-1
- $ESG_{i,t-1,}*FS_{i,t-1}$ is a measure of interaction between the disclosure score (total, E, S or G) of company i at time t-1, multiplied by the firm size (revenue or assets) of the company i at time t-1
- $Control(MC)_{i,t}$ is the control variable of market capitalisation at time t
- ε_i is the error term

4.5 Model Tests

To conduct an ordinary least squares regression, eight model tests are run. For each of the four independent direct variables (total, E, S, G Score), two tests are run. One will test for the direct relationship, and another for the interaction effect. In all tests, the same control (market capitalisation) and independent variable (P/E) are used. Table 4.4 presents the difference in variables used across each model.

Table 4.4 Model Description

Model	**Direct Variable**	**Control Variable**	**Control Variable**	**Dependent Variable**
Model 1	Total Score	Ln(Revenue)	Ln(Market Cap)	P/E
Model 2	E Score	Ln(Revenue)	Ln(Market Cap)	P/E
Model 3	S Score	Ln(Revenue)	Ln(Market Cap)	P/E
Model 4	G Score	Ln(Revenue)	Ln(Market Cap)	P/E
Model	**Direct Variable**	**Interactive Variable**	**Control Variable**	**Dependent Variable**
Model 5	Total Score	Total Score * Revenue	Ln(Market Cap)	P/E
Model 6	E Score	E Score * Revenue	Ln(Market Cap)	P/E
Model 7	S Score	S Score * Revenue	Ln(Market Cap)	P/E
Model 8	G Score	G Score * Revenue	Ln(Market Cap)	P/E

5 Results and Analysis

This chapter examines the data through descriptive statistics, correlation analysis and the regression results of the study which analyses whether the hypotheses in question can be accepted or rejected.

5.1 Descriptive Statistics

Table 5.1 presents the summary statistics for the 36 publicly listed palm oil companies in this study. The P/E ratio averages 10.150 with a range from 3.85 to 58.57 which indicates that firms can be significantly undervalued or overvalued relative to one another. The total scores range from 8.1 to 91.30 with an average of 61.4. This average is higher than the average of 42.8 from the original list of 100 companies which included private companies, hinting that publicly listed companies are more inclined to engage in more ESG transparency to meet additional requirements from public exchanges. The individual E, S and G scores average 56.293, 63.066, and 56.153 respectively, suggesting that each component does not differ too far from the average total score, although the S score is the closest.

Table 5.1 Descriptive Statistics

	No. of Observations	***Mean***	***Std Deviation***	***Min***	***Median***	***Max***
P/E	36	10.150	9.355	3.85	8.105	58.57
Total Score	36	61.428	21.857	8.1	63.65	91.30
E Score	36	56.293	22.639	4.93	58.91	88.91
S Score	36	63.066	22.391	9.03	65.57	90.41
G Score	36	56.153	20.866	9.91	60.38	84.24
*Total Score * Revenue*	36	742,506.695	1,723,629.010	3,879.19	50,948.704	6,197,719.390
*E Score * Revenue*	36	665,867.004	1,541,088.722	3,279.329	46,576.012	5,849,710.754
*S Score * Revenue*	36	738,785.806	1,703,177.589	3,841.940	52,927.939	6,104,551.060
*G Score * Revenue*	36	712,677.684	1,651,408.457	2,346.782	45,914.334	5,542,454.549
*Total Score * Assets*	36	596,484.186	1,419,963.363	1,832.460	84,209.547	6,127,294.359
*E Score * Assets*	36	535,365.658	1,259,438.613	1,115.312	80,873.139	5,220,657.390
*S Score * Assets*	36	594,525.127	1,400,293.119	2,042.854	87,702.192	6,035,184.705
*G Score * Assets*	36	559,637.869	1,303,225.275	3,479.412	74,761.188	5,294,302.707
Ln(Revenue)	36	7.402	1.844	4.856	6.996	11.526
Ln(Assets)	36	7.651	1.485	5.422	7.213	11.514
Ln(Market Cap)	36	6.923	1.668	3.674	6.636	10.713
Revenue (USD Mn)	36	10,947.016	25,121.318	128.45	1,092.830	101,269.925
Assets (USD Mn)	36	8,649.901	20,604.289	226.230	1,361.785	100,119.189
Market Cap (USD Mn)	36	4,597.198	10,593.469	39.395	762.781	44,921.994

5.2 Correlation Analysis

Table 5.2 presents the correlation coefficients for the variables used in this paper. At first glance, the direct variables total, E, S and G scores are negatively correlated with P/E with E having the highest correlation. Firm size variables of revenue and assets are weakly negatively correlated with P/E while market capitalisation has a positive correlation with P/E. In its natural logarithm form, revenue, assets and market capitalisation are all positively correlated with P/E and disclosure scores. As interactive variables, when the score is multiplied by revenue or assets, the correlation is negative. Among the direct variables, E, S and G scores are highly correlated with the total score above 0.9, suggesting that netting effects from each score are minimal. E and S have higher correlations with the total score above 0.99, while G has a lower correlation of 0.95, implying that E and S scores could have more influence over the total scores than G scores.

Table 5.2 a) Correlation Matrix

	P/E	*Total Score*	*E Score*	*S Score*	*G Score*	*Total Score * Revenue*	*E Score * Revenue*	*S Score * Revenue*	*G Score * Revenue*	*Total Score * Assets*	*E Score * Assets*	*S Score * Assets*	*G Score * Assets*
P/E	1.000												
Total Score	-0.288	1.000											
E Score	-0.310	0.994	1.000										
S Score	-0.279	0.994	0.987	1.000									
G Score	-0.160	0.947	0.941	0.951	1.000								
*Total Score * Revenue*	-0.023	0.182	0.147	0.139	0.242	1.000							
*E Score * Revenue*	-0.022	0.198	0.166	0.155	0.260	0.997	1.000						
*S Score * Revenue*	-0.024	0.184	0.149	0.142	0.246	1.000	0.997	1.000					
*G Score * Revenue*	-0.016	0.182	0.148	0.140	0.255	0.995	0.994	0.995	1.000				
*Total Score * Assets*	-0.021	0.203	0.169	0.163	0.231	0.959	0.952	0.958	0.929	1.000			
*E Score * Assets*	-0.020	0.223	0.192	0.182	0.253	0.959	0.959	0.958	0.932	0.996	1.000		
*S Score * Assets*	-0.022	0.206	0.172	0.166	0.235	0.959	0.952	0.958	0.930	1.000	0.996	1.000	
*G Score * Assets*	-0.013	0.209	0.175	0.168	0.248	0.974	0.970	0.973	0.952	0.997	0.996	0.997	1.000
Ln(Revenue)	0.068	0.089	0.067	0.049	0.203	0.816	0.813	0.818	0.818	0.746	0.747	0.748	0.765
Ln(Assets)	0.031	0.299	0.262	0.262	0.359	0.847	0.844	0.849	0.843	0.815	0.815	0.817	0.829
Ln(Market Cap)	0.294	0.283	0.246	0.257	0.390	0.746	0.741	0.747	0.749	0.716	0.715	0.718	0.734
Revenue (USD Mn)	-0.018	0.131	0.090	0.088	0.192	0.984	0.969	0.984	0.979	0.937	0.923	0.936	0.950
Assets (USD Mn)	-0.016	0.149	0.107	0.109	0.177	0.944	0.923	0.942	0.913	0.982	0.963	0.982	0.976
Market Cap (USD Mn)	0.080	0.118	0.074	0.079	0.175	0.902	0.876	0.899	0.894	0.892	0.867	0.890	0.904

Table 5.2 b) Correlation Matrix (continued)

	Ln(Revenue)	*Ln(Assets)*	*Ln(Market Cap)*	*Revenue (USD Mn)*	*Assets (USD Mn)*	*Market Cap (USD Mn)*
Ln(Revenue)	1.000					
Ln(Assets)	0.927	1.000				
Ln(Market Cap)	0.843	0.899	1.000			
Revenue (USD Mn)	0.818	0.841	0.745	1.000		
Assets (USD Mn)	0.742	0.806	0.715	0.954	1.000	
Market Cap (USD Mn)	0.730	0.788	0.757	0.942	0.939	1.000

5.3 Regression Results

Table 5.3 summarises the results of the eight model tests. It reports the estimated coefficients, standard errors and significance levels.

Table 5.3 Regression Results for 36 Palm Oil Companies

	Model 1	***Model 2***	***Model 3***	***Model 4***	***Model 5***	***Model 6***	***Model 7***	***Model 8***
Variables								
Direct								
Total Score	-0.236***				-0.181***			
	(0.061)				(0.062)			
E Score		-0.223***				-0.172***		
		(0.058)				(0.059)		
S Score			-0.230***				-0.172***	
			(0.060)				(0.060)	
G Score				-0.200***				-0.156**
				(0.071)				(0.071)
Interactive								
*Total Score * Revenue*					-3.109E-06*** (1.133E-06)			
*E Score * Revenue*						-3.321E-06** (1.261E-06)		
*S Score * Revenue*							-3.280E-06*** (1.155E-06)	
*G Score * Revenue*								-3.204E-06** (1.252E-06)
Control								
Ln(Revenue)	-4.606***	-4.487***	-4.780***	-4.146***				
	(1.286)	(1.282)	(1.306)	(1.384)				
Ln(Market Cap)	6.819***	6.575***	6.898***	6.489***	4.717***	4.498***	4.747***	4.787***
	(1.477)	(1.458)	(1.492)	(1.627)	(1.200)	(1.185)	(1.208)	(1.301)
Constant	11.532*	10.378*	12.255*	7.131	-9.105	-9.094	-9.431	-11.940
	(5.907)	(5.806)	(6.019)	(6.117)	(7.856)	(7.794)	(7.882)	(8.133)
Observations	36	36	36	36	36	36	36	36
Adjusted R-squared	0.404	0.401	0.400	0.296	0.324	0.319	0.320	0.251

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors are in parentheses.

Direct Effect of ESG Transparency on Firm Valuation

H1a: *Total ESG transparency will have a positive relationship with firm valuation.*

H1b: *Total ESG transparency will have a negative relationship with firm valuation.*

The regression results of the total score variable in model 1 are negatively significant at a 1% significance level. This means that companies with higher total scores reflect lower P/E ratios. H1a is rejected while H1b is accepted at a 99% confidence interval.

H2a: *Environmental transparency will have a positive relationship with firm valuation.*

H2b: *Environmental transparency will have a negative relationship with firm valuation.*

The regression results of the E score variable in model 2 are negatively significant at a 1% significance level. This means that companies with higher E scores reflect lower P/E ratios. H2a is rejected while H2b is accepted at a 99% confidence interval.

H3a: *Social transparency will have a positive relationship with firm valuation.*

H3b: *Social transparency will have a negative relationship with firm valuation.*

The regression results of the S score variable in model 3 are negatively significant at a 1% significance level. This means that companies with higher S scores reflect lower P/E ratios. H3a is rejected while H3b is accepted at a 99% confidence interval.

H4a: *Governance transparency will have a positive relationship with firm valuation.*

H4b: *Governance transparency will have a negative relationship with firm valuation.*

The regression results of the G score variable in model 4 are negatively significant at a 1% significance level. This means that companies with higher G scores reflect lower P/E ratios. H4a is rejected while H4b is accepted at a 99% confidence interval.

Firm Size Moderates the Effect of ESG Transparency on Firm Valuation

H5a: *Firm size will moderate the positive effect of total ESG transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H5b: *Firm size will moderate the negative effect of total ESG transparency on firm valuation such that when firm size increases, the negative effect is larger.*

The regression results of the interactive variable using firm size multiplied by the total score in model 5 are negatively significant at a 1% significance level. This means that firm size strengthens the negative effect of the total score on P/E. H5a is rejected while H5b is accepted at a 99% confidence interval.

H6a: *Firm size will moderate the positive effect of environmental transparency such that when firm size increases, the positive effect is larger.*

H6b: *Firm size will moderate the negative effect of environmental transparency on firm valuation such that when firm size increases, the negative effect is larger.*

The regression results of the interactive variable using firm size multiplied by the E score in model 6 are negatively significant at a 5% significance level respectively. This means that firm size strengthens the negative effect of the E score on P/E. H6a is rejected while H6b is accepted at a 95% confidence interval.

H7a: *Firm size will moderate the positive effect of social transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H7b: *Firm size will moderate the negative effect of social transparency on firm valuation such that when firm size increases, the negative effect is larger.*

The regression results of the interactive variable using firm size multiplied by the S score in model 7 are negatively significant at a 1% significance level. This means that firm size strengthens the negative effect of the S score on P/E. H7a is rejected while H7b is accepted at a 99% confidence interval.

H8a: *Firm size will moderate the positive effect of governance transparency on firm valuation such that when firm size increases, the positive effect is larger.*

H8b: *Firm size will moderate the negative effect of governance transparency on firm valuation such that when firm size increases, the negative effect is larger.*

The regression results of the interactive variable using firm size multiplied by the G score in model 8 are negatively significant at a 5% significance level. This means that firm size strengthens the negative effect of the G score on P/E. H8a is rejected while H8b is accepted at a 95% confidence interval.

Robustness

A robustness test was performed by replacing revenue with assets as a control variable in models 1r to 4r, and as an interactive variable in models 5r to 8r which is summarised in Table 5.4. The reproduced regression results in Table 5.5 reiterate that overall relationships across direct and interactive variables are all negatively significant at a 5% significance level in models 1r to 8r. When revenue is used, the direct negative relationships are stronger at a 1% significance in models 1 to 4. Similarly, the interaction effects are stronger at a 1% significance when revenue is multiplied by total and social scores (models 5 and 7 respectively). In the robustness test, the adjusted R-squared parameters are smaller when assets are used for testing the interaction effect. Models 5, 6, 7 and 8 hence explain a larger proportion of the variance for P/E by the interaction effect of firm size when compared to models 5r, 6r, 7r and 8r respectively. Nonetheless, the robustness test provides consistent results that the direct and interactive relationships hold at a 5% significance level.

Table 5.4 Model Description for Robustness Test

Model	**Direct Variable**	**Control Variable**	**Control Variable**	**Dependent Variable**
Model 1r	Total Score	Ln(Assets)	Ln(Market Cap)	P/E
Model 2r	E Score	Ln(Assets)	Ln(Market Cap)	P/E
Model 3r	S Score	Ln(Assets)	Ln(Market Cap)	P/E
Model 4r	G Score	Ln(Assets)	Ln(Market Cap)	P/E
Model	**Direct Variable**	**Interactive Variable**	**Control Variable**	**Dependent Variable**
Model 5r	Total Score	Total Score * Assets	Ln(Market Cap)	P/E
Model 6r	E Score	E Score * Assets	Ln(Market Cap)	P/E
Model 7r	S Score	S Score * Assets	Ln(Market Cap)	P/E
Model 8r	G Score	G Score * Assets	Ln(Market Cap)	P/E

Table 5.5 Regression Results for Robustness Test of 36 Palm Oil Companies

	Model 1r	***Model 2r***	***Model 3r***	***Model 4r***	***Model 5r***	***Model 6r***	***Model 7r***	***Model 8r***
Variables								
Direct								
Total Score	-0.150**				-0.173**			
	(0.057)				(0.064)			
E Score		-0.148**				-0.165**		
		(0.054)				(0.061)		
S Score			-0.143**				-0.163**	
			(0.055)				(0.062)	
G Score				-0.140**				-0.156**
				(0.064)				(0.072)
Interactive								
*Total Score * Assets*					-3.136E-06** (1.349E-06)			
*E Score * Assets*						-3.406E-06** (1.520E-06)		
*S Score * Assets*							-3.316E-06** (1.378E-06)	
*G Score * Assets*								-3.774E-06** (1.563E-06)
Control								
Ln(Assets)	-7.142***	-7.164***	-7.308***	-7.557***				
	(1.839)	(1.824)	(1.837)	(1.880)				
Ln(Market Cap)	7.922***	7.877***	7.993***	8.379***	4.204***	4.040***	4.212***	4.575***
	(1.629)	(1.617)	(1.634)	(1.696)	(1.172)	(1.162)	(1.181)	(1.285)
Constant	19.135***	18.733***	19.741***	17.787**	-6.472	-6.706	-6.771	-10.665
	(6.586)	(6.491)	(6.667)	(6.692)	(7.849)	(7.799)	(7.901)	(8.044)
Observations	36	36	36	36	36	36	36	36
Adjusted R-squared	0.433	0.441	0.430	0.401	0.286	0.284	0.279	0.237

Note: ***p<0.01, **p<0.05, *p<0.1. Standard errors are in parentheses.

The results in the first four models affirm the negative effect of total ESG, environmental, social and governance transparency on firm valuation.

Table 5.6 summarises the results of the direct relationship, which accepts the first four hypotheses that favour a negative relationship and rejects those that favour a positive relationship.

Table 5.6 Result Summary for the Direct Relationship

	Direct Effect of ESG Transparency on Firm Valuation	**Result**
H1a	*Total ESG transparency will have a positive relationship with firm valuation.*	Rejected
H1b	*Total ESG transparency will have a negative relationship with firm valuation.*	Accepted
H2a	*Environmental transparency will have a positive relationship with firm valuation.*	Rejected
H2b	*Environmental transparency will have a negative relationship with firm valuation.*	Accepted
H3a	*Social transparency will have a positive relationship with firm valuation.*	Rejected
H3b	*Social transparency will have a negative relationship with firm valuation.*	Accepted
H4a	*Governance transparency will have a positive relationship with firm valuation.*	Rejected
H4b	*Governance transparency will have a negative relationship with firm valuation.*	Accepted

Expanding on the direct relationship, the results confirm that firm size acts as a moderator in strengthening the negative effect that total ESG, environmental, social and governance transparency have on firm valuation.

Table 5.7 summarises the moderating role of firm size, which accepts the last four hypotheses in favour of strengthening the negative effect.

Table 5.7 Result Summary for the Moderating Role of Firm Size

	Firm Size Moderates the Effect of ESG Transparency on Firm Valuation	**Result**
H5a	*Firm size will moderate the positive effect of total ESG transparency on firm valuation such that when firm size increases, the positive effect is larger.*	Rejected
H5b	*Firm size will moderate the negative effect of total ESG transparency on firm valuation such that when firm size increases, the negative effect is larger.*	Accepted
H6a	*Firm size will moderate the positive effect of environmental transparency such that when firm size increases, the positive effect is larger.*	Rejected
H6b	*Firm size will moderate the negative effect of environmental transparency on firm valuation such that when firm size increases, the negative effect is larger.*	Accepted
H7a	*Firm size will moderate the positive effect of social transparency on firm valuation such that when firm size increases, the positive effect is larger.*	Rejected
H7b	*Firm size will moderate the negative effect of social transparency on firm valuation such that when firm size increases, the negative effect is larger.*	Accepted
H8a	*Firm size will moderate the positive effect of governance transparency on firm valuation such that when firm size increases, the positive effect is larger.*	Rejected
H8b	*Firm size will moderate the negative effect of governance transparency on firm valuation such that when firm size increases, the negative effect is larger.*	Accepted

6 Discussion

This chapter evaluates the results to verify how they align with findings from the literature review and conceptual development. It then provides recommendations for various stakeholder groups and describes the limitations of the study which can have implications for future research.

6.1 Interpretation

Direct Relationship

The results of the first four models reflect that total, environmental, social and governance scores are all negatively significantly correlated with P/E in the palm oil sector. These differ from Almeyda and Darmansyah (2019), Abdullah, Hamzah, Ali, Tseng, and Brander, (2020), Orlitzky, Schmidt, and Rynes (2003) and Velte (2017) who found that individual components of E, S or G were more determinant in influencing financial indicators. The results also counter Nofsingera, Sulaeman, and Varma (2019) on the possibility of netting effects and Lam, Zhang and Chien's (2018) mix of positive and negative relationships. Instead, the netting effects of individual E, S and G scores are considered minimal and less heterogeneous. The results show that all three ESG factors in the palm oil sector are strongly linked with one another and must be considered holistically. This aligns with the correlation matrix in Table 5.2 which showed a strong positive relationship between total, environmental, social and governance scores. The 182 indicators in Table 4.2 also reflected that some indicators overlap with one another. For example, attaining 100% traceability not only enhances transparency and ensures good governance, but it mitigates environmental issues associated with deforestation and social issues such as land use conflicts. Initiatives such as companies' NDPE policies and RSPO certifications collectively target to address environmental issues such as deforestation and peatland management, social issues such as exploitation, human conflicts and smallholder inclusion, and governance issues such as weak transparency and traceability.

The direct negative relationship highlights that companies with high ESG transparency are discounted relative to poor performers. This adds to the existing minority of literature that found a negative relationship between sustainability and financial indicators. The negative relationship offers a few insightful perspectives on the palm oil sector. Firstly, an optimistic interpretation would infer that companies with high ESG transparency have low P/E which supports Basu's (1977) view that they potentially have a higher return for their price relative to earnings, making them preferred by investors. High ESG transparency may thus be positively perceived for high returns. However, the findings are also similar to Svensson's (2020) study

on Northern European firms which found a weak negative correlation. In this study, the highest adjusted R-squared is 0.404 in model 1 which tests the total score against P/E, implying that investors concerned with ESG in the palm oil sector are not as focused on high returns. Secondly, the results could be explained by Foo, Glover, Chang, and Pratama (2021), in that companies are trading below peak P/E due to rising scrutiny over ESG risks which resulted in aversion, including those with higher ESG scores. Based on Shen (2000), low P/E could be associated with more growth prospects. This would align with the growing demands for ESG transparency, and anticipated growth in global demand for palm oil, justifying the argument by Foo, Glover, Chang, and Pratama (2021) to encourage mainstreaming sustainable palm oil. Thirdly, the results contradict Jones, et al. (2022) and Temple-West (2020) where high ESG performers were trading at a premium to align with growing regulations or reflect an ESG bubble. In the palm oil sector, high ESG performers are not overvalued relative to poorer ESG performers. The ESG premium is not prevalent among palm oil companies. Overall, it appears that the sector's ESG risks have overridden the prospect of good-performing companies with high ESG transparency that offered a potentially higher return for their price. Good performers are penalised by overall perceptions of the sector. It also suggests that the investing strategy of divestment may dominate more than ESG integration in the palm oil sector. Investors appear to respond weakly to high ESG performers, as highlighted similarly in Krüger's (2015) research that the market responds weakly to positive ESG news. It also revalidates Luo, Meier and Oberholzer-Gee's (2011) finding that high-performing firms were exposed to more liability as they received more attention on negative events. Investors' aversion appears guided by minimising risks through divesting from the sector rather than investing in companies with high ESG transparency. Engagement efforts between investors, financiers, regulators, and companies may still be lacking. Therefore, in summary, ESG transparency does not strengthen valuation in the palm oil sector. Companies with higher ESG transparency are discounted relative to poorer performers. The sectors' ESG risks are likely to have eroded investor confidence and raised perceived financial risks, causing investors to be averse towards the sector as a whole, especially toward good performers. Good performers appear to be penalised more for having higher ESG transparency, but they provide the opportunity for a higher return for having a low price relative to earnings. The aversion towards good performers suggests that palm oil companies need to step up their efforts to minimise ESG risks to restore stakeholder confidence in the sector.

Moderating Role of Firm Size

The results of the last four hypotheses align with previous studies that firm size plays a moderating role in strengthening the relationship between ESG transparency and firm valuation. The larger the revenue or assets, the stronger the negative effect that total, environmental, social and governance scores have on P/E. This revalidates that all three components of ESG are interlinked and have an influence on P/E. The results agree with the notion that larger firms dominate in visibility and hence receive greater media attention on ESG risks (Udayasankar, 2008; Krueger, Sautner, Tang, & Zhong, 2021). Larger firms are also subject to greater reputational, operational and hence financial risks for their impact. P/E ratios of larger firms are likely to reflect more modest expectations of value creation that consider ESG risks. The growth potential of larger companies was eroded as investors became more averse in anticipation of higher financial risks linked to ESG issues. Sime Darby and FGV were among the larger companies that had SPOTT scores of 83.4 and 74.2 respectively, above the average total score. These companies responded to heavy criticisms and sanctions which revalidate that large firms are receptive and have the resources to right their wrongs. Such responses are necessary as they are under greater regulatory pressure such as mandates from listed exchanges to set exemplary standards, and they also have greater stakeholder impact. Meanwhile, smaller companies are likely to be subject to less visibility and less pressure and are equipped with fewer resources to communicate stakeholder transparency about adopting ESG practices.

However, looking at firm size as a control, the results from all eight model tests reflect a conflict that P/E has a significantly positive correlation with market capitalisation as the control, indicating that smaller firms have smaller P/E. When revenue and assets were used as controls for firm size in the first four tests, the relationship is significantly negative. This highlights that while market capitalisation, assets and revenue are three popular measures of firm size, they are theoretically different (Dang, Li, & Yang, 2018). Among the three, only market capitalisation is forward-looking and reflects a firm's growth opportunities. It is the only measure of firm size that is calculated by using the share price at a point in time, which is also used to calculate the numerator for P/E. Thus, market capitalisation is mechanically correlated with P/E. Meanwhile, revenue measures the money flowing from its sales while assets measure a firm's total resources. Both are not forward-looking (Dang, Li, & Yang, 2018). Theoretically, revenue could be negatively correlated with P/E as is it positively correlated with the denominator, earnings per share. Therefore, it would be more appropriate to state that only accounting-based measures of firm size (revenue and assets) have a moderating role in strengthening the negative relationship between ESG disclosure scores and firm valuation.

Overall, the results show that ESG transparency significantly influences firm valuation for companies in the palm oil sector which validate the organisational theories of legitimacy, agency, stakeholder and signalling theories. Companies, that act on behalf of shareholders, need to step up their communication efforts to improve perceptions of the sector by addressing the collective ESG concerns raised by multiple stakeholder groups to signal their commitment to ESG and legitimise their social license to continue operating. By doing so, they minimise reputational, legal and operational risks that can improve their earnings and anticipated growth, and hence overall financial valuation.

6.2 Recommendations

The research findings provide insight for various stakeholders across the palm oil value chain who have important roles in ensuring companies uphold good standards of ESG practices to mainstream sustainable palm oil. All stakeholders should be kept abreast of the related environmental, social and governance issues in the sector, and how companies are responding, to make constructive decisions.

The results of the study provide direction for palm oil companies to consider all aspects of ESG issues seriously as these concerns can impact firm valuation. Companies can better reflect on ESG risks within their operations to pinpoint improvement areas by developing sustainable strategies to legitimise their operations. They need to be proactively aware of the available supporting initiatives to develop practices that accelerate the transition towards sustainable production while meeting future global demand. They should invest in technological capabilities to boost transparency by reporting comprehensive ESG data on accessible platforms. Moreover, they must concurrently provide assurance against greenwashing risks and ensure these efforts are communicated to stakeholders on relevant channels to effectively minimise financial risks associated with compliance, reputational, and operational risks. These efforts will also improve their differentiation and branding across competitors which in turn gains stakeholder trust and enhances accessibility to financial capital. They should also monitor and report their efforts periodically, to track progress and signal accountability to their commitments. With regards to the moderating role of firm size in managing ESG transparency, smaller companies with lesser resources and competencies are encouraged to seek external assistance from governments, financial institutions and NGOs through voluntary initiatives to improve their practices and transparency efforts. Companies can also learn from each other's efforts to strengthen practices and consequently improve overall perceptions of the sector.

The results also prompt financial institutions and investors to increase engagement efforts to discourage divesting to manage financial risks. ESG integration should be embraced by paying more attention to how companies respond to ESG risks, as companies with high ESG transparency present opportunities for higher financial returns. Furthermore, the results support investment analysis that each ESG component is intertwined with one another and must be considered holistically when making investment decisions. As observed by the moderating role of firm size, financial institutions and investors need to develop a more inclusive approach that enables financing for smaller companies that lack capital for certification but perform sustainable practices, to encourage further ESG integration in the palm oil sector. These include upholding higher standards of transparency and going beyond certification criteria such as referencing data reporting and platforms like the SPOTT framework. This incentivises companies to minimise room for greenwashing. It also provides flexibility in investors' due diligence towards the palm oil sector to expand financial opportunities that support more sustainable firms. It will also complement policymaking for financial institutions and reduce the gaps in weak policies that support less sustainable companies. Investors will hence be in a better position to assess the ESG performance of firms.

Similarly, regulators from producing countries, importing countries, and public exchanges which list palm oil companies can strengthen legislation and policy implementation by embedding environmental and social capital more into policy considerations. In addition to having policies that are ban-focused (e.g., moratoria) and dependent on penalties, incentives can be placed to encourage companies to innovate and build a competitive advantage over their peers. This can improve legitimacy and encourage positive investor sentiments about sustainable growth in the sector. Further assistance should also be given to smaller firms that lack the capital and resources so that their standards do not lag behind larger firms. While some public exchanges globally have enforced disclosure requirements for companies, they should enforce more lenient requirements for smaller companies to engage with ESG transparency.

Given the interdisciplinary nature of ESG, governments and companies should engage with specialists across multiple disciplines for improving practices in the sector. For example, scientists and engineers should be involved, as they have the capabilities to better attribute the companies' impact on the environment and develop innovative solutions for improving yields and land use efficiency while addressing environmental risks. Consultants and planners can also be engaged, to improve environmental and social impact assessments of land use change. Environmental assessments can help to address the avoidance of deforestation and peatland degradation that would minimise biodiversity loss, emissions, and the risks of haze

and floods. Social assessments can help establish more complete maps of indigenous and local community groups and develop better methods for grievance mechanisms such as fairer compensation approaches which help to address land use change conflicts. With a more inclusive assessment, environmental and social impacts on the livelihood of local community groups can be improved. Companies would also be able to minimise their financial risks associated with environmental and social issues.

With growing awareness of the sector's ESG impact on financial valuation, NGOs can divert efforts to develop initiatives to identify remaining gaps in practices and unaddressed ESG risks, bolstering companies' efforts. Certification bodies such as the RSPO should continue their progressive efforts to identify more ways of assessing smaller companies, that make certification accessible to companies with good practices. ZSL, which developed the SPOTT framework, should continue to stay informed of updates in the sector and reassess if new types of frameworks would be applicable for tracking progress. They can also work towards making their framework integrated into the various reporting standards, to encourage harmonisation and homogeneity of ESG transparency criteria. WWF could explore more avenues of engaging financial institutions and investors to encourage ESG integration.

The results also educate palm oil consumers on their constructive influence over the sector's ESG impact, such as by encouraging complete traceability. They can create a collective voice that pressures companies to be transparent about their adoption of sustainable practices. Furthermore, they can reassess their consumption habits and adopt other means of due diligence methods such as referencing frameworks like SPOTT when purchasing products containing palm oil and pay more attention to how companies respond to ESG risks.

6.3 Implications for Future Research

As the demand for palm oil is expected to grow with the world population, there is an expected increase in research interest in managing sustainability for the palm oil sector. The study provides a baseline that unlocks many potential areas of research. It is a cross-sectional study that acknowledges the limitation that the data was captured in a snapshot period for one financial indicator. While findings are consistent with P/E ratios assessed in 2021 by Foo, Glover, Chang, & Pratama (2021), the P/E used is based on past earnings to identify sentiment on future value creation which could change with time due to uncontrollable market events such as international crises, inflation or government policies (Almeyda & Darmansyah, 2019). Future research could include analysing longer time frames to assess how the influence of ESG transparency on firm valuation in the sector has evolved with time. Other financial

indicators such as return on assets (ROA) or return on equity (ROE) could also be considered to revalidate consistent drivers of value and strengthen the interpretation of the results.

This study investigates palm oil companies in the SPOTT assessment which are producers, processors and traders in the commodity sector that are most exposed to ESG risks related to palm oil production and have the most control in changing their practices. Future research could also consider companies down the value chain that have influential power in encouraging upstream companies to adopt sustainable practices, such as those in the WWF Palm Oil Buyer's score card for a more complete picture of the sector's supply chain.

As the study uses publicly listed companies that are under significant pressure and are differentiated to be more sustainable, little insight is provided about companies that are not publicly listed, including private companies and smallholders who make a substantial contribution to production. This warrants future research for investigating the effects of ESG disclosure scores against other financial indicators if the data of private companies become more accessible and transparent to the public to achieve a more representative view of the sector.

This study also notes that ESG transparency does not equate to implementation on the ground. Baumann-Pauly, Wickert, Spence, & Scherer (2013) finds that multinational companies are frequently better at communicating sustainability without substantial implementation in organisational practices, as opposed to SMEs who poorly communicate the strong implementation of CSR practices. Thus, more in-depth due diligence could be considered by investigating effective implementation in addition to ESG transparency.

7 Conclusion

This paper delves into the wicked problem of supporting ESG integration to provide financing for sustainability in the palm oil sector which is riddled with controversies. By recognising its contributions to global economies, the paper highlights the material ESG issues and consequent financial risks associated with the sector which have been heavily scrutinised by various stakeholder groups. While efforts are growing for companies to improve their practices, a key step to ensuring ESG concerns are met is by engaging in stakeholder transparency through the disclosure of ESG practices, which are supported by regulations, public exchanges, certifications and data and reporting platforms. In so doing, the paper acts within the framework of organisational theories such as legitimacy theory, stakeholder theory, agency theory and signalling theory to justify the connection between ESG transparency and financial indicators. With limited studies in the palm oil sector, this paper draws inspiration from studies conducted in different countries and sectors that found direct relationships between ESG transparency and financial indicators, where some studies used firm valuation as a dependent variable, and included firm size as a moderator that strengthens the relationship. The paper then applies the findings back into the context of research in the palm oil sector and hypothesizes that ESG efforts in the sector could be discounted in terms of firm valuation (P/E), due to increased transparency of ESG risks outweighing the benefits. This builds the hypotheses to examine the direct relationship between ESG transparency and firm valuation, and the subsequent hypotheses that firm size has a moderating role in strengthening the relationship. The study is conducted on publicly listed companies in the palm oil sector globally by referencing ESG disclosure scores from the SPOTT 2021 palm oil assessment for ESG transparency, revenue (and assets for robustness) for firm size, and P/E ratio for firm valuation. As the current literature review is mixed about the direction of the relationship between ESG transparency and financial indicators, the findings add to the existing minority of literature that finds a negative relationship. Companies with higher ESG transparency in the palm oil sector are undervalued and provide the potential for a higher return when compared to those with lower ESG transparency. In addition, the results find that accounting-based measures of firm size act as a moderator, such that when firm size increases, the negative effect is strengthened.

The contributions to existing literature are in five key domains.

Firstly, this study is a unique assessment of the emerging phenomenon of palm oil companies' response to heightened ESG scrutiny. It also answers studies calling for the use of industry-focused ESG frameworks such as SPOTT that is customised for ESG concerns in the sector. The results serve as a baseline for researchers to understand how the direct effect of ESG

transparency on firm valuation and the moderating role of firm size could evolve as the sector progresses in its efforts towards sustainable production.

Secondly, this study develops a better understanding of the implications of ESG transparency on firm valuation indicators such as P/E, which is commonly used by investors and financial institutions. The results provide awareness about sentiment towards the adoption of ESG transparency among palm oil companies and encourage companies to explore areas to improve perceptions of the sector.

Thirdly, for policy, regulators in the sector are still looking to improve their approaches. This study marries a holistic set of non-financial indicators with firm valuation in the palm oil sector, identifying opportunities for policy improvement and providing better assurances of validity for policymakers as they strengthen their regulations in the palm oil sector, which can be extended to other agricultural commodities.

Fourthly, this study helps NGOs to better distinguish unaddressed gaps in ESG practices to create new or enhance existing voluntary initiatives to accelerate the transition to sustainable palm oil. These include expanding their engagement efforts with different stakeholder groups, improving the defining criteria for sustainable practices and making them consistent across reporting standards.

Lastly, consumers can gain more awareness of their collective impact in influencing sustainable palm oil. They can attain more clarity about the ESG concerns and efforts to improve sustainability in the sector so that they can exercise better judgement when making decisions about consuming products with palm oil.

The study highlights avenues for future research by acknowledging limitations in the study. Although the study finds a negative relationship between ESG transparency and firm valuation, these results represent a snapshot in time and may not represent the sector's status indefinitely. Future studies that include more cross-sections in time and more measures for firm valuation may be needed for a better understanding of the sector. Moreover, the palm oil companies in scope can also be extended to include private companies not publicly listed, and those down the supply chain such as buyers, for a more complete representation of companies in the sector.

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Appendix I – List of Sample Companies

AAK AB
Anglo-Eastern Plantations plc
Archer Daniels Midland Company (ADM)
Astra Agro Lestari Tbk PT
Austindo Nusantara Jaya Tbk PT
BLD Plantation Bhd (Bintulu Lumber Development (BLD) Plantation)
Boustead Plantations Bhd
Bumitama Agri Ltd
Bunge Ltd
Dharma Satya Nusantara Tbk
FGV Holdings Bhd
First Resources Ltd
Genting Plantations Bhd
Gokul Agro Resources Ltd
Golden Agri Resources Ltd
Hap Seng Plantations Holdings Bhd
Indofood Agri Resources Ltd
IOI Corporation Bhd
ITOCHU Corporation
Kencana Agri Ltd
Kuala Lumpur Kepong Bhd
M.P. Evans Group plc
Mewah International Inc
Nisshin OilliO
POSCO International
QL Resources Bhd
R.E.A. Holdings plc
Sampoerna Agro Tbk PT
Sarawak Oil Palms Bhd
Sawit Sumbermas Sarana Tbk PT
Sime Darby Plantation Sdn Bhd
SIPEF
TSH Resources Bhd
Tunas Baru Lampung Tbk PT
United Plantations Bhd
Wilmar International Ltd