# Description of 9-class Environmental, Social and Governance (ESG) Classification

We establish our ESG topics framework, which includes eight distinct ESG topics and a non-ESG class, after surveying the ESG framework by MSCI, Refinitiv, Sustainability Accounting Standards Board, and Institutional Shareholder Services. The closest to our framework is the MSCI ESG Key Issues, which is used by most ESG Exchange-Traded Funds (SquareWell, 2021).

The eight ESG topics include three in **Environmental**: *Climate Change*, *Natural Capital*, and *Pollution and Waste*; three in **Social**: *Human Capital*, *Product Liability*, and *Community Relations*; and two in **Governance**: *Corporate Governance* and *Business Ethics & Values* (see Appendix for detailed descriptions and examples).

We obtain the training sample from CSR reports, proxy statements and annual reports of 55 S&P 500 firms. Specifically, we first sort S&P 500 firms in 2019 into quintiles by total assets within each of the 11 two-digit GICS sector and select the largest firm in each subgroup. We then download all available CSR reports from firms' websites and proxy statements as well as annual reports from EDGAR. We randomly select 24,380 sentences from CSR reports and 7,420 sentences from proxy statements and keep sentences covering only one of eight ESG topic, including 2,418 sentences labeled as *Climate Change*, 1,060 as *Natural Capital*, 1,568 as *Pollution & Waste*, 2,221 as *Human Capital*, 636 as *Product Liability*, 1,313 as *Community Relations*, 4,264 as *Corporate Governance*, 795 as *Business Ethics & Values*. Lastly, we randomly select 2,750 sentences from MD&A sections of annual reports and keep 2,582 of them not discussing ESG issues as *Non-ESG*. Our final training sample include 16,857 sentences. Following Huang, Wang and Yang (2022), we use 81% of the sentences as training, 9% as validation, and 10% as testing. The following figure plots *Precision* and *Recall* of each topic.

Precision and *Recall* in the Nine ESG Topics

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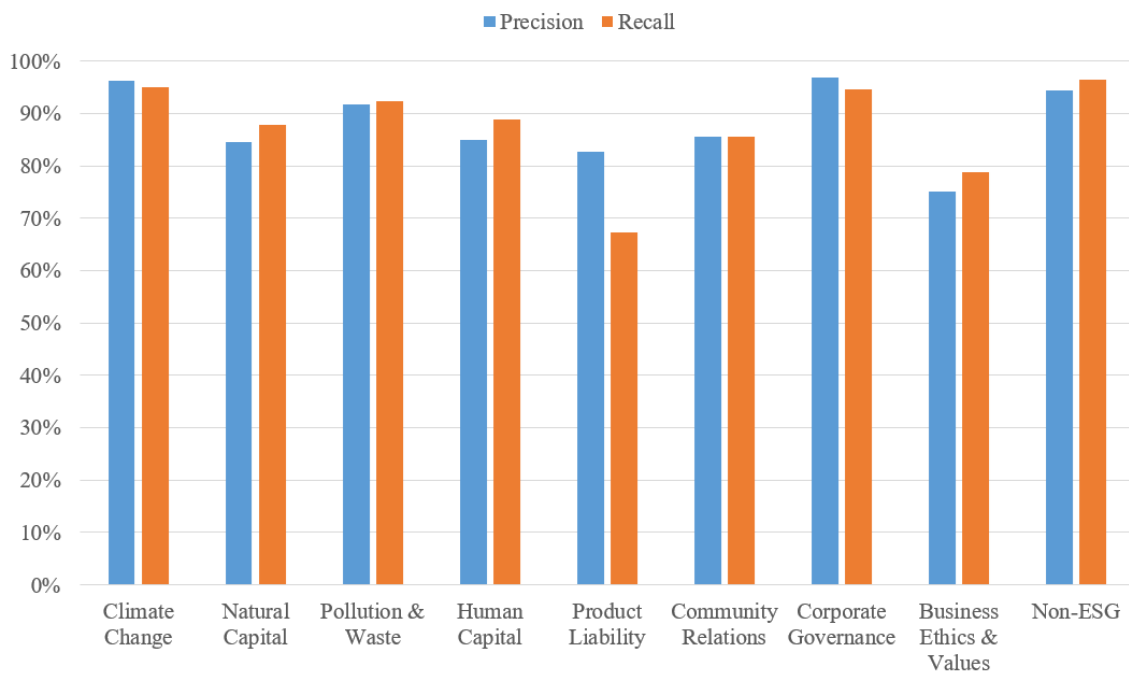
We calculate overall *Accuracy* (the number of sentences correctly classified scaled by the total number of sentences in the testing sample), mean *Precision* (the number of sentences correctly classified into a category scaled by the total number of sentences classified into that category), mean *Recall* (the number of sentences correctly classified into a category scaled by the number of sentences researchers label as that category), and mean F_1 *score* (the harmonic mean of *Precision* and *Recall*). FinBERT achieves *Accuracy* of 91.04%, mean *Precision* of 87.98%, mean *Recall* of 87.38%, and mean F_1 *score* of 87.58% in the testing sample.

Appendix: Detail description and examples of the eight ESG topics:

Climate Change: This topic includes discussions about carbon emissions or climate change, including initiatives to increase carbon efficiency, environmental technologies, renewable energy, and the development or refurbishment of buildings with leading ecological design features. The following are some examples:

- *We are also excited about our commitment to securing 100% of our purchased electricity from renewable sources by 2025, reducing our operational carbon footprint by 30%.*
- *In 2018, we acquired a 43.83% interest in Silicon Ranch, a leading US developer, owner, and operator of solar assets. In 2019, Silicon Ranch announced the launch of a program that combines clean electricity generation with carbon sequestration and ecosystem restoration.*
- *Beginning in 2012 through the end of 2016, we have converted 19 plants from coal to natural gas or steam.*
- *40% of our operations are to be certified under a green building standard by 2018.*

Natural Capital: This topic includes discussions about water stress, biodiversity, land use, and raw materials sourcing. For water stress, we include discussions of how companies manage risks of water shortages, such as by employing efficient water processes, water recycling, and alternative water sources. For biodiversity and land use, we include discussions about programs and policies designed to protect biodiversity and address community land-use concerns. For raw materials sourcing, we include discussions about policies and procedures to source materials with lower environmental impact, such as seafood/aquaculture, timber/paper, palm oil, beef/dairy, leather, and cotton. The following are some examples:

- *This year, we continued Stella Artois' Buy a Lady a Drink program with Water.org, which aims to tackle the global water crisis. Having to date supported nearly 800,000 people, we recently announced our ambition to provide access to safe water to 3.5 million people in the developing world by 2020.*
- *At the chemical complex in the Netherlands, our biodiversity action plan has helped maintain a variety of flora and fauna. It has also raised awareness about biodiversity among technical staff. For example, in 2019, planned maintenance work was adjusted after operators found a protected bird species nesting in equipment.*
- *100% of the paper used in our U.S direct marketing efforts was certified to be from sustainably managed forests.*

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- *During the period, Kimco remediated soil as a part of major development or redevelopment projects at the following locations: Dania Pointe (Dania Beach, FL), Suburban Square (Ardmore, PA), Lincoln Square (Philadelphia, PA).*

Pollution and Waste: This topic includes discussions about toxic emissions, packaging materials, and electronic waste. For toxic emissions and waste, we include discussions of pollution, contamination, and emission of toxic and carcinogenic substances and wastewater. For packaging materials and waste, we include discussions of product packaging content and end-of-life recycling or disposal of packaging materials. We include discussions about the recycling and removal of end-of-life electronic products for electronic waste. The following are some examples:

- *We also have programs in place to reduce the number of operational spills over the long term. In 2019, we continued to carry out vital work to clean up Bodo, an area badly affected by oil spills.*
- *Through lightweighting and packaging reduction initiatives, we have reduced the amount of packaging we use by 126,800 tons since 2012, exceeding our 2017 reduction goal of 100,000 tons a year early.*
- *All of these programs reduce waste and encourage reuse by ensuring that valuable products can go back into the hands of customers rather than being sent to landfills.*
- *Several years ago, we saw an opportunity to create a single streamlined solution for tenants that could provide them with more reliable and cost-effective waste services.*

Human Capital: This topic includes discussions about labor management, health and safety, human capital development and training, and supply chain labor standards. For labor management, we include discussions workforce management, risk of workflow disruptions, labor productivity issues, employee diversity, and pay equality (non-executive). For health and safety, we include discussions of employee health and safety (H&S) programs such as H&S policies and their implementations, H&S training, and safety certifications. For human capital development and training, we include discussions of the ability to attract, retain, and develop human capital based on benefits, training, development programs, and employee engagement provided. For supply chain labor standards, we include discussions of supply chain production disruptions and brand value damage due to sub-standard treatment of workers in the company's supply chain or reliance on raw materials that originate in areas associated with severe human rights and labor rights issues (e.g., slave labor and child labor). The following are some examples:

- *We provide formal channels to guide colleagues and leaders on decisions related to flextime, part-time, compressed work weeks, job sharing, and remote work.*
- *We use technology systems on our trucks to track driver behaviors, which has increased accountability among our managers and resulted in a reduction in speeding and safer fleet operations.*
- *Enterprise Leadership delivers targeted leadership development programs to colleagues at specific stages of their careers.*
- *This can lead to unfair treatment of workers, which is why we continue our efforts to source secondary raw materials in a way that's aligned with our "Fair and Equal" agenda.*

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Product Liability: This topic includes discussing product safety and quality, privacy and data security, chemical safety, consumer financial protection, and health and demographic risk. For product safety and quality, we include discussion of product recalls, losing customer trust through product quality concerns, or product safety and quality certifications. For privacy and data security, we have discussions of data security breaches, the controversial use of personal data, and company data privacy policies and data security management systems. For chemical safety, we include discussions of the use or presence of chemicals of concern and procedures relating to chemical safety and its impact on customers. For consumer financial protection, we include discussions of the transparency of financial products based on borrowers' ability to repay and initiatives to protect customers through product transparency. For health and demographic risk, we include discussions of public health trends and demographic changes, growth opportunities in the market for healthier products, and improved nutritional profiles. The following are some examples:

- *Our products are designed and tested to comply with all applicable safety regulations in the countries where the products are sold.*
- *Information Security oversees a comprehensive program to help predict, protect, detect, respond to, and recover from cyberattacks.*
- *For example, we have phased out any chemicals suspected of causing medical reactions or harm.*
- *The Smarter CreditTM Center includes resources to help customers understand, build, and improve credit, as well as manage debt and plan for large purchases.*

Community Relations: This topic includes discussions of a firm's interaction with its local communities, including access to communications, access to finance, and access to healthcare. We include discussions about opportunities in historically underserved markets, such as developing countries and underserved populations, and relevant philanthropic efforts. The following are some examples:

- *We've gone from sourcing 70% of barley locally in 2014 to 86% in 2016, and we're on track to achieve 100% local sourcing by 2017.*
- *In addition, we have committed to a package of public interest commitments, which include a commitment to invest 1 billion ZAR in areas including supporting smallholder farmers and enterprise development.*
- *We aim to improve access for local people to health care and treatments for diseases such as cancer.*
- *Participants volunteer for significant causes such as disaster relief, hunger, medical research, home building or youth mentoring, and groups are encouraged to serve together as a means of multiplying their impact and fostering team spirit.*

Corporate Governance: This topic includes discussions on shareholders and ownership, board of directors, executive pay, and internal controls. For shareholders and ownership, we include discussions regarding ownership structure, control structure, and shareholders. For the board of directors, we include discussions of the board's independence from management, board skills and diversity, and board effectiveness. For executive pay, we include CEO and other executives' pay practices and

specific pay figures, performance incentives, and overall pay plan design. For internal control, we consider internal controls, audit matters, audit committee matters, and internal audit matters. The following are some examples:

- *Based on filings made under Sections 13(d) and 13(g) of the Securities Exchange Act of 1934, as amended, as of December 31, 2020, the only persons or entities known by us to be a beneficial owner of more than 5% of our common stock were as follows.*
- *Our Board is composed entirely of independent directors other than our chairman and CEO, and is diverse, with diversity reflecting gender, age, race, ethnicity, background, professional experience, and perspectives.*
- *We announced plans in 2018 to link executive remuneration to short-term targets to reduce the Net Carbon Footprint of the energy products we sell, including our customers' emissions from their use of our energy products.*
- *The appointment by the Audit and Compliance Committee of the Company's Board of Directors of PricewaterhouseCoopers LLP, as an independent registered public accounting firm for the Company, to audit the financial statements of the Company and its subsidiaries for 2022 is hereby ratified and approved.*

Business Ethics and Values: This topic includes discussions about ethical components such as a firm's values and controversies. We include discussions about the ethical conduct of business, fraud, corruption, bribery, fiduciary responsibilities, conflicts of interest, misrepresentation, bias, negligence, political contributions, negative accounting events, and other behaviors which may have ethical components. The following is an example:

- *At the heart of our culture is what we call our Blue Box Values – a set of seven guiding principles that every employee pledges to embrace and work by each day.*
- *Huntington is dedicated to uncompromising integrity in all that it does and how it relates to its internal colleagues and to persons outside Huntington.*
- *In reaching this settlement, we neither admitted nor denied the claims in the order and agreed to pay a civil monetary penalty of $5.5 million.*
- *In addition, certain private parties as well as state attorneys general and other antitrust authorities may challenge the transactions under U.S. or foreign antitrust laws under certain circumstances.*

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