

# ESG Disclosures in the Private Equity Industry\*

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## Abstract

This paper offers the first systematic evidence on environmental, social and governance (ESG) disclosures provided by a global sample of private equity (PE) firms. Using historical websites from 2000 to 2021, we develop a novel measure of voluntary PE firm ESG disclosures. We find that these disclosures have been increasing over time, irrespective of the firms' investment strategy, size, listing status or investment location. We investigate disclosure determinants and document that PE firms' ESG disclosures are associated with mandatory ESG regulations aimed at publicly listed firms in countries of PE firms' portfolio companies. ESG disclosures also increase when PE firms voluntarily sign up to United Nations' standards of responsible investing and around fundraising events. Finally, we examine whether PE firms' ESG disclosures match their investment activities. We find that PE firms with high environmental disclosures target portfolio companies with lower environmental toxic releases. Further, the funds of PE firms with high ESG disclosures achieve better returns. Overall, these findings indicate that PE firms' take actions consistent with their ESG disclosures.

**Keywords:** Private Equity, Financial Reporting, ESG Disclosures, Voluntary Disclosures, ESG Investing, Value Creation, Fund Performance

**JEL Classifications:** M41, G32, G34, G12

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## 1. Introduction

The assets under management in the global private equity (PE) fund industry have increased over the past decade at a rate of about 10% per year, reaching over \$5tn at the end of 2021, and are forecasted to nearly double by 2025 (Economist, 2020; Preqin, 2022). Also, the latest U.S. data in 2021 suggest that PE firms raised nearly \$425bn in capital compared to an IPO volume of less than \$150bn (see Figure 1). Despite the PE industry's greater economic importance, there is very limited evidence on the disclosure practices of PE firms because PE firms are typically not subject to financial reporting mandates.<sup>1</sup> We fill this research gap by developing a novel measure of environmental, social, and governance (ESG) disclosures provided voluntarily by PE firms. We investigate determinants of PE firms' ESG disclosures and whether these disclosures are reflected in PE firms' investment activities at the portfolio company level and in the performance of the PE funds.

ESG disclosures and the associated investment activities of PE firms are important to assess for several reasons. First, because PE firms typically provide only limited disclosures in general and face relatively little regulatory scrutiny, a growing concern has been that PE firms invest in assets with low ESG performance but attractive financial returns, undermining the overarching goal of worldwide ESG regulation (e.g., Economist, 2022). Second, the PE industry's increasing size and the predominantly institutional investor base suggest that PE firms receive a significant amount of capital from global investors who demand ESG-related information (e.g., Kreutzer, 2011; Amel-Zadeh and Serafeim, 2018; Cohen, Kadach, Ormazabal, 2022; Bourveau, Chowdhury, Le, Rouen, 2022). In light of this greater demand for ESG information, we expect that the relative importance of ESG disclosures across all types of disclosures should be particularly high since the overall financial transparency of PE firms is low. Third, the PE industry's investments can have a meaningful ESG impact. PE funds often acquire significant stakes in private companies, thus having a strong and direct

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<sup>1</sup> The PE industry's assets under management cover buyout, growth and venture capital fund. Given that PE firms raise capital for their funds from sophisticated institutional and high net-worth individual investors, regulators like the SEC did not think it was necessary to impose disclosure mandates. However, as PE firms received more capital from institutions supported by public money that are subject to disclosure requirements (e.g., government agencies, university endowments or public pension funds), the industry faced increased pressure for greater transparency. This trend has potentially contributed to more voluntary and transparent information disclosures by PE firms.

impact on portfolio companies' decisions and affecting many employees, company owners and government-related entities. Fourth, in contrast to other investment issues, ESG matters are less likely to be subject to non-disclosure agreements signed between the PE firms and their investors. As a result, PE firms are more likely to discuss ESG aspects publicly. Finally, understanding the drivers and associated actions of firms' ESG disclosures is important, as highlighted by the recent financial reporting policy debate (e.g., Christensen et al., 2021; Yoon and Serafeim 2022).

To measure PE firms' ESG disclosures, we use information from PE firms' historical websites which are available through the Wayback Machine over the 2000-2021 time period. Absent any disclosure mandate, PE firms' websites constitute the most comprehensive public source of information on the objectives, strategies, activities, and achievements of PE firms. Also, historical websites allow us to observe timely ESG disclosures of a representative and global sample of PE firms. We construct an annual measure of PE firms' ESG disclosures by scaling the number of ESG-related keywords mentioned on a PE firms' historical website by the total website word count.<sup>2</sup> We apply a textual analysis algorithm to the unstructured website text data and use a dictionary sourced from the United Nations Principles of Responsible Investing (UN PRI) Reporting Framework glossary which allows us to separately capture environmental, social, and governance-related topics. On average, we observe 26 ESG-related words per 10,000 total words on a PE firm's website.

We source our main PE firm sample from the Preqin Private Equity Database which provides details about PE firms, including their website, but also information about the firms' funds under management or portfolio companies. We focus on English language websites and successfully locate and match the websites of 5,873 PE firms with the Wayback Machine data. For a subset of these firms, we are also able to obtain portfolio company information (approximately 2,500 firms) and fund

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<sup>2</sup> The Wayback Machine is an archive of digital content maintained by the Internet Archive, a non-profit library of millions of free books, movies, software, music and websites. We follow a similar approach to that employed by Boulland, Bourveau, and Breuer (2021) who create a standardized measure of website disclosures for publicly listed firms using the Wayback Machine. Our use of website disclosures also shares the motivation of other papers that use online media to study timely firm disclosures (e.g., Blankespoor, Miller, White, 2014; Blankespoor, 2018 and Jung, Naughton, Tahoun, Wang, 2017). Consistent with the view in this related work, we consider website information a non-traditional form of voluntary disclosure, which can complement traditional financial disclosures but also reflect firms' decision to talk about a wide array of corporate actions.

performance data (approximately 1,300 firms).

We start our analysis with a descriptive presentation of the evolution of PE firms' ESG disclosures over the sample period. We find that, while online information as proxied by the total wordcount increases, the relative importance of ESG disclosures in the overall content increases more strongly, in particular since 2012. While environmental topics have traditionally been the most important, we observe that social and, to a lesser extent, governance issues are being disclosed more frequently in recent years. ESG disclosures increase over time irrespective of the PE firms' investment strategy, listing status, size, location or target portfolio company industry focus. We note, however, that the growth in ESG disclosures is stronger for PE firms based in Europe, larger PE firms, listed PE firms and PE firms investing in industries with greater environmental risks. Despite meaningful increases in PE firms' ESG disclosures over time, we find that their ESG disclosure ratios continue to be significantly below those of publicly listed companies in the S&P 500 index. Overall, these patterns are consistent with the interpretation that, while generally operating in an opaque reporting environment, a growing number of PE firms have responded to the increased focus on climate change and social issues by broadening their corporate mission to encompass all important stakeholders, as well as their investors. This suggests that PE firms' management of ESG risks and the pursuit of ESG opportunities have potentially become increasingly relevant to their value creation potentially by reducing investment risks, identifying new sources of growth for portfolio companies, and increasing the resilience to long term changes in the political and regulatory environment.

In our second set of tests we investigate potential determinants of PE firms' voluntary ESG disclosures. We first assess whether PE firms increase their ESG disclosures in response to arguably exogenous increases in their exposure to geographic markets where ESG disclosures become more prevalent. To this end, we use data on the introduction of ESG disclosure mandates across the world from Krueger, Sautner, Tang, Zhong (2022) and our sample PE firms' investment exposures to individual countries. We then exploit a shift-share design akin to the approach in Bourveau, She, Žaldokas (2020). This identification strategy relies on PE firms' varying exposures to ESG

disclosures made by public peer firms and observable to global investors. We find that PE firms increase ESG disclosures if they are more exposed to, i.e., they invest more in portfolio companies located in, countries where publicly listed firms are subject to ESG disclosure mandates. For example, we document that a 10 percentage point increase in exposure to environmental disclosure mandates is associated with a 2.3% increase in PE firms' environment-related disclosures.<sup>3</sup> Our findings thus highlight an underexplored externality of ESG disclosure regulations: although the introduction of ESG disclosure mandates around the world was targeted at large publicly listed companies (e.g., Christensen, Hail, Leuz, 2021; Krueger et al., 2022), these mandates seem to induce additional disclosures by PE firms investing in these markets. One interpretation is that PE firms likely respond to investors' increased awareness of ESG issues triggered by regulatory mandates in various countries because they compete for the capital of global institutional investors that also have the option of investing in publicly listed firms in those countries.

We next investigate whether PE firms proactively increase ESG disclosures to signal their ESG commitments. Specifically, we exploit the staggered signing up to the UN Principles of Responsible Investment (UN PRI) (Kreutzer, 2011 and Crifo and Forget, 2013 discuss this setting). Using an event-study design, we show that ESG disclosures increase by around 30% for PE firms that have committed to investment practices that follow UN PRI standards, relative to the control PE firms that have not yet committed to UN PRI in the same country and year. Further, we show that ESG disclosures significantly increase in the years leading up to a fundraising event, peak in the year of fundraising, and decrease thereafter. Collectively, these findings show that PE firms' ESG disclosures are also driven by firm-specific endogenous factors such as their ex-ante commitment to focus on sustainable investments and to cater to the demand for information from new fund investors.

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<sup>3</sup> Our results suggest that if a PE firm had a 20% exposure to the U.K. because during the sample period 2 out of 10 portfolio company investments of this PE firm happen in the U.K., the PE firm's ESG disclosures increase by 4-7% after the U.K. introduced mandatory ESG disclosures for all publicly listed U.K. firms in 2013. As in Bourveau et al. (2020), we effectively use a fixed weight to measure exposure because we take the average investment share in a country during the sample period. See also Breuer (2022a) for a discussion of shift-share designs.

In our third set of tests, we examine whether PE firms' ESG disclosures are consistent with PE firms' investment activities. In particular, we assess whether PE firms with relatively more disclosures of environmental topics invest in portfolio companies with better environmental performance. We build on an emerging stream of literature (e.g., Shive and Forster, 2020; Naaraayanan, Sachdeva, Sharma, 2022) and obtain facility-level pollution data from the Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI) which we merge to our PE firms' portfolio firms. We identify a sample of 938 PE-owned portfolio companies owning 2,633 facilities as well as 29,179 facilities that belong to companies not owned by PE firms. We find that PE firms with more environmental disclosures invest in companies owning facilities with significantly lower levels of environmental pollution. Specifically, a 10% higher environmental disclosure ratio is associated with a 2-3% lower level of chemical releases of acquired facilities, holding constant industry-level releases and county-year trends. Further, the level of pollution remains consistently below that of control facilities in the years after the PE transaction. This evidence indicates that PE firms "walk the environmental talk" – firms with high environmental disclosures strategically invest in portfolio companies with ex-ante better environmental performance and these companies continue to display superior environmental performance after the investment.

In the final set of tests, we study the performance of PE funds as a function of PE firms' ESG disclosures. We relate several fund performance metrics obtained from Preqin to our ESG disclosure measures. Across all types of performance metrics (returns, cash multiples, and cash distribution ratios), we document a consistent and statistically significant positive association between ESG disclosures and fund performance. For instance, a one standard-deviation increase in the website-based ESG disclosure is associated with an increase of 4.9% in the net internal rate of return of a fund. We refrain from making causal claims given the potential selection issues around voluntary ESG disclosures. However, we note that our results are robust to controlling for the performance of peer funds, time-varying market-wide PE firm ESG disclosures, fund ages, PE firms' macroeconomic exposures and a host of fixed effects that hold constant country-trends as well as time-invariant PE

firm and fund strategy characteristics. Thus, while suggestive, our findings are consistent with the interpretation that a stronger focus on ESG issues in PE firms' investment strategies, as proxied by website-based ESG disclosures, pays off for PE firms and their investors in the form of successful exits and, thus, superior fund performance.

Our paper makes several contributions. First, to the best of our knowledge, our study is the first to provide systematic empirical evidence on PE firms' ESG disclosures.<sup>4</sup> We do so by following Boulland, Bourveau, Breuer (2021) and developing a novel, transparent, and intuitive measure of PE firms' voluntary ESG-related disclosures using data publicly available on their historical websites. In contrast, prior literature investigating publicly listed firms relies on ESG ratings provided by various data providers that often use conflicting methodologies.<sup>5</sup> We show that PE firms' ESG disclosures have been significantly improving over time and are driven both by country-specific regulations that apply to publicly listed firms but also by PE firms' own commitments to sustainable investment practices. Consistent with disclosure theory and prior evidence for public and industrial companies (e.g., Diamond and Verrechia, 1991; Breuer, Hombach, Mueller, 2020), we argue that PE firms potentially make these commitments to attract capital from institutional investors with a focus on ESG objectives and to potentially increase the chance of making successful investments in companies whose owners and employees care about ESG factors.

Second, we contribute to the wider disclosure literature by examining the ESG disclosures of an understudied set of firms that operate in the private market. Given that the provision of ESG information has become one of the key issues in the policy debate around public company disclosures

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<sup>4</sup> Crifo and Forget (2013) offer some initial survey evidence based on a sample of 72 French PE firms and find that large PE firms have developed a strong focus on ESG issues, largely driven by their investors' demand. Their survey also suggests that PE firms can influence sustainable business practices at their portfolio firms if PE firms consider ESG a strategic element of their investment activities. Crifo, Forget, and Teyssier (2015) provide some experimental evidence suggesting that PE fund managers respond to ESG disclosures of their potential target portfolio companies.

<sup>5</sup> Berg, Kolbel and Rigobon (2022) document significant divergence in the ESG ratings of the six most prominent ESG rating agencies, with a correlation between ratings of only 0.3. Surprisingly, there is even disagreement on objective facts that can be verified from public records. See also Larcker, Pomorski, Tayan, Watts (2022) for a discussion. We believe future research can use our measure to investigate the broader consequences of ESG investing in PE, for instance at the aggregate industry-country level (e.g., Breuer 2021; Breuer and Breuer, 2022), at the level of non-PE-owned peer firms potentially learning from these disclosures (Bernard, Kaya, Wertz, 2021; Breuer 2022b), or in terms of capital reallocation across private and public securities (e.g., Baik, Berfeld, Verdi, 2022; Kim and Olbert, 2022; Minnis, 2022).

(Christensen et al., 2021; Yoon and Serafeim 2022), our evidence complements recent studies on the impact of ESG disclosure regimes on public firms' disclosures and real decision-making (e.g., Darendeli, Fiechter, Hitz, Lehmann, 2022; Fiechter et al. 2022; Rajgopal and Tantri, 2022; Krueger et al.; 2022). We find that ESG disclosures are increasingly relevant across all types of PE firms, even though they are not subject to mandatory financial reporting. Further, we show that the trend in ESG disclosure mandates for public firms spills over to these non-regulated PE firms.

Third, we add to an expanding literature that investigates PE investments and the association between PE ownership and economic outcomes (e.g., Kaplan and Stromberg, 2009; Boucly et al., 2011; Guo et al., 2011; Cohn et al., 2014; Gompers, Kaplan, Mukharlyamov, 2016; Bernstein et al., 2019; Cohn et al., 2022; Olbert and Severin, 2022; Bellon, 2022; Baik, Berfeld, Verdi, 2022). While this literature suggests that PE firms generally create value for their investors by increasing portfolio companies' financial performance, the associated consequences for the broader set of stakeholders like customers, employees, or governments are not unambiguously positive (e.g., Davis et al., 2014, 2020; Antoni et al., 2019; Eaton et al., 2020; Olbert and Severin, 2022; Bellon, 2022). In light of these findings, our study offers new empirical insights that environmental disclosures in the PE industry are associated with investments in portfolio firms with better environmental performance. In addition, we show that more ESG disclosures are associated with better PE fund financial performance.

Finally, our analysis provides new evidence that can potentially inform regulators about PE firms' lack of transparency on ESG initiatives, in the context of recent ESG disclosure mandates for PE firms that address concerns about "greenwashing".<sup>6</sup> We show that PE firms' investment activities are consistent their ESG disclosures suggesting that "greenwashing" might not be salient in our setting. This could be due to the fact that PEs firms disclose to more sophisticated investors who

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<sup>6</sup> "Greenwashing" typically refers to making unsubstantiated claims to investors and other stakeholders that a firm's investment activities are environmentally friendly. The European Union's (EU) Sustainable Finance Disclosure Regulation (SFDR), which came into force in March 2021, requires PE firms that operate within the EU to provide disclosures of sustainability risks to their investors and more publicly on their websites. Similarly, in May 2022, the Securities and Exchange Commission (SEC) issued proposed rules, under the Investment Advisers Act of 1940, that require PE firms employing ESG strategies to report additional information about those strategies to the SEC and to provide more details to their investors.

perform thorough due diligence and may be difficult to manipulate or because extensive regulations can sometimes distort the signaling value of ESG disclosures (e.g., Rajgopal and Tantri, 2022). Our study thus adds to the emerging research providing ambiguous evidence on greenwashing by publicly listed firms and mutual funds (e.g., Li and Wu, 2020; Basu, Vitanza, Wang, Zhu, 2022; Raghunandan and Rajgopal, 2022; Cohen, Kadach, Ormazabal, 2022 and Dikolli, Frank, Guo, Lynch, 2022).

## **2. Data and Sample Construction**

### **2.1. Measurement of PE firm's ESG Disclosure**

To construct our measure of ESG disclosures of PE firms, we obtain historical website records from the Wayback Machine. The Wayback Machine is a digital archive of websites which is maintained by the Internet Archive since 1996 and available at <https://archive.org/web/>. The key feature of the Wayback Machine is that it allows us to track the evolution of websites over time as it periodically crawls the internet to keep a record of all existing and newly created websites (Boulland et al., 2021). We first access the Wayback Machine's Application Programming Interface (API) to collect the historical structure of the PE firms' websites. As Boulland et al. (2021) point out, this rich time series of predominantly text-based website information is a powerful resource to measure the absolute extent of firms' disclosures (e.g., website size or word count) and to conduct content-specific analyses of these disclosures. We then construct an annual time-series for these PE firms' websites for the years 2000 to 2021. When the API provides several snapshots per year, we use the latest snapshot in a given calendar year according to the API's timestamp. Figure C1 in Appendix C illustrates the coverage of Blackstone's website snapshots in the Wayback Machine.

For our main ESG disclosure measure, our algorithm scrapes all URLs of a given PE firm-year snapshot and counts the number of words and the number of ESG words according to the dictionary which we source from the United Nations Principles of Responsible Investing (UN PRI) Reporting Framework glossary (see Table OA.1 in the Online Appendix for details). That is, our algorithm covers the total and ESG word count on the main page and all subpages that are connected via clickable links within the same website snapshot. This measurement approach provides several

advantages. First, given that PE firms are not subject to mandated public disclosures, website information is usually the only source of information available to the public about a PE firm. The lack of alternative communication channels suggests that our disclosure measure is thus less likely to be subject to measurement errors. In addition, an empirical implementation benefit is that website addresses are available for a representative and global sample of PE firms, independent of their age, size or location, and that we can measure ESG disclosures for each PE firm over time. Second, the automatic coding of website information using established keyword dictionaries allows us to collect specific disclosure measures that separately capture environmental, social and governance related topics. As a result, we can run more refined empirical analyses to investigate a specific topic. Third, PE firms' website disclosures are likely to be timely given the firms' continuous interactions with their fund investors and stakeholders in portfolio companies – both sets of counterparties demand timely information and have reputational concerns.<sup>7</sup> Finally, Boulland et al. (2021) document in the case of publicly listed firms that disclosure measures based on website content are a valid proxy for voluntary disclosures and exhibit meaningful cross-sectional and within-firm time-series variation. We expect this variation to also apply to PE firms' website disclosures, especially given that over the last two decades there has been a significant shift in the composition of fund investors in the PE funds across the world with the emergence of more European and Asian institutional investors, family offices, private pension funds and sovereign wealth funds. This new set of investors is likely to have different disclosure expectations.<sup>8</sup>

Figures C2 and C3 in Appendix C show the snapshot with Blackstone's main page and one subpage as of December 28, 2018. We highlight words that are classified as ESG words in boxes. Appendix B provides details on the definition of the ESG ratio. For our final analyses, we use the natural logarithm of one plus the ratio of ESG words per 10,000 words on a given website.<sup>9</sup> We

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<sup>7</sup> The fundraising process for the average fund takes more than 12 months (about 45% of the funds are raised in more than 18 months) and firms raise funds sometimes every two or three years according to the Preqin database.

<sup>8</sup> Traditionally, investors in PE funds used to be mainly North American institutional investors (usually University endowments, foundations and pension funds).

<sup>9</sup> We use this log ratio to account for the skewness in the data and allow for an interpretation of regression coefficients in percentage terms. In robustness tests reported in Table OA.9, we use the inverse hyperbolic sine (IHS) transformation of

proceed analogously to capture the disclosure of environmental, social, and governance topics separately, as well as to measure the importance of positive and valuation-related words (see Tables OA.2 and OA.3 in the Online Appendix for the corresponding dictionaries).

## **2.2. PE Data from Preqin and PE Firm Sample Construction**

We source our PE firm sample from the Private Equity Database provided by Preqin, a market-leading data provider in the alternative asset market. Preqin's private equity coverage includes details about PE firms, their funds, the funds' portfolio companies, and associated fund performance such as fundraising, exits, and financial performance metrics. Preqin sources the data from regulatory filings, press releases, the business press, and website information. In the raw data from Preqin, we observe current and historical information for over 50,000 PE funds managed by over 29,000 PE firms (also referred to as general partner or fund manager in Preqin). As Figure 1 shows, our sample PE firms account for an economically large part of private capital fundraising in the last two decades.

Table 1 presents our sample construction process. We start with the 22,886 unique PE firms for which the Preqin database provides a unique URL. Out of the approximately 60% of websites in English language, we successfully located and matched 5,873 PE firm URLs in the Wayback Machine.<sup>10</sup> We obtain information on the PE firm's address, including headquarter country, the year of its establishment, ownership characteristics, staff numbers, and assets under management (AUM). This information is available for all PE firms as a static snapshot. We use the information provided in the database as of July 2022. Table OA.4 in the Online Appendix presents the distribution of PE firm-year website observations for our sample period. Our sample includes PE firms from around the world. Consistent with aggregate statistics on worldwide PE activity (Preqin, 2022), most sample

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the ESG ratio and document consistent results throughout. Because the IHS transformation is defined for zero values, these findings alleviate concerns related to measurement bias is due to the log-transformation of our ESG Ratio. See also Glaeser and Omartian (2022) for the use of the IHS transformation.

<sup>10</sup> We rely on the English language filter because all our dictionaries (ESG and others) are in English. We use the Python package "langdetect" to determine the language of the website. This package is a part of Google's language detection library that supports 55 languages. We drop a small number of websites with an Alexa rank of below 10,000. This imposition of the Amazon Alexa rank filter allows us to remove websites that see abnormally high traffic and are primarily unrelated to private equity information. In these cases, the URL provided by Preqin was likely inaccurate and often leads to generic websites like search platforms.

firms (54.6%) are incorporated in the U.S. The next-largest home markets of PE firms are the United Kingdom, Canada, and Germany, accounting for approximately 8.1%, 3.4%, and 2.9% of the total number of observations.

Preqin also provides us with data on the portfolio company investments (deals) of the PE firms and the investors (limited partners) involved in these deals. We obtain data on 95,858 deals over the period from 2000 to 2021. The deal data contains information on the portfolio company such as the address, year of establishment, revenue and EBITDA at the time of the deal, the revenue and EBITDA multiples at the time of the deal, deal status, deal size (in USD), and industry membership. We use this information to identify portfolio companies and PE firms' investment exposures across countries and industries. We observe this portfolio company information for approximately 2,500 PE firms.

We also obtain data on the funds raised and managed by the PE Firms. Among other information, we observe details on the fund inception year (its vintage), the fund size (in USD), the lifespan of the fund, the fund strategy, the current status of the fund, the geography and industry focus of the fund, the target IRR and several private capital characteristics. We collect this information for 23,831 funds belonging to 6,327 PE firms. We also retrieve quarterly fund performance data, including quantitative information on the Net IRR, Net Multiple, and Distribution to Paid-in (%) ratio of the fund. Preqin provides this time-series fund performance information for approximately 10,500 funds. In our final analysis, we use information on over 6,000 funds managed by over 1,300 PE firms.

### **2.3. Regulation, Macroeconomic, UN-PRI, and Environmental Pollution Data (EPA TRI)**

In our regression analysis, we use regulatory, institutional, and macroeconomic data from publicly available sources. We obtain the time series on regulatory changes in ESG disclosures from Krueger et al. (2022). Information on whether and when PE firms signed up to the UN PRI is directly taken from the UN-PRI website that provides a full list of the signatories to the PRI.<sup>11</sup> Macroeconomic data on GDP, population, labor force, and female representation in national parliaments comes from the World Bank's Open Data repository (<https://data.worldbank.org/>).

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<sup>11</sup> See the source at: <https://www.unpri.org/signatories/signatory-resources/signatory-directory>

To measure the environmental performance of PE-owned production facilities, we access the detailed documentation of the U.S. Environmental Protection Agency (EPA) on permits and emission levels of its regulated facilities (see Shive and Forster 2020 and Narayanan et al., 2022). Specifically, we use the EPA's Toxic Release Inventory (TRI), which provides time-series data the emissions of specific chemicals.<sup>12</sup> A strength of this dataset is that the EPA oversees and enforces its collection, circumventing misreporting issues in ESG performance data collected by second parties or not subject to meaningful regulatory enforcement (e.g., Bailey, Glaeser, Omartian, Raghunandan, 2022).

In the EPA's TRI dataset, each reporting facility also provides the name of the firm owning the facility and a 6-digit NAICS industry code. We start by merging the PE portfolio company names to the firm names of the facilities in the TRI dataset.<sup>13</sup> Because not all industries are covered by the TRI program and report facilities are, on average larger facilities involved in manufacturing, metal mining, electric power generation, chemical manufacturing and hazardous waste treatment, our sample using these data consist of a subset of approximately 350 PE firms invested in approximately 1,600 portfolio companies which own more than 5,500 facilities reporting to the EPA.<sup>14</sup>

We use information on the different categories of chemicals from the TRI. Specifically, we use total releases as a proxy for overall pollution, but also distinguish between environmentally "harmful" chemicals, as classified in the Comprehensive Environmental Response, Compensation, and Liability Act (CLERC Act) of 1980, the Clean Air Act of 1963, and the Safe Drinking Water Act of 1996, as well as other "less harmful" chemicals. We use both data on the complete universe of reporting facilities and on the facilities owned by our PE firms' portfolio companies. In addition, we

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<sup>12</sup> The data are available at <https://www.epa.gov/toxics-release-inventory-tri-program>.

<sup>13</sup> We first employ a direct match on names of portfolio firms (deal data from Preqin) with the names of the firms to which the facility belongs (from TRI). We clean name extensions and suffixes (for example, LTD., LLC., CO., etc.). We then employ a fuzzy text matching algorithm. We retain matches with a similarity score of at least 90%. Finally, these matches were manually reviewed by an independent research assistant for accuracy. For the final analysis, we retain only those matches that were manually classified as correct matches based on the original names.

<sup>14</sup> Further, not all facilities in covered sectors are required to report. See <https://www.epa.gov/toxics-release-inventory-tri-program/tri-covered-industry-sectors>. Given the specific set of covered industries, we restrict the sample of our PE firms' portfolio companies' industries before applying the fuzzy matching algorithm. We use the following list of industries: "food", "chemicals", "oil & gas", "electronics", "biopolymers", "biotechnology", "bottling", "automobiles, other vehicles & parts", "agribusiness", "construction", "energy storage & batteries", "forestry & timber", "hardware", "heating, cooling & ventilation equipment", "industrial machinery", "logistics & distribution", "materials", "mining", "packaging", "pharmaceuticals", "power & utilities", "semiconductors".

use the data on all reporting facilities in the database to construct a time-varying benchmark toxic release values to gauge the relative or abnormal level of emissions of the facilities of interest.

### **3. Descriptive Statistics on ESG Website Disclosures in the Private Equity Industry**

#### **3.1. Summary Statistics**

Table 2 presents summary statistics on the variables used throughout our analysis. We present the number of observations, the mean, the standard deviation, the 5th percentile, the median and the 95th percentile for the main variables of the analyses. The table is structured by the different categories of variables used in the analyses: PE firm website disclosure variables, variables of interest (determinants of PE ESG disclosures), toxic release variables level from EPA-TRI, PE Fund financial performance variables from Preqin, and control variables from Preqin, and the World Bank. We provide variable definitions in Appendix A.

The sample mean for our main ESG disclosure measure of interest, *Log. ESG Ratio*, is 2.35, and the sample mean of the raw *ESG Ratio* is approximately 26 ESG-related words per 10,000 total words on a PE firm's website. Consistent with the website size-based voluntary disclosure measure in Boulland et al. (2021), we document significant variation in our ESG disclosure measure. The standard deviation in the raw *ESG Ratio* is 36, and the within-firm standard deviation is 22 (untabulated). Consistent with the findings in Boulland et al. (2021), these statistics suggest that our ESG disclosure measure exhibits significant cross-sectional and firm-level variation, which we exploit when studying the determinants and associated outcomes of PE firms' ESG disclosures in the following sections. We note that most of the ESG-related words fall into the "environmental" category, followed by "social", while "governance"-related topics are the least frequent.

#### **3.2. The Evolution of ESG Website Disclosures in PE**

We start the descriptive analysis of our novel PE firm ESG disclosure measure by exploring its evolution over the sample period. Figure 2 shows the evolution of PE firms' ESG disclosures on their websites from 2000 to 2021 using separate lines based on average annual values for *Log. ESG Ratio* and the individual components of the ESG ratio, environmental, social, and governance topics.

The figure also presents bars for the evolution of total word counts on PE firms' websites. Based on the full sample in Panel A, we note that the overall information content, as proxied by the total wordcount, on PE firms' websites increases. At the same time, the relative importance of ESG disclosures increases more strongly, in particular since 2012. These patterns in PE firms' disclosures are in line with the PE industry's pledge to focus less on pure financial returns and more on sustainable investments (Kreutzer, 2011; Cumming, 2021; Kenan Insight, 2022; PRI Blog, 2022). As of 2021, the mean (median) sample PE firm discusses 35 (22) ESG-related words for every 10,000 words on their website. While environmental topics have traditionally been the most important, we observe that social and, to a lesser extent, governance issues are being disclosed more frequently in recent years. In Panel B, we reproduce the statistics by focusing on a balanced sample since 2008.<sup>15</sup>

In Panel C, we formally assess the time trend in ESG disclosures. From 2003 onwards, we find statistically significant increases in each year relative to the starting year of the sample period (2000). By 2009, the relative importance of ESG words on PE firms' websites had doubled. By 2020, the ESG Ratio was 200% larger than at the beginning of the sample period. Results from several regressions which control for total word count, positive and valuation words, and using a balanced sample confirm the finding that the importance of ESG disclosure in the PE industry significantly increased in the last two decades (results reported in Table OA.8 in the Online Appendix).

### **3.3. ESG Website Disclosures by Country, Strategy, and Industry**

In Figure 3, we examine the evolution in PE firms' ESG disclosures by PE firm characteristics. Panel A shows that the growth in ESG disclosure is stronger among European, including U.K., PE firms relative to U.S. firms. Panel B shows that PE firms exhibit no discernible differences in ESG disclosures based on their main investment strategies. In Panel C, we observe higher ESG disclosures for the small sample of listed PE firms. This pattern is consistent with listed PE firms being subject to more mandatory disclosure regulation, including the disclosure of ESG-related information. Panel

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<sup>15</sup> Studying the consistency for a balanced sample since 2008 helps mitigating potential measurement issues due to changes in technical standards in the web. From 2008 on, most firms had departed from using JAVA and followed a consistent technical standard.

D shows average values in the ESG disclosure measure by PE firm size, measured using assets under management. While PE firms in the largest size quintile disclose the most ESG-related content, we observe consistent levels of ESG disclosures across all other size groups.

Figure 4 plots average ESG disclosures by country and industry of PE firms' portfolio company investments. In Panel A, we document that PE firms disclose more ESG information when they invest in countries in which ESG and CSR disclosures are more prevalent (both through voluntary disclosures by companies and regulatory mandates) such as in the U.K. or the European Union (Fiechter, Hitz, Lehmann, 2022). In Panel B, we see larger ESG disclosures when PE firms invest more in industries with greater exposure to environmental risk (such as Mining, Utilities, and Agriculture) or with arguably green technologies (such as Software and Renewable Energy).<sup>16</sup>

### **3.4. Benchmark to Publicly Listed Companies**

A natural question is whether PE firms' ESG disclosures on their websites are distinct from those of publicly listed industrial companies. We expect that this is the case for several reasons. First, PE firms are typically not subject to financial reporting mandates and operate in an opaque environment (e.g., Katz, 2009). Thus, their overall disclosure level should be low. Second, given outside stakeholders have little to no access to financial disclosures of PE firms, the qualitative information disclosed on PE firms' websites have a more unique, and less complementary, characteristic relative to website disclosures of publicly firms as studied in Boulland et al. (2021). Third, PE firms have a distinct business model: attracting capital to invest this capital on behalf of their limited partners, such that the voluntary disclosures are likely consumed by a more concentrated set of investors relative to the large and diverse set of shareholders of publicly listed firms.

To explore this question, we derive ESG disclosure metrics for publicly listed firms included in the S&P 500 index using the same methodology we apply when collecting the data from the PE firms' websites. We then plot the evolution of U.S.-based PE firms' and S&P 500 firms' ESG

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<sup>16</sup> Table OA.7 in the Online Appendix plots average ESG disclosure values for the complete list of industries in our data with industry information on portfolio companies sourced from Prequin.

disclosures in Panel A of Figure 5. We observe that PE firms' ESG disclosures are on average lower but follow a consistent growth path in the sample period. Publicly listed firms' ESG disclosures, instead, exhibit a stronger volatility over time. These findings are consistent with public firms' voluntary disclosures being responsive to specific events (Boulland et al., 2021), while the persistent increase in PE firms' ESG disclosures likely reflects PE firms' commitment to focus on ESG performance given the scrutiny of their relatively sophisticated investors. While PE firms' ESG disclosures are on average lower than those of public firms, we note that the increasing trend in PE firms' ESG disclosures is economically important, in light of the size of capital managed by PE firms relative to the size of the public capital market in many countries.

#### 4. Drivers of PE Firms' ESG Disclosures

##### 4.1. Exposure to ESG Disclosure Regulation

###### *Setting and Empirical Design*

Our first set of tests on the determinants of PE firms' voluntary ESG disclosures explores whether ESG disclosure mandates impact PE firms' ESG disclosures. PE firms are not directly affected by ESG disclosure rules because mandatory ESG disclosures regulate large publicly listed firms (e.g., Christensen et al., 2021; Krueger et al. 2022). However, PE firms could adjust their own disclosures if mandatory ESG disclosure rules in countries of their portfolio companies change. The reason is that ESG disclosure mandates increase the overall availability of ESG information on publicly listed firms in a given country (Fiechter et al., 2022), and PE firms compete for the capital of global institutional investors that can reallocate capital across PE and the public market (Kim and Olbert, 2022; Minnis, 2022). To examine the impact of mandatory ESG disclosures for public firms on PE firms' disclosure choices, we estimate the following model using ordinary least squares (OLS):

$$\text{Log. ESG Ratio}_{i,t} = \alpha_0 + \beta_1 \text{ESG Regulation Exposure}_{i,t} + X\phi + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad (1)$$

*Log. ESG Ratio* is our ESG disclosure measure of interest, defined as the natural logarithm of one plus the number of ESG words per 10,000 words on the website of PE firm  $i$  in year  $t$ .<sup>17</sup> *ESG Regulation Exposure* is the extent to which a PE firm is exposed to a change in worldwide ESG regulation. Specifically, we measure *ESG Regulation Exposure* as the sum-product of a PE firm  $i$ 's investment share in a given country and an indicator variable equal to one if there is an ESG disclosure mandate for publicly listed firms in that country in year  $t$ . We define the investment share as the number of portfolio company investments in a given country scaled by the total number of portfolio company investments made throughout the sample period.<sup>18</sup> We obtain ESG disclosure mandates by country and year from Krueger et al. (2022). We tabulate the years of ESG disclosure mandate introductions by country along with the number of PE firms' portfolio company investments in these countries in Table OA.5 in the Online Appendix. We use standard errors clustered at the PE firm level as we do not rely on a clustered sampling process and the treatment variable (exposure to worldwide ESG disclosure regulation) varies by PE firm (Abadie, Athey, Imbens, Wooldridge, 2022).

$X$  is a vector of control variables. Specifically, we include a PE firms' disclosures of positive and valuation-related words to control for concurrent changes in the general sentiment or financial performance. We also include several investment exposure-weighted macroeconomic characteristics of the countries in which PE firms operate to isolate the variation from ESG regulation changes in these countries on PE firms' ESG disclosure choices.<sup>19</sup>  $\alpha_i$  denotes PE firm fixed effects, absorbing

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<sup>17</sup> We use the logarithm to account for skewness in the data and allow for an interpretation of regression results in percentage terms. Our results are robust to using the inverse hyperbolic sine transformation of the ESG ratio.

<sup>18</sup> The investment share is a fixed exposure weight because we effectively use a sample average value as the weight. We do not use weights based on investment shares in the first sample year due to the lack of sufficient variation, i.e., number of portfolio company investments, as of 2000. Consider a PE firm making ten portfolio company investments throughout our sample period and two of those are in the U.K, three in Germany, and five in the U.S. The investment share in the U.K. is 20%, in Germany 30%, and in the U.S. 50%. The U.K. introduced mandatory ESG disclosures for publicly listed firms in 2013, Germany did so in 2016, and the U.S. has no mandatory regime in place until today (Krueger et al. 2022, see also Table OA.5 in the Online Appendix). For this exemplary firm, the *ESG Regulation Exposure* variable will be 0 before 2013, 0.2 in 2013, and 0.5 from 2016.

<sup>19</sup> These variables are constructed analogously to the ESG regulation exposure variable. For example, consider a PE firm making ten portfolio company investments throughout our sample period and two of those are in the U.K, three in Germany, and five in the U.S.. Then, the investment exposure-weighted GDP variable in the year 2012 will be the sum of 0.2 times GDP in the U.K. in 2012, 0.3 times GDP in Germany in 2012, and 0.5 times GDP in the U.S. in 2012. Thus, a shock to GDP in the U.S. in 2012 affects this PE firm relatively more compared to another firm which has a U.S. investment exposure of less than 50%.

time-invariant omitted variables by PE firm, and  $\alpha_t$  denotes year fixed effects, absorbing unobserved time trends that affect all PE firms. In additional specifications, we include separate year fixed effects for PE firms of given size groups, as overall economic trends might affect large PE firms differently than small firms due to differences in fundraising and fund deployment opportunities. Further, the trend in ESG investing might have affected larger PE firms more dynamically in our sample period as large PE firms' limited partners showed an early interest in ESG issues (Kreutzer, 2011).<sup>20</sup>

Our identification strategy in Eq. (1) relies on PE firms' varying exposures to ESG disclosures which are made by public firms and are observable to global investors. We measure exposures using the introduction of ESG disclosure mandates in the countries in which a PE firm is invested. Because we consider a constant average PE firm investment exposure throughout the sample period, this empirical approach is akin to a shift-share design as used in Bourveau et al. (2020). Eq. (1) represents a continuous treatment difference-in-difference specification where the coefficient of interest,  $\beta_1$ , estimates the effect of PE firms' increased exposure to ESG disclosures of public firms in the same markets in which their portfolio companies operate, relative to control PE firms that are not (as) exposed to the changes in these countries' ESG disclosure mandates. The key identifying assumption is that ESG disclosure mandates for publicly listed firms in countries of PE firms' portfolio companies increase PE firms' incentives to disclose ESG-related information on their website. While this assumption is untestable, we argue it is unlikely that unmodelled factors, such as economic fundamentals, correlate with the introduction of ESG mandates across countries (Krueger et al., 2022) and systematically drive cross-sectional differences in ESG disclosures of our sample PE firms based on their predetermined investment shares in the respective countries.

## **Results**

Table 3 presents the results of estimating the relationship between PE firms' ESG disclosures and PE firms' exposure to ESG disclosure mandates in countries of their portfolio companies based

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<sup>20</sup> We define PE firm size groups based on the total word count on PE firms' websites. Specifically, we use the PE website word count as a size proxy, and we construct deciles based on the full sample distribution. We then interact the decile categories with year indicators.

on Eq. (1). Panel A shows the results when studying our main disclosure variable, *Log. ESG Ratio*. Column (1) shows the results without any control variables, Column (2) includes control variables, and Column (3) includes PE firm size group-year fixed effects. In Panel B, we re-estimate the specification from Column (3) of Panel A with separate outcome variables for environmental, social and governance disclosures (*Log. Envir. Ratio*, *Log. Social Ratio*, and *Log. Gov. Ratio*, in Columns (1), (2), and (3), respectively). In Panel C, we repeat this analysis after disaggregating the ESG regulation exposure measure of interest into its individual components. That is, we measure exposure to regulatory mandates for environmental, social and governance disclosures specifically by relying on the disaggregated information on regulatory changes in these areas from Krueger et al. (2022). We construct three individual variables, *Envir. Regn Exp*, *Social Regn Exp* and *Gov. Regn Exp*, capturing the exposure of PE firms to the respective disclosure rules for publicly listed firms in the countries of PE firms' portfolio companies.

The coefficient estimate on *ESG Regulation Exposure* in Column (1) of Panel A suggests that a 10 percentage point increase in the *ESG Regulation Exposure* is associated with an approximately 3.1% increase in the *ESG Ratio* based on a PE firms' website disclosures.<sup>21</sup> This economically significant estimate is also statistically significant at the 1% level. After including control variables in Column (2), we document a lower coefficient estimate of 0.19 (statistically significant at the 5% level). The estimates on *Log. Positive Words Ratio* and *Log Valuation Words Ratio* are economically large and statistically significant, suggesting that the baseline estimate of 0.31 likely captures correlated size and performance characteristics of a given PE firm. Including PE firm size group-year fixed effects does not change our inferences (Column (3)).

The results in Panel B suggest that a 10 percentage point increase in *ESG Regulation Exposure* is associated with a 1.2%, 3.5%, and 3.8% increase in environmental, social and governance related

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<sup>21</sup> We use a 10 percentage point increase to discuss the economic magnitudes for ease of interpretability. The unconditional standard deviation of the *ESG Regulation Exposure* variable is 0.34, suggesting that a one standard deviation increase in ESG regulation exposure is associated with a 10.5% increase in website related ESG disclosures. As our outcome variable is a log-ratio and the ESG regulation exposure measure ranges from 0-1 (representing 0-100% exposure to ESG regulation), the specification based on Eq. (1) is a log-level specification. Thus, a 1-unit increase in ESG regulation exposure (a 100 percentage point increase exposure) is associated with an approximately 31% increase in the ESG ratio.

disclosures on PE firms' websites, respectively. All estimates are statistically significant at the 5% (Column (1)) or 1% levels (Columns (2) and (3)). Panel C shows corresponding results after disaggregating the ESG disclosure regulation exposure measure into the different categories of mandated disclosures (environmental, social, or governance). We document that a 10 percentage point increase in exposure to environmental disclosure mandates is associated with a 2.3% increase in PE firms' environment-related disclosures. The estimates for social topics is 4.1%, and for governance topics it is 4.0%. Consistent with our measures successfully capturing specific ESG topics, these coefficients are measured with less noise and they are highly statistically significant.<sup>22</sup>

Collectively, the results in Table 3 suggest that PE firms increase their own ESG disclosures if they are more exposed to, i.e., they invest more in portfolio companies located in, countries where large publicly listed firms are subject to ESG disclosure mandates. Thus, our results are consistent with the presence of significant, and previously unexplored, spillovers from disclosure mandates for publicly listed firms to unregulated PE firms. As the strength of the spillover effects depends on the extent of PE firms' investment exposures in a given country, our results are consistent with two interpretations. First, PE firms likely internalize the ESG disclosures provided by their portfolio companies as the portfolio companies will have more transparent ESG disclosures if affected by the reporting mandates in their countries (Fiechter et al., 2022). Second, even if PE firms' own portfolio companies are not subject to ESG disclosure mandates, these portfolio companies operate in markets with large and publicly listed peer firms that provide detailed ESG disclosures. As PE firms compete for the capital of global investors that have the option to directly invest in large and publicly listed firms in a given country, PE firms likely respond to these investors' awareness of ESG disclosures by increasing their own ESG disclosures. This interpretation is consistent with the time-series patterns in ESG disclosures around fundraising events as discussed in Section 4.3.

## 4.2. Pledges to Responsible Investment

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<sup>22</sup> We attribute the economically smaller estimate for environmental topics compared to social and governance topics to the fact that, on average, the level in environmental disclosures is higher than that of social and governance disclosures (see Table 1; the unconditional sample mean in *Log. Envir. Ratio* is 0.77 compared to a mean of 0.68 and 0.33 for *Log. Social Ratio* and *Log. Gov. Ratio*, respectively).

## *Setting and Empirical Design*

To further explore the determinants of PE firms' ESG disclosure, we ask whether PE firms increase their ESG disclosures when they commit to sustainable investment practices. To explore this question, we use the setting of the United Nations Principles of Sustainable Investment (UN PRI) signatories. While some players in the PE industry had pledged to focus on sustainable investment shortly before and in particular shortly after the global financial crisis, several market leaders showed their official commitment to sustainable investment by becoming signatories to the UN PRI from 2009 onwards (Crifo and Forget, 2013). Signing up to the UN PRI is a credible commitment device for PE firms as it allows them to publicly demonstrate their commitment to responsible investment and their objective to contribute to building a more sustainable financial system.

For our analysis, we collect the UN PRI signing dates of all investment managers in the period from 2006 to 2021. We then manually match the signatories' names to the names of our sample PE firms.<sup>23</sup> Table OA.6 in the Online Appendix shows the staggered signing up of investment managers as well as our sample PE firms. Cumulatively, 421 PE firms had joined the list by 2021. These signatories account for approximately 7.2% of our 5,873 sample PE firms with non-missing website data for the regression analysis (see Table 1 for details). We exploit the sign-up process of some of our sample PE firms in a difference-in-differences design to compare the ESG disclosures of signatories versus non-signatories (first difference) relative to the period before the sign-up (second difference) based on the following OLS model.

$$\text{Log. ESG Ratio}_{i,t} = \alpha_0 + \beta_1 \text{Post UN - PRI Pledge}_{i,t} + X\phi + \alpha_i + \alpha_{c,t} + \varepsilon_{i,t} \quad (2)$$

*Log. ESG Ratio* is again our ESG disclosure measure of interest, defined as the natural logarithm of one plus the number of ESG words per 10,000 words on the website of PE firm  $i$  in year  $t$ . *Post UN-PRI Pledge* is an indicator variable equal to one for all PE firm-years since the year in which a PE firm signed up to UN PRI (see Table OA.6), and zero otherwise. We use standard errors

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<sup>23</sup> We employ a fuzzy matching algorithm to map the investment firms that have signed the UN-PRI pledge with the PE firms in Preqin that have website data. We limit matches to those that have a similarity score of at least 95%, which we then manually examine for accuracy.

clustered at the PE firm level as we do not rely on a clustered sampling process and the signing date vary by PE firm (Abadie et al., 2022).  $X$  is the same vector of control variables as used in Eq. (2). As in Eq. (2),  $\alpha_i$  denotes PE firm fixed effects, and in additional specifications again include separate year fixed effects for PE firm size groups. In Eq. (2), we include separate year effects by PE firm headquarter country,  $\alpha_{c,t}$ , to account for country-specific changes in regulation or political and societal sentiment that could be correlated with PE firms' investment and disclosure choices.

Our identification strategy in Eq. (2) relies on timing differences in PE firms' signing up to the UN PRI, thus lending itself to a standard staggered difference-in-differences setup. The coefficient of interest,  $\beta_1$ , estimates the difference between PE firms' ESG disclosures after and before signing up to the UN PRI, relative to control PE firms that never sign up, have already signed up, or have not yet signed up to the UN PRI. We acknowledge that the signing decisions are endogenous choices of the PE firms' management, thus inhibiting us to draw causal inference regarding the impact of a UN PRI signature on disclosures. However, this strategy allows us to precisely measure changes in ESG disclosures attributable to PE firms' commitment to responsible investment because we also hold constant important correlated factors, such as all observed and unobserved time-invariant PE firm characteristics, their exposure to macroeconomic factors, other website disclosures and time trends by country and PE firm size group. To lend credibility to this identifying assumption, we first estimate an event-study variant of Eq. (2) to investigate pre-trends and the dynamics of changes in disclosures in the years after the UN-PRI sign-up (following the recommendation in, e.g., Barrios, 2021).<sup>24</sup>

## **Results**

Figure 6 presents the event-study estimates from OLS regressions of Eq. (2) when mapping out the *Post UN-PRI Pledge* indicator into relative event years from three years leading up to the

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<sup>24</sup> We conduct several (untabulated) robustness analyses to support our inferences from this staggered difference-in-differences design. We address potential weighting and bias issues due to the heterogeneity in treatment timing and, in particular, the use of already treated units as controls. See Barrios (2021) and Baker, Larcker, Wang (2022) for applied discussions. Qualitatively, our inferences do not change when using alternative difference-in-differences estimators. Specifically, when applying the estimators developed and recommended in Callaway and Sant'Anna (2021) or De Chaisemartin and D'Haultfoeuille (2020), the coefficients of interest on *Post UN-PRI Pledge* remain statistically significant at conventional levels but are somewhat smaller in magnitude (between 0.09 and 0.16 depending on the specification).

sign-up until three years after the sign-up. The underlying regression specification includes PE firm, country-year and PE firm size group-year fixed effects. The plotted results suggest that the difference in ESG disclosures between PE firms that sign up to the UN PRI and those that do not are nearly identical in the years leading up to the signing up year. We then observe positive event study estimates starting in the year of the sign-up. The coefficient increases in magnitude and is statistically significant in years one to three after the signing year. In terms of economic magnitude, the results suggest that PE firms increase the relative share of ESG words disclosed on their websites by approximately 12%, 25%, and 35% in the year of signing, one year after and two years after relative to the year before the signing. Overall, the flat pre-trends and the sharp and increasing positive estimates in the post-period strongly support the inference that the increase in ESG disclosures is attributable to the PE firms committing to sustainable investment, and not to other correlated factors.

Table 4 presents results from estimating different variants of Eq. (2). Panel A shows results from regressing our main measure of interest, *Log. ESG Ratio*, on the *Post UN-PRI Pledge* indicator, and several controls and fixed effects as discussed in Section 4.2.1. Column (1) presents results from a parsimonious specification without control variables. Column (2) includes control variables, and Column (3) also includes PE firm size group-year fixed effects. In Panel B, we re-estimate the specification from Column (3) of Table A and investigate the coefficients on *Post UN-PRI Pledge* when studying environmental, social, and governance-related disclosures as the outcomes separately (*Log. Envir. Ratio*, *Log. Social Ratio*, and *Log. Gov. Ratio*, in Columns (1), (2), and (3), respectively). The coefficient estimate of 0.24 in Column (1) of Table 4 suggests that PE firms increase their ESG-related disclosures on their website by approximately 24%. This estimate is significant at conventional levels of significance. The coefficient is somewhat larger (0.31) and is estimated with greater precision when including control variables (Column (2)), and it remains robust to controlling for separate year trends by PE firm size group (Column (3)). When we study the association between UN PRI sign-ups and ESG disclosures for environmental, social, and governance-related disclosures separately in Panel B, we observe highly statistically significant coefficients of 0.19, 0.29, and 0.25.

Overall, these findings suggest that PE firms increase their ESG disclosures substantially after publicly committing to focus on sustainable investment. This evidence suggests that our measure of PE firms' ESG disclosures is indeed attributable to PE firms' strategies. The relatively stronger results for social (and governance)-related disclosures compared to environmental disclosures are consistent with the UN PRI primarily focusing on social and governance issues in the investment industry, with sustainable actions to address climate change being the third (and last) area of action (UN PRI, 2017).

### **4.3. Attracting Capital**

#### ***Setting and Empirical Design***

Theory and prior evidence on disclosure suggest that firms increase voluntary disclosures to cater to external financiers and thereby decrease their cost of capital (e.g., Diamond and Verrecchia, 1991; Breuer, Hombach, Mueller, 2020). Therefore, we expect that PE firms likely have an incentive to provide more ESG disclosures when they aim to attract capital as they face an increasing trend in ESG investing and greater demand for ESG disclosures from investors (e.g., Kreutzer, 2011; Amel-Zadeh and Serafeim, 2018; Berg, Heeb, and Kölbel, 2022, Cohen et al., 2022). To explore whether PE firms indeed alter their ESG disclosures to influence capital allocation from their investors, we explore the time-series variation in our ESG disclosure measure within firms and study changes in our ESG measure within time windows around PE firms' fundraising events.

We proceed in three steps. First, we conduct a baseline analysis and study averages in our measure of interest, *Log. ESG Ratio*, in the years around a major fundraising round of a given PE firm. To this end, we use a standardized time series variable, the event year, in which the year  $t=0$  indicates the year of fundraising. We classify a year as a fundraising year for a given PE firm if the PE Firm raises funds that exceed any funds raised in the immediate prior and following years. We use time-series information on PE firms' fundraising from Preqin. Second, we demean our measure of interest, *Log. ESG Ratio*, and we purge it from the correlation with a website's total word count to account for any observed and unobserved time-invariant firm characteristics and time-varying non-ESG disclosures that might correlate with both ESG disclosures and fundraising outcomes. We then

again study the sample average of this residualized *Log. ESG Ratio* measure in the event years around the fundraising year. Third, we absorb PE firm and year fixed effects from *Log. ESG Ratio* and its correlation with total website word count to also account for general time trends. We then again study the average residualized *Log. ESG Ratio* in the event years around the fundraising year.

## **Results**

We visualize our results in Figure 7. Panel A plots the development of the average value in *Log. ESG Ratio* for the average sample firm in the years around fundraising. We observe a clear upward trend in ESG disclosures in the year leading up to the fundraising, and the trend continues thereafter. As this observed trend could reflect a general increase in ESG disclosures over time (see Figure 2), we absorb firm and year fixed effects and plot the residual values in *Log. ESG Ratio* in the event window around fundraising years in Panels B and C, respectively. Panel B, which plots on average within-firm changes in ESG disclosures, also demonstrates that ESG disclosures strongly increase in the years leading up to the fundraising events. In terms of economic magnitudes, the graph suggests that the average firm increases the relative prominence of ESG disclosure on its websites by 3% over the two year period leading up to the fundraising, and that the ESG disclosures remain at a stable level after that. Panel C even suggests that the ESG disclosures slightly decline after the PE firm has collected additional capital in the latest fundraising round.

Complementing our evidence on PE firms' exposure to ESG disclosure regulation and commitment to sustainable investment, these findings suggest that PE firms also increase their ESG disclosure strategically in order to facilitate fundraising in light of the increasing focus on ESG of global investors. These findings point at opportunism as a driver of PE firms' ESG disclosures. However, we note that we observe trends based on very modest economic magnitudes of around 3% compared to the estimates in Tables 3 and 4, which suggest that ESG disclosures increase by 30% when a PE firm is newly exposed to ESG disclosure mandates in their portfolio companies' countries or by 24% after committing to sustainable investing by signing up to the UN PRI. Thus, we conclude that, as expected, our measure of PE firms' voluntary ESG disclosures to some extent picks up PE

firm managers' endogenous disclosure decisions in response to fundraising needs, as theory would predict. Overall, it seems that changes in PE firms' ESG disclosures are driven to a large extent by quasi-exogenous changes in the regulatory environment (and associated ESG disclosures of publicly listed peer firms) as well as actual changes in the PE firms' investment strategies.

## **5. ESG Disclosures in Private Equity and Associated Investment Outcomes**

### **5.1. Portfolio Company Environmental Performance**

#### *Setting and Empirical Design*

We now turn our analysis to the associated consequences of PE firms' ESG disclosures. Specifically, we ask whether PE firms' investment realized strategies are consistent with their ESG disclosure. To operationalize this question, we examine whether PE firms with relatively more disclosures of environmental topics invest in portfolio companies with better environmental performance. We focus on the "E" (i.e., environmental) component of ESG in this part of our analysis because of the availability of reliable data on environmental pollution of facilities owned by companies in which our sample PE firms potentially invest.<sup>25</sup>

One could ask two interesting questions. First, do PE firms with greater environmental disclosures invest in portfolio companies with better environmental performance, i.e., "greener" companies, in the first place? Second, do PE firms with greater environmental disclosures actively improve the environmental performance of their performance firms? It is arguably more challenging to address the second question in a causal way given the endogenous nature of both ESG disclosure and PE firms' portfolio company investment decisions (see, e.g., Bellon, 2022). We therefore center our analysis around the first question of whether PE firms invest in portfolio companies with better environmental performance in the first place, and thus, whether PE firms really "walk" the environmental "talk" of their ESG disclosures.

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<sup>25</sup> Ideally, we would like to measure equivalent outcomes in the social and government dimensions for all sample PE firms at the same time. To the best of our knowledge, there are no publicly available databases that would allow us to do so. We therefore focus on the environmental dimensions, which also allows us to compare our results to related studies in the area of PE investments and activist investors (Bellon, 2022; Naaraayanan et al., 2021).

To motivate this question, explore our data, and relate our study to the recent results in Bellon (2022), we nonetheless start by investigating changes in environmental pollution, measured as chemical releases at the facility level, around PE firm investments into portfolio companies. To this end, we combine our PE firm and portfolio company data with chemical release information on U.S. facilities from the EPA's TRI database to construct a panel of environmental performance outcomes of PE-owned facilities (see Section 2.4). After identifying PE ownership in a facility with non-zero chemical release information before and after the PE firm investment into the portfolio company, we rely on a sample of 938 PE-owned portfolio companies owning 2,633 facilities and 29,179 facilities that belong to companies not owned by PE firms.

To examine if PE firms with a stronger focus on environmental issues invest in companies with better environmental performance ex-ante, we then estimate the following OLS model:

$$\begin{aligned} & \text{Chemical Release}_{f,j,k,i,t} \\ & = \alpha_0 + \beta_1 \text{Log. Envir. Ratio}_{f,i,t=0} + \beta_1 \text{Benchmark Release}_{j,t} + \alpha_{k,t} + \varepsilon_{j,c,t} \end{aligned} \quad (3)$$

*Chemical Release* is a measure of environmental pollution of facility  $f$  in year  $t$  in industry  $j$  and U.S. county  $k$ , acquired by PE firm  $i$ . *Log. Envir. Ratio* is now the independent variable of interest and is defined as the natural logarithm of one plus the number of environmental words per 10,000 words on the website of PE firm  $i$  in the year in which the PE firm acquires a portfolio company owning facility  $f$  ( $t=0$ ). We environmental, and not overall ESG-related, disclosures to study the most direct conceptual link between disclosures and investment outcomes in this setting.<sup>26</sup> We use standard errors clustered by facility as the treatment varies by facility.<sup>27</sup>  $\alpha_{k,t}$  denotes PE county-year fixed effects, which absorb unobserved time trends that affect all facilities within the same county.

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<sup>26</sup> Estimates are qualitatively similar but less precise and mostly insignificant at conventional significance levels when using *Log. ESG Ratio* as the independent variable of interest (untabulated). These findings are plausible given the ESG ratio correlates with the environmental ratio but should be a less precise predictor of PE firm's focus on environmental outcomes at the portfolio company level.

<sup>27</sup> Strictly speaking, the treatment varies by company owning facilities, or units of observation. However, there is no unique company (owner-firm) ID in the EPA's TRI dataset and we use non-PE owned facilities as control units, inhibiting us from defining a company-level identifier to cluster at the facility-owning company level. Our inferences remain unchanged when clustering standard errors by county or by state-year, alleviating concerns that there is significant correlation in measurement error of the emissions data within a county over time or within the same state due to the nature of data collection and reporting.

We use different measures for *Chemical Release* as the TRI provides for different categorizations of released chemicals for a given facility. In our main tests, the outcome variable is *Log. Total Onsite Releases*, which is the natural logarithm of the total amount of all chemicals released by a given facility onsite in a given year (in pounds). In additional tests, we use an analogous measure but only count emissions that belong to certain categories, such as chemicals mentioned in the CERCLA Act, the Clean Air Act, the Safe Drinking Water Act, or a placebo category which subsumes other less harmful chemicals. *Benchmark Release* is a control variable defined as the natural logarithm of the average level in facility-level chemical releases within the same category as the outcome variable's category for a given industry and year. Including this benchmark control effectively leads to a design in which we compare abnormal chemical releases above and beyond the industry standard in a given year of a facility acquired by a PE firm with relatively more environmental disclosures with those owned by PE firms with relatively less environmental disclosures. Controlling for separate time trends for narrowly defined geographic regions (i.e., counties) purges our design of variation arising from PE firms' potentially endogenous differences in PE firm's geographic preferences for investments. Further, the county-year effects effectively absorb all changes in the macroeconomic, regulatory, or natural environment which affect the environmental performances of all businesses of the same county.

## **Results**

Figure 8 presents event-study results of tests that examine the environmental performance of facilities around the investment of a PE firm in a facility-owning company. Panel A presents results from a baseline regression of *Log. Total Onsite Releases* on the relative event-year indicators using a staggered difference-in-differences design. A facility is considered as treated if it belongs to a portfolio company acquired by a PE firm. The relative event year  $t=0$  indicates that a PE firm invested in a portfolio company which owns a given facility in that given calendar year. The regression includes the industry-year benchmark release control variable as well as facility and year fixed effects. Standard errors are clustered by facility. The results suggest that a facility's chemical releases

decrease around the change in PE ownership, consistent with the finding in Bellon (2022). Chemical releases are on average 10 % lower after the PE deal relative to the year prior to the PE deal. This is a baseline result, independent of PE firms' environmental disclosures. We also document that PE firms seem to invest in portfolio companies with facilities that show a decreasing trend in chemical release. Specifically, the coefficients in the two pre-deal years are economically and statistically significant. This finding is consistent with PE managers considering expected pollution outcomes in their selection of future portfolio companies (Bellon, 2022).

Panel B of Figure 8 presents results from re-estimating the model in Panel A for two different subsamples. The solid line with diamond markers visualizes results for facilities acquired by PE firms with relatively high environmental disclosures, defined as the PE firm being in the highest quartile of the sample distribution of *Log. Envir. Ratio* in the year of the acquisition. The dotted line with square markers visualizes results for facilities acquired by PE firms which are not in the top quartile of the distribution of *Log. Envir. Ratio*. The control units in this regression are all facilities that have not been acquired by a PE firm in a given year. Interestingly, we document that the negative trend in within-facility changes in releases around PE deals only persists for deals of PE firms that do *not* exhibit high environmental disclosures. For PE firms with relatively high environmental disclosures, the portfolio companies' facilities do not exhibit discernable changes in their chemical releases in any year of the event window from  $t=-3$  to  $t=+3$  relative to the year prior to a PE deal ( $t=-1$ ).

In light of the findings of Bellon (2022), our evidence is consistent with the average PE firm's response to the increasing trend in regulatory scrutiny and greater legal liability in the area of environmental pollution.<sup>28</sup> However, our evidence also suggests that PE firms with greater environmental disclosures appear to have different investment strategies compared to the average PE

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<sup>28</sup> Bellon (2022) shows that PE firms strongly focus on maximizing shareholder value which typically means that portfolio companies increase output, and thereby pollution. At the same time, PE-backed companies more quickly reduce their emissions of legal liabilities with respect to environmental pollutions became more risky relative to non PE-owned companies. Bellon (2022) argues that this finding is due to PE investors more strongly focusing on legal liability risks and respective cash flow implications. Thus, it is plausible to document a decreasing trend in facility-level emissions for PE-owned companies in dependent of the PE firms' ESG focus as legal liabilities with respect to environmental pollution, and environmental policy stringency in general, increase over our sample period.

firm because their selected portfolio companies' facilities do not seem to change their emissions after the PE deal *and* seem to exhibit a different development in emissions before the PE deals.

To further investigate this the investment strategies of PE firms in terms of the environmental performance of their selected portfolio firms, we estimate a model without facility-specific fixed effects and interact the relative event-year indicators with our main PE firm ESG disclosure variable, *Log. ESG Ratio*, measured as of the year prior to the deal. This strategy allows us to compare the average levels of chemical releases of facilities belonging to PE firms with higher versus lower environmental disclosures in each year in the event window around a PE deal, always relative to facilities not owned by PE firms in the same county and year. Panel C of Figure 8 presents results of this triple differences analysis. Specifically, we show coefficient estimates on the interaction terms of the relative event-year indicators and the continuous environmental disclosure variable *Log. Envir. Ratio* of the PE firm as of the year prior to the PE deal.<sup>29</sup>

The results presented in Panel C of Figure 8 suggest that PE firms with relatively more environmental disclosures invest in companies owning facilities with significantly lower levels of environmental pollution. Further, the level of pollution remains consistently lower in the years after the PE deal, relative to facilities of companies not backed by PE firms. In terms of economic magnitudes, the estimates suggest that facility-level chemical releases are 2%-3% lower in the years before a PE deal if a PE firm has a 10% higher environmental disclosure ratio. The results are most pronounced in the year of a PE deal. Specifically, PE firms with a 10% higher ratio of ESG-related words on their websites seem to invest in portfolio companies with facilities emitting 3.5% less chemicals. This result is statistically significant at the 1% level. After the PE deal, facilities backed by PE firms with a 10% higher environmental disclosure ratio have a chemical release level which is consistently 3% lower on average.

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<sup>29</sup> In this specification, the coefficient on the baseline year  $t=-1$  is still omitted, but the triple differences design allows us to estimate a coefficient for the difference in chemical releases across facilities acquired by PE firms with different levels of environmental disclosures in year  $t=0$ .

Table 5 presents results of tests exploring the pattern above in more detail, using different regression specifications and studying different measures of chemical releases. In Panel A, the outcome variable is the same as in Figure 8, which is the natural logarithm of the total amount of all chemicals released by a given facility onsite in a given year (in pounds). In Column (1), we estimate the average difference in total onsite releases between facilities acquired by PE firms with high versus low environmental disclosures in the pre-deal period to further confirm whether PE firms with higher ESG disclosures have different investment strategies and to quantify the results visualized in Figure 8. In Columns (2) to (4), we focus on observations in the year of a PE deal only and study the association between our environmental disclosure measure of interest, *Log. Envir. Ratio*, and facility-level onsite releases. Column (2) presents a parsimonious specification which only includes the benchmark release control variable and year fixed effects. Column (3) adds county-year fixed effects and also includes the main ESG disclosure measure, *Log. ESG Ratio*, as an independent variable. This design allows us to study the specific relationship between environmental disclosures and environmental outcomes for PE firms with similar overall levels of ESG disclosures. In Column (4), we restrict the sample to PE-acquired facilities only. In Panel B of Table 5, we re-estimate the model of Column (3) of Panel A for the different categories of chemicals released.

The results in Panel A of Table 5 confirm the inference that PE firms with higher environmental disclosure invest in “cleaner” companies. Specifically, the coefficient estimate on the interaction term of *High Envir. Quartile* and *Pre-Deal Period* in Column (1) suggests that PE firms in the highest quartile of environmental disclosures invest in companies whose facilities have on average approximately 29% lower chemical emissions in the years prior to a PE deal.<sup>30</sup> The estimated coefficient is statistically significant at the 1% level. The economic magnitude of this result is smaller, but still economically and statistically significant when focusing only on the year prior to the deal in Column (2). The estimated coefficient is substantially larger and statistically more significant when we include the average level of ESG disclosures as an additional explanatory variable in Column (3).

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<sup>30</sup> We derive the interpretation in percentage terms as follows:  $29\% = (e^{(-0.34)} - 1) * 100$ .

The inferences remain unchanged when removing never-treated control firms (i.e., non-PE backed facilities) from the regression sample in Column (4).

Panel B of Table 5 presents several results that corroborate the inference that PE firms with higher environmental disclosures invest in portfolio companies with better environmental performance. Specifically, we re-run the model from Column (3) of Panel A and document that our results are particularly strong when focusing on releases of chemicals that are harmful to the environment such as the chemicals identified as toxic in the CERCLA Act (Column (1)), Clean Air Act (Column (2)), and the Safe Drinking Water Act (Column (3)). We do not document a comparable pattern when focusing on chemicals that are not considered as harmful by the U.S. Environmental Protection Agency. The coefficient estimate of 0.49 has the opposite sign but is statistically insignificant. Our results are economically significant and robust to a host of alternative specifications. Further, the results from a placebo test using emissions of non-harmful chemicals as the outcome variable lends further support to our inference.

Collectively, the evidence in this section strongly suggests that PE firms that talk a lot about environmental issues on their websites strategically invest in portfolio companies with better environmental performance ex-ante and with better environmental performance after the PE investment. This finding suggests that PE firms “walk the environmental talk”. This finding is particularly intriguing since the ESG disclosures of PE firms are not mandated, and could therefore be considered less credible by market participants.

## **5.2. PE Fund Financial Performance**

### ***Setting and Empirical Design***

We conclude our analysis by studying the performance of PE funds conditional on PE firms’ ESG disclosures. PE firms typically focus on increasing financial returns to maximize shareholder value (e.g., Kaplan, 1989; Boucly et al., 2011; Davis et al, 2014; Gompers et al., 2016). The results of our study so far suggest that PE firms with higher ESG disclosures focus on more sustainable investments in the first place. Thus, a natural question is whether PE firms with higher ESG

disclosures also achieve superior fund performance, or whether PE firms, and thus, their investors, might even sacrifice financial returns for the sake of sustainability. To explore this question, we relate PE fund-level performance metrics from Preqin to our PE firm ESG disclosure measure. Specifically, we estimate the following OLS model.

$$Fund\ Performance_{u,i,q} = \alpha_0 + \beta_1 Log.ESG\ Ratio_{i,t} + X\phi + \alpha_{us} + \alpha_i + \alpha_t + \alpha_c + \varepsilon_{i,t} \quad (4)$$

*Fund Performance* is one of six different fund-level performance measures for fund  $u$  of PE firm  $j$  in the calendar quarter  $t$ . We make use of three main categories of performance measures that are frequently used in the PE industry to evaluate fund managers – the *Net IRR (%)*, *Net Multiple (X)*, and the *Distribution to Paid-in Ratio (%)*. *Net IRR (%)* is the money-weighted return of the fund expressed as a percentage. It is calculated as the discount rate that equates the sum of distributions and the current value of unrealized investments in the fund to the sum of cash contributed (all the capital that has been called from the limited partners). *Net Multiple (X)* is the ratio of the total distributions and the unrealized value of investments in the fund to the total capital called. It represents how many times the initial paid in capital the limited partners receive as a payout. *Distribution to Paid-in Ratio (%)* is the ratio of the total distributions made to limited partners to the total capital called expressed as a percentage. We examine the raw version of each measure and an abnormal version that controls for benchmark performance of other funds by subtracting a PE fund's peer group average performance from the raw measure.<sup>31</sup>

The *Log. ESG Ratio* is the website-based disclosure measure, defined as the natural logarithm of one plus the number of ESG words per 10,000 words on the website of PE firm  $i$  in the calendar year corresponding to the calendar-quarter  $t$ . As in the previous analyses, we cluster standard errors at the PE firm level.  $X$  is a vector of control variables. As in the specifications based on Eq. (1) and (2), we include PE firms' disclosures of positive and valuation-related words to control for concurrent

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<sup>31</sup> The performance benchmarks are provided by Preqin and relies on performance information from over 10,000 private capital funds. We use Preqin's weighted performance benchmarks that takes the performance ratio of each fund and calculates a weighted average using the size of each fund. The benchmark groups are defined by Preqin depending on the funds' vintage, geographic focus, and fund strategy. The main strategies listed in Preqin are Buyout (53%), venture capital (8%) and growth (8%).

changes in the general sentiment and investment-exposure weighted macroeconomic factors. In this fund-level analysis, we additionally control for a market-wide ESG measure which proxies for the aggregate ESG disclosure environment that a PE firm faces (*Market ESG*). *Market ESG* for a PE firm is calculated as the weighted sum of country-level ESG values where the weights are the investment share of the PE firm in that particular country and country-level ESG values are the simple average of the *Log. ESG Ratio* across all PE firms in a given country. We also control for the fund's age, defined as calendar years since fund inception.  $\alpha_{us}$  denotes fund-strategy fixed effects which controls for all time-invariant characteristics of an investment style that potentially correlates with fund performance,  $\alpha_i$  denotes PE-firm fixed effects,  $\alpha_q$  denotes calendar-year fixed effects that control for general performance trends in each quarter, and  $\alpha_{ct}$  denotes country-year fixed effects that controls for unobserved time-varying country level characteristics.

Based on this specification, we identify the association between ESG disclosures and PE fund performance of interest,  $\beta_1$ , by comparing the financial performance of funds in the same quarter managed by the same PE firm and having the same strategy, holding constant time-varying trends in PE firm's macroeconomic exposures and PE firms' disclosures of positive and valuation-related words. While we acknowledge the potential presence of correlated factors that drive ESG disclosures and performance, we believe our tight design allows us to examine whether PE firm-specific ESG disclosure choices are associated with the firms' funds generating alpha, in particular because we also control for the industry-wide levels in ESG disclosures and peer-group fund performance.

## **Results**

Table 6 presents the results of estimating the association between fund-level performance and PE firms' ESG disclosures based on Eq. (4). Column (1) shows results of modeling *Net IRR (%)* as a function of the *Log. ESG Ratio* when only including the market-wide ESG disclosure ratio and fund age as controls. Column (2) includes the full set of controls, and Column (3) uses of the abnormal IRR measure, *Abnormal Net IRR (%)*, as the dependent variable. Columns (4)-(6) and (7)-(9) proceed analogously for the *Net Multiple (X)* and *Distribution to Paid-in (%)* as the outcomes, respectively.

The coefficient estimate of 0.56 on *Log. ESG Ratio* in Column (1) suggests that a one standard-deviation increase in the website based ESG disclosure is associated with an increase of 4.9% in the *Net IRR*.<sup>32</sup> This is an economically significant increase and also statistically significant at the 1% level. When we include the full set of control variables the economic magnitude remains relatively unchanged while remaining statistically significant at the 5% level. The statistically significant result in Column (3) confirms this result when controlling for the benchmark fund performance. The coefficient of 0.07 suggests that a one standard deviation higher ESG Ratio of a PE firm is associated with an 8.2% higher abnormal IRR. Our inferences are qualitatively similar when studying the two alternative performance metrics, *Net Multiple (X)* and *Distribution to Paid-in (%)*, in Columns (4) to (6) and (7) to (9), respectively. In terms of economic magnitudes, we document that a one standard deviation increase in the *ESG Ratio* is associated with an approximately 1.5% higher net multiple and a 2.4% higher distribution to paid-in ratio.

The consistent findings across all types of performance metrics suggest that a stronger focus on ESG issues in PE firms' investment strategies, as proxied by ESG disclosures, is associated with greater fund performance. We acknowledge that PE firms choose to disclose ESG topics on their websites, and that omitted factors that affect fund financial performance likely correlate with these ESG disclosures. While we do not interpret these results causally, we note that our results are robust to controlling for benchmark fund performance, time-varying market-wide PE firm ESG disclosures, fund age, PE firms' macroeconomic exposures and a host of fixed effects that hold constant country-trends and time-invariant PE firm and fund strategy characteristics.

## 6. Conclusions

Our study offers the first systematic evidence on environmental, social and governance (ESG) disclosures of PE firms. We develop a novel measure of voluntary ESG disclosures for a global sample of PE firms in the period 2000-2021. We show that ESG disclosures of PE firms are on

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<sup>32</sup> Because Eq. (4) is a levels-log specification, we derive this estimate as follows. A one standard deviation change in the *ESG Ratio* represents a 123% increase relative to the unconditional sample mean. If the *ESG Ratio* increases by 125%, the coefficient of 0.56 suggests that the *Net IRR* increases by 0.69 units (here percentage points). Relative to the sample mean of 13.95, this represents a 5% change.

average less prevalent than those of publicly listed industrial firms, but PE firms' ESG disclosures have been strongly growing in the last twenty years. We demonstrate that PE firms' ESG disclosures increase in PE firms' exposure to countries with mandatory ESG disclosure regulation for publicly listed firms, and when PE firms' commit to sustainable investment strategies as well as when they intend to raise capital. We also document that PE firms with higher environmental disclosures invest in portfolio companies with better ex-ante environmental performance and lower emissions in the PE ownership period relative to peer companies. Finally, greater ESG disclosures are positively associated with fund performance. Collectively, our results suggest that, while PE firms' ESG disclosures are voluntary and intend to attract global capital, PE firms exhibit investment strategies that are consistent with the promise in their ESG disclosures.

By focusing on ESG disclosures, their determinants, and associated investment outcomes in the PE industry, our evidence fills a void in existing research. Our paper informs a recent debate around ESG disclosure regulation. Our findings are economically important due to the sheer size of the PE industry's managed capital. Understanding ESG disclosures in the PE industry is particularly important because PE firms typically possess industry-specific operational and institutional knowledge which, combined with their meaningful control, can significantly influence the ESG performance of their portfolio companies (Kaplan and Stromberg, 2009; Bellon, 2022). We believe future research can further use our global panel of PE firms' ESG disclosure data to examine the broader economic consequences of ESG investing and disclosure in the growing private capital space.

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## APPENDIX A: Variable Definitions

Variable	Definition & Source
<i>- PE Firm Website Disclosure Variables</i>	
Word Count	Sum of all words in a firm's website (Source: Wayback Machine)
ESG Words	Sum of all ESG-dictionary words in a firm's website. The dictionary is provided in the Online Appendix (Table OA.1)
Environmental Words	Sum of all environmental-dictionary words in a firm's website. The dictionary is provided in the Online Appendix (Table OA.1)
Social Words	Sum of all social-dictionary words in a firm's website. The dictionary is provided in the Online Appendix (Table OA.1)
Governance Words	Sum of all governance-dictionary words in a firm's website. The dictionary is provided in the Online Appendix (Table OA.1)
Positive Words	Sum of all positive words in a firm's websites from the Loughran-McDonald dictionary (provided in the Online Appendix).
Valuation Words	Sum of all valuation words in a firm's websites from the American Institute of Certified Public Accountants (AICPA) valuation glossary dictionary (provided in the Online Appendix).
Market ESG	Weighted average of the mean country-level ESG ratio across all countries in which a PE firm has owns portfolio companies. Weights are calculated as the sample-wide fraction of portfolio companies acquired in a given country.
<i>- Variables of Interest</i>	
ESG Regulation Exposure	The sum-product of a PE firm's investment share in a given country and an indicator variable equal to one if there is an ESG disclosure mandate for publicly listed firms in that country. Investment share is the number of portfolio company investments in a given country scaled by the total number of portfolio company investments made throughout the sample period.
Post UN-PRI Pledge	Indicator variable equal to one in years fro the signing of the UN-PRI pledge by a PE Firm and 0 otherwise (refer Appendix table OA.6)
<i>- Toxic Release Variables from EPA-TRI</i>	
Total Onsite Release	Total release of a chemical at the site of a facility (in Pounds) (Source: TRI EPA)
Industry Benchmark	Average of the facility-level total release of a chemical across all facilities that belong to a particular industry in a year (Source: TRI EPA)

Variable	Definition & Source
<i>- PE Fund Financial Performance from Preqin</i>	
Net IRR	The money-weighted return of the fund in %. Calculated as the discount rate that equates the sum of distributions and the current value of unrealized investments in the fund to the sum of cash contributed (all the capital that has been called from the limited partners) (Source: Preqin)
Benchmark IRR	Net IRR Performance Benchmark. Takes the Net IRR of each individual fund and calculates a weighted average using the size of each fund. The benchmark is based on the fund's vintage, investment strategy and geographic focus. (Source: Preqin)
Abnormal IRR	= (Net IRR/Benchmark IRR)
Net Multiple (X)	Reveals how many times investors have received, or are likely to receive, their money back and make a profit from their investments, expressed as a multiple (Source: Preqin)
Benchmark Multiple	= (Distributions(\$)+Unrealized Value of Fund (\$))/Called Capital (\$) Net Multiple Performance Benchmark. Takes the Net Multiple of each individual fund and calculates a weighted average using the size of each fund. (Source: Preqin)
Abnormal Multiple	=(Net Multiple (X)/Benchmark Multiple)
Distribution to Paid-in Ratio (%)	It is the income and capital realized from investments less expenses and liabilities = (Total LP Distribution/Total LP Contribution)*100 (Source: Preqin)
Benchmark DPI	DPI Performance Benchmark. Takes the DPI of each individual fund and calculates a weighted average using the size of each fund. (Source: Preqin)
Abnormal DPI	= (Fund DPI - Benchmark DPI)
<i>- Control Variables</i>	
Fund Age	Age of a PE fund calculated as the difference between the current year and the vintage year of the fund (Source: Preqin)
<i>World Bank Variables</i>	
<i>All of the below variables are calculated for a PE Firm-Year as a weighted average across all countries in which the PE Firm operates, with weights equal to the share of portfolio companies acquired in a given country relative to all acquires companies over the entire sample.</i>	
Log. GDP	Log. GDP (current US\$) (Source: World Bank)
GDP Growth	GDP growth (annual %) (Source: World Bank)
Log. Population	Log. Population (Total) (Source: World Bank)
Labor Force (%)	Labor force participation rate, total (Source: World Bank)
Female Representation (%)	Proportion of seats held by women in national parliaments (%) (Source: World Bank)

*Notes:* This table provides definitions for variables used throughout the analyses. Time subscripts are omitted for brevity. The table is structured into different types of variables used in the analysis: PE firm website disclosure variables, variables of interest (determinants of PE ESG disclosures), toxic release level variables from EPA-TRI, PE Fund financial performance variables from Preqin, and control variables from Preqin and the World Bank. Based on the disclosure variables, we construct log ratios for our analysis. Specifically, we use the natural logarithm of one plus the ratio of ESG words per 10,000 words on a given website. We proceed analogously for the ratio of environmental, social, and governance-related as well as the positive and valuation-related words. The toxic release variables are measured at the individual facility-year level. The PE fund performance variables are measured at the individual PE fund-calendar quarter level. All other variables are available at the PE firm-year level.

## APPENDIX B: ESG Disclosure Measures Computation based on Textual Website Information

We explain below the calculation of our main ESG disclosure measure of interest, *Log. ESG Ratio*, and the disaggregated disclosure measures, *Log. Envir. Ratio*, *Log. Social Ratio*, and *Log. Gov. Ratio*. As an example, consider the archived website for an illustrative firm, ABC Capital in 2015.

We extract all textual content from all subpages of ABC Capital’s website that was archived on December 31, 2015. The following table illustrates this hypothetical sample of webpages:

ABC Capital 2015 Snapshot	Word Count	ESG Words	Envir. Words	Social Words	Gov. Words
Page 1	20,000	5	2	2	1
Page 2	30,000	10	4	2	4
Page 3	25,000	400	134	88	150
Page 4	100,000	15	8	0	7
Page 5	60,000	125	100	20	4
Page 6	215,000	50	50	0	0
Page 7	20,000	15	10	0	4
Page 8	75,000	5	1	2	2
Page 9	10,000	35	15	10	10
Page 10	45,000	10	5	3	2
<b>Total</b>	<b>600,000</b>	<b>670</b>	<b>329</b>	<b>127</b>	<b>184</b>

<b>Log. ESG Ratio</b>	<b>2.50</b>
Log. Envir. Ratio	1.87
Log. Social Ratio	1.14
Log. Gov. Ratio	1.40

In this example, there are a total of ten pages in the archived website of ABC Capital in 2015. The ten pages consist of the main landing page and nine subpages that the user can reach through clickable links. Thus, these pages are part of a hierarchical tree. The ‘Word Count’ column in the table shows the total number of words on each page and the ‘ESG Words’ column shows the number of ESG-related words (based on the ESG dictionary (refer the online appendix [OA.1](#)) on each page. The total number of words (ESG words) in the Dec 31, 2015 website archive of ABC Capital is 600,000 (670). The ESG Ratio computes the number of ESG words per 10,000 words:

$$\text{ESG Ratio} = \frac{670}{600,000} * 10,000 = 11.167.$$

The *Log. ESG Ratio* is thus computed as follows:

$$\text{Log. ESG Ratio} = \log(1 + \text{ESG Ratio}) = \log(1 + 11.167) = 2.50.$$

The calculation of *Log. Envir. Ratio*, *Log. Social Ratio*, and *Log. Gov. Ratio* is similar:

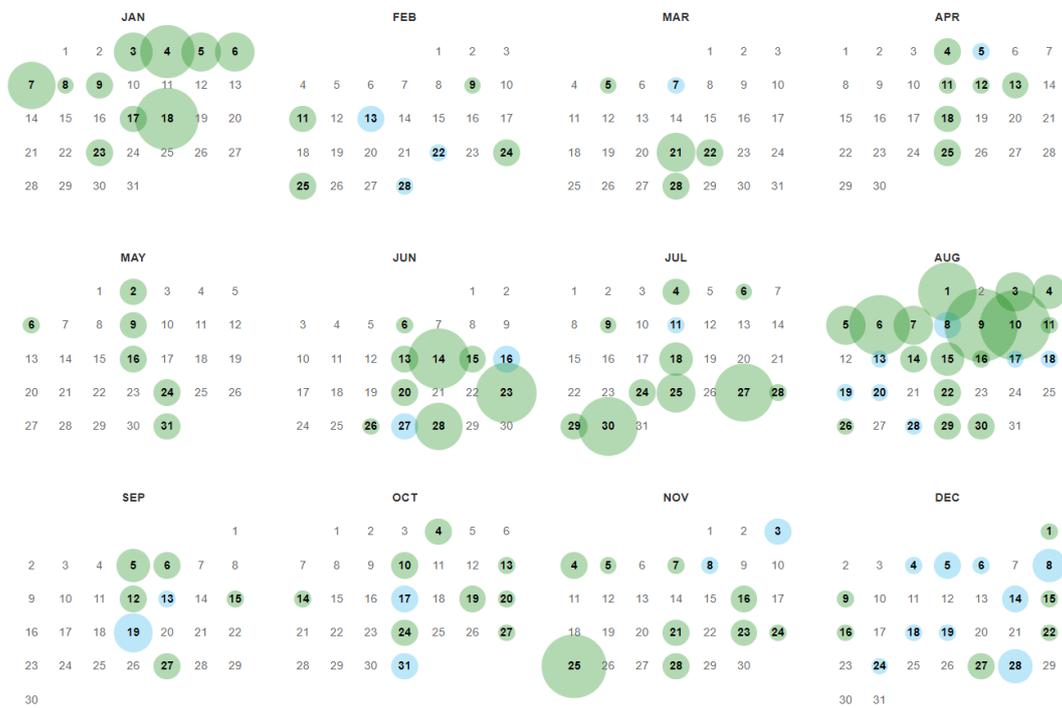
$$\text{Log. Envir. Ratio} = \log(1 + \text{Envir. Ratio}) = \log \left[ 1 + \frac{\text{Envir. Words}}{\text{Word Count}} \right] = 1.87.$$

$$\text{Log. Social Ratio} = \log(1 + \text{Social Ratio}) = \log \left[ 1 + \frac{\text{Social Words}}{\text{Word Count}} \right] = 1.14$$

$$\text{Log. Gov. Ratio} = \log(1 + \text{Gov. Ratio}) = \log \left[ 1 + \frac{\text{Gov. Words}}{\text{Word Count}} \right] = 1.40.$$

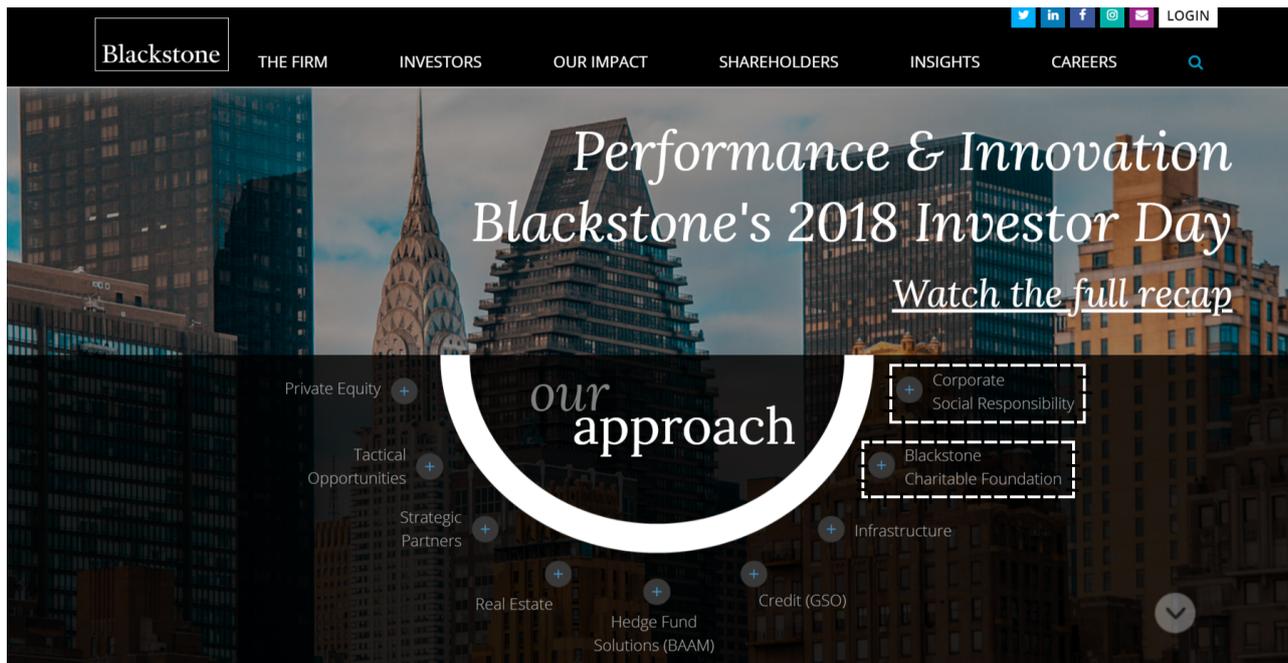
## APPENDIX C: Example of Blackstone Website Archive on Wayback Machine

**Figure C1: Blackstone Website Availability in 2018 on the Wayback Machine**



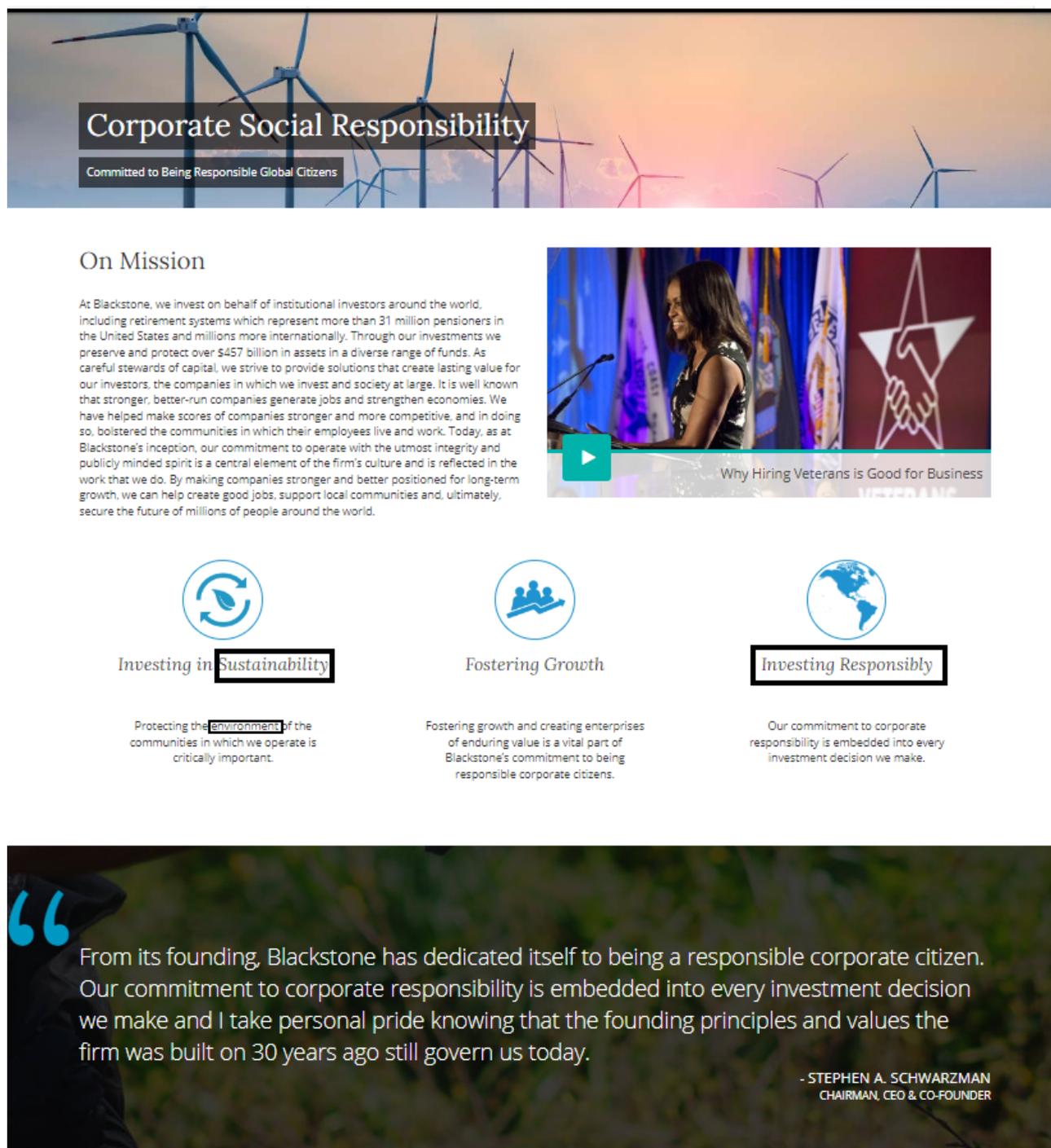
*Notes:* This figure shows the availability of Blackstone’s website for each day in year 2018. The size of the bubble on a day signifies the number of snapshots available on that particular day. To construct our measure, we make use of the snapshot made by the Wayback Machine on December 28, 2018 (the last available archive of Blackstone for 2018).

Figure C2: Main Landing Page of Blackstone Website as Captured on December 28, 2018



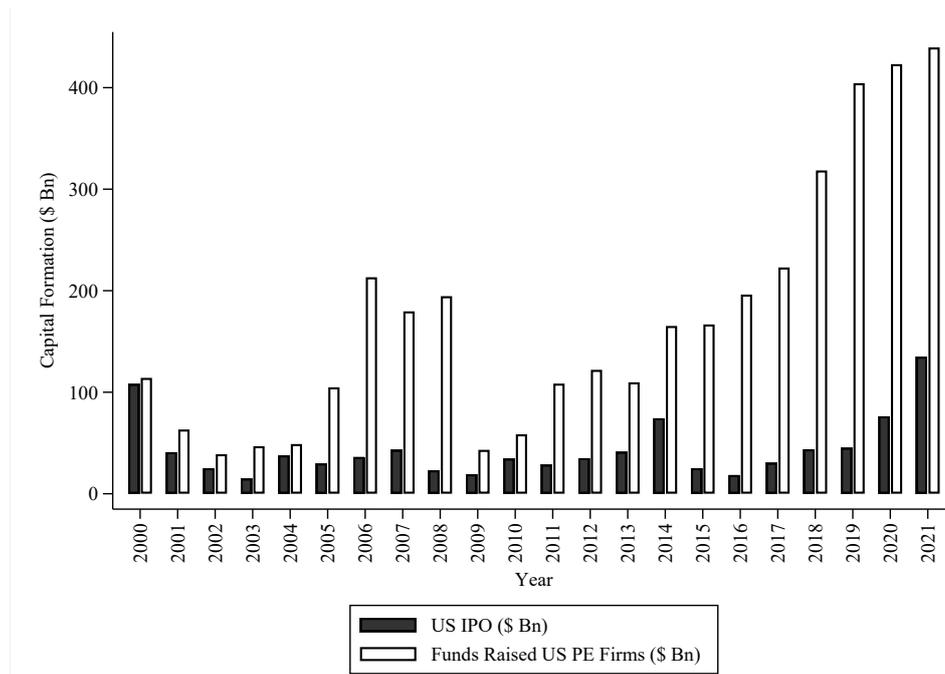
*Notes:* This figure shows the view of Blackstone’s main landing webpage as captured by the Wayback Machine on December 28, 2018. The figure also highlights words that are classified as ESG-words based on our algorithm to construct the ESG disclosure measure (boxes with white dashed lines). Each linked webpage starting from the main landing page (the root page) is examined and contributes toward the construction of our website disclosure measures for Blackstone in 2018.

**Figure C3: CSR Subpage of Blackstone’s Website as Captured on December 28, 2018**



*Notes:* This figure shows the view of Blackstone’s Corporate Social Responsibility (CSR) subpage that opens when the link behind *Corporate Social Responsibility* on the main webpage is clicked. We highlight some of the words that are classified as ESG-words based on our algorithm to construct the ESG disclosure measure (boxes with black solid lines).

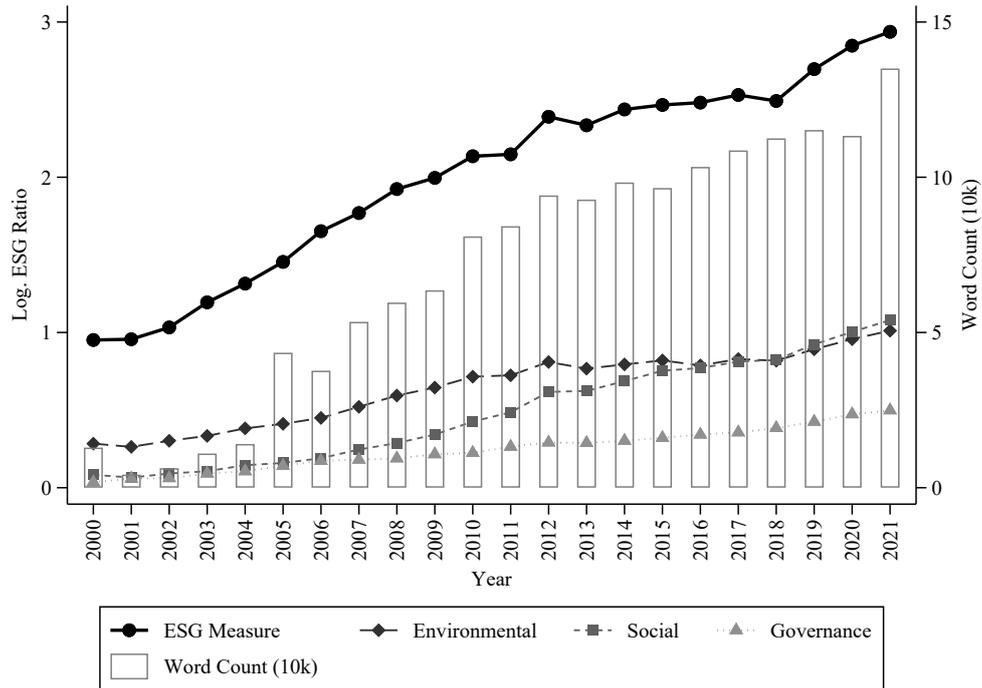
**Figure 1: US Initial Public Offerings vs. PE Funds Raised.**



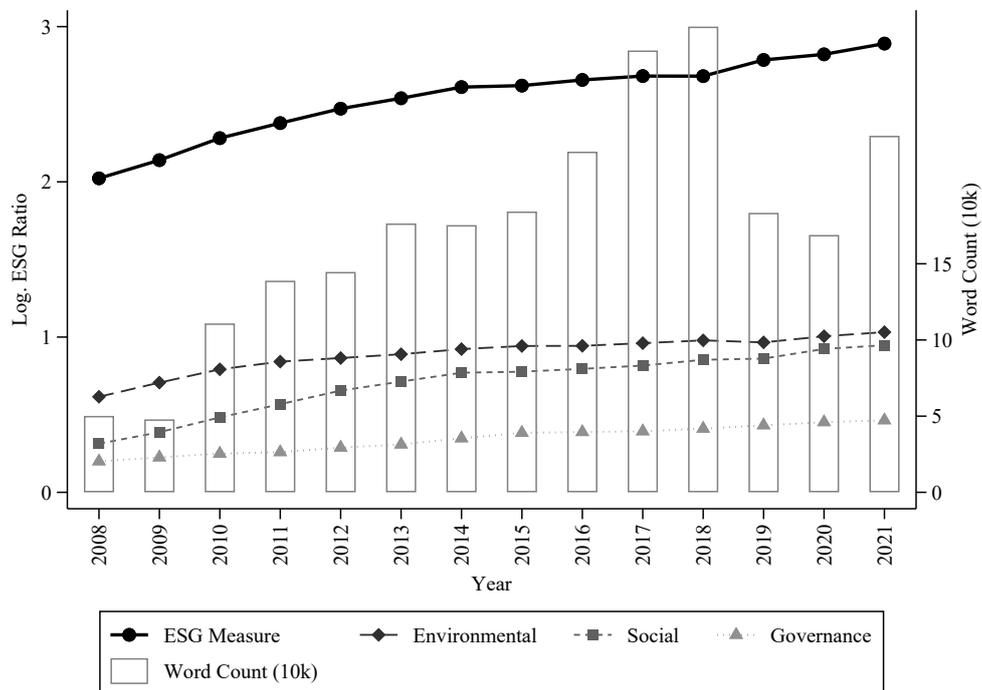
*Notes:* The figure shows the total dollar values of external capital raised by US public firms through initial public offerings (IPOs, solid bars) and US PE firms through fundraising rounds (white bars). We obtain total US IPO volumes from Statista and funds raised by US-based PE firms of our sample from Preqin.

**Figure 2: Evolution of PE Firms' ESG Disclosures from 2000 to 2021**

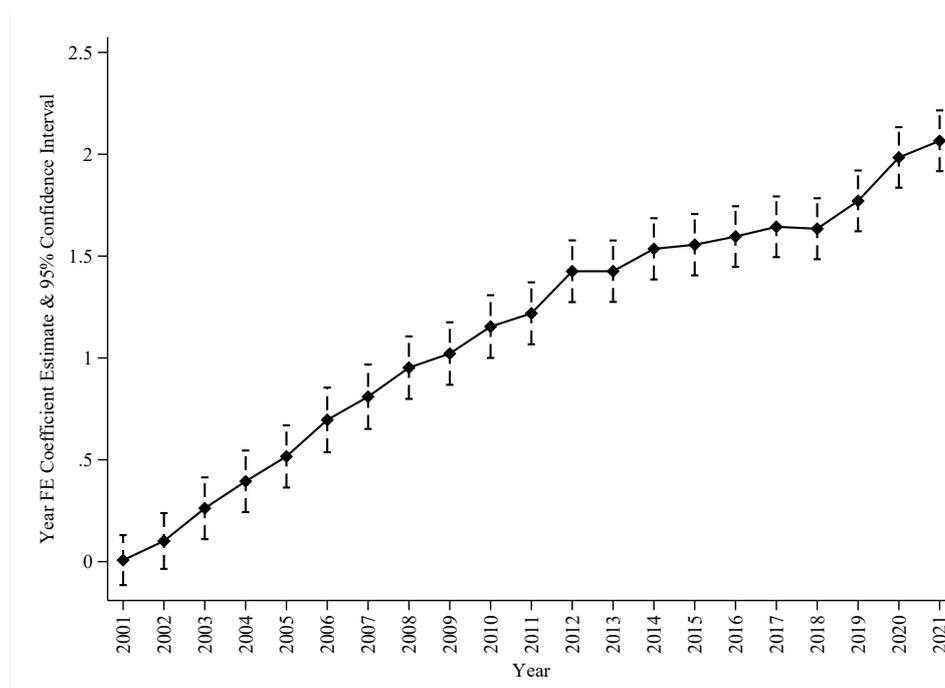
**(A) Full Sample**



**(B) Balanced Sample (starting 2008)**



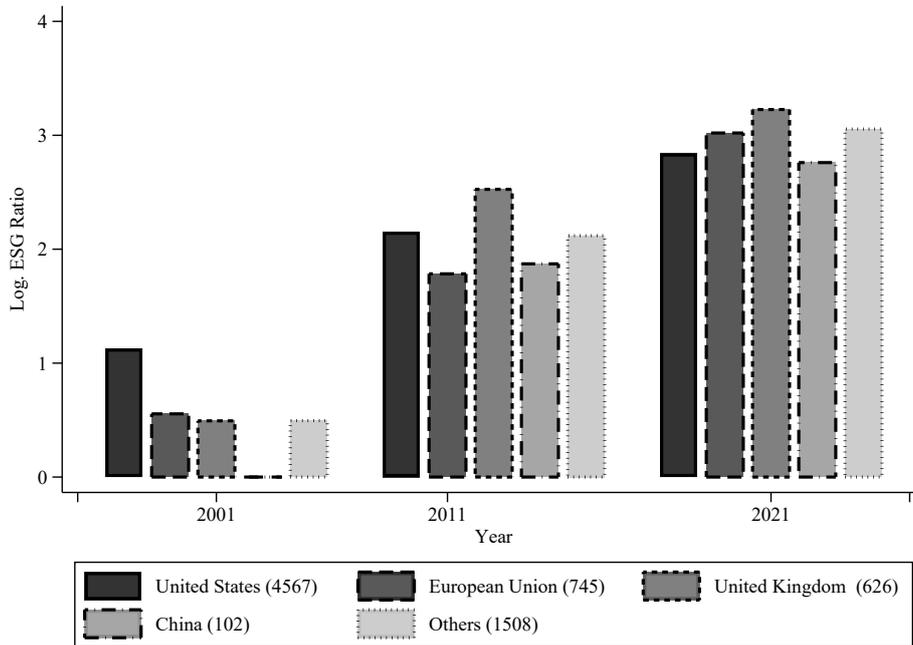
(C) Coefficient Estimates & 95% Confidence Intervals



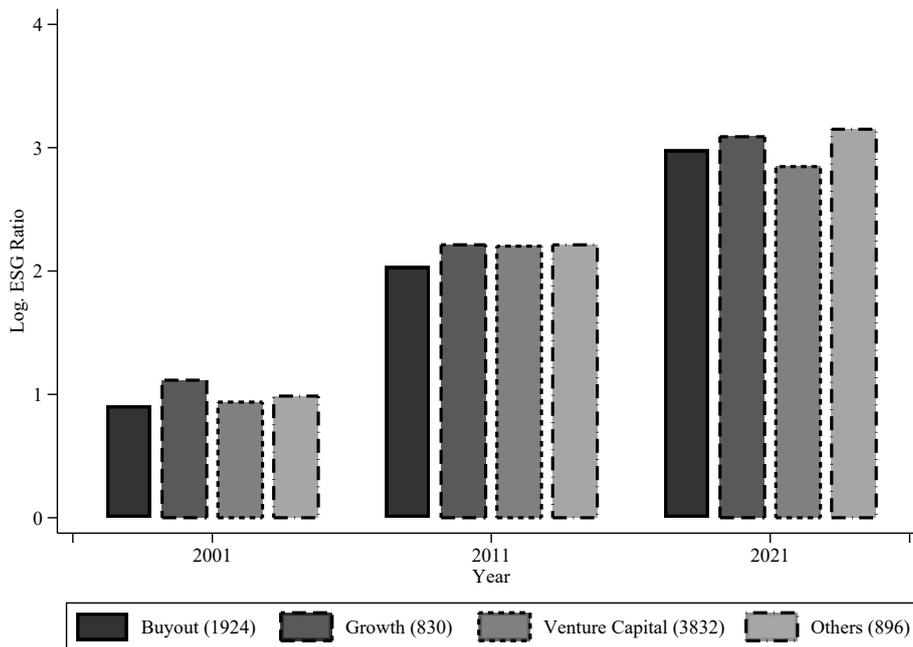
*Notes:* This figure shows the evolution of PE firms' ESG disclosures on their websites from 2000 to 2021. The figure shows different lines for (1) the average annual values (across all sample PE firms) of the main measure used in the analysis, *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website), (2) separate measures for environmental, social, and governance words, *Log. Envir. Ratio*, *Log. Social Ratio*, and *Log. Gov. Ratio* (the natural logarithm of one plus the number of environmental, social or governance related words per 10,000 words on a PE firm website). The figure also shows bars for the average total website word count (in 10k words). We provide variable definitions in Appendix A. Panel A shows average values for the full sample of firms for which historical data is available in the Wayback Machine archive in a given year. Panel B plots the same measures for a balanced panel of PE firms with websites available for the entire period from 2008 to 2021. Panel C plots the coefficient estimates and the 95% confidence intervals for the year dummies from a regression of *Log. ESG Ratio* on year fixed effects and firm fixed effects with the year 2000 taken as the baseline year.

**Figure 3: ESG Disclosures and PE Firm Characteristics**

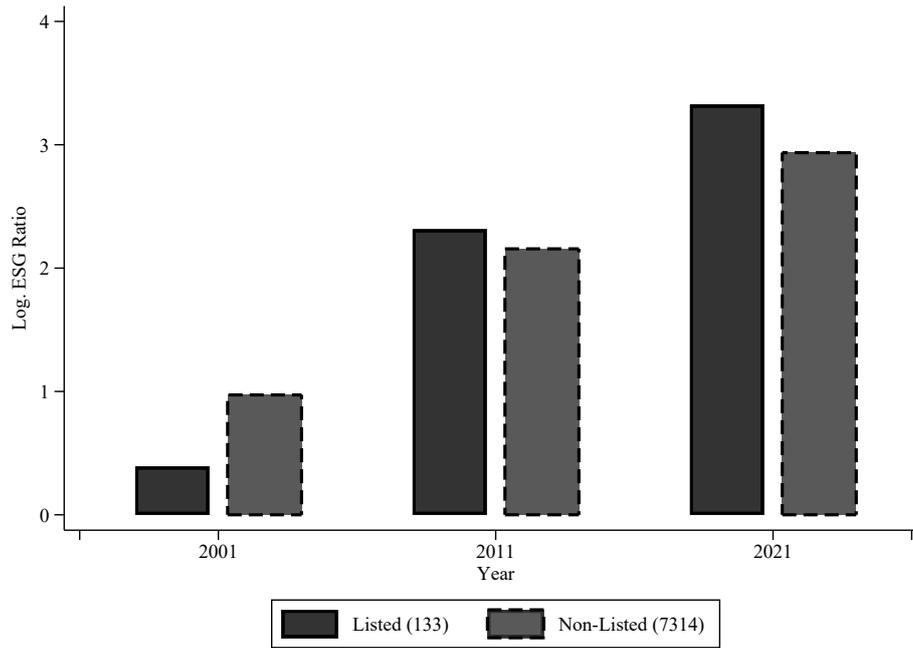
**(A) PE Firm ESG Disclosures by Headquarter Country**



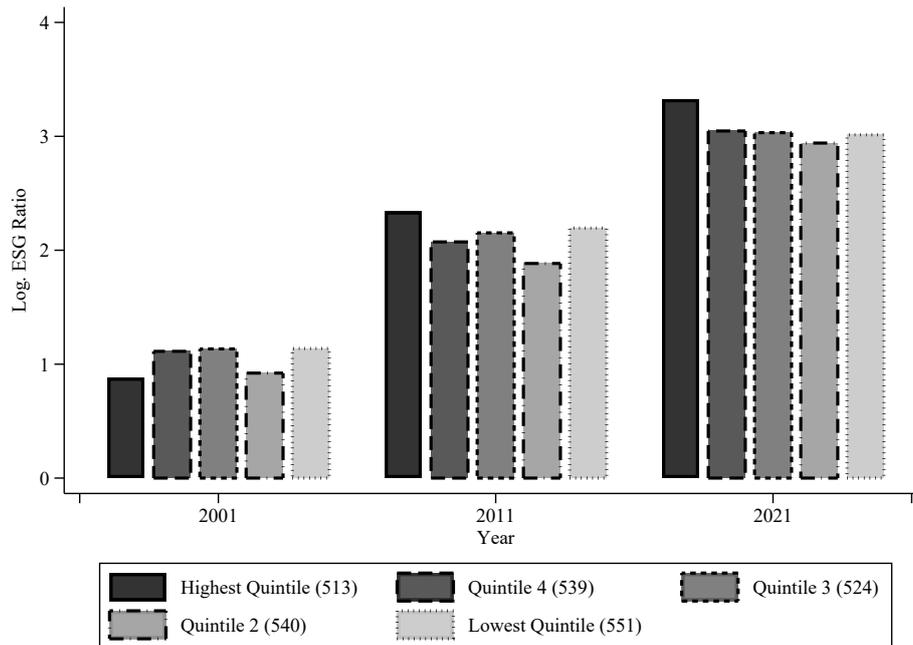
**(B) PE Firm ESG Disclosures by Main Investment Strategy**



(C) PE Firm ESG Disclosures by Listed/Unlisted Status



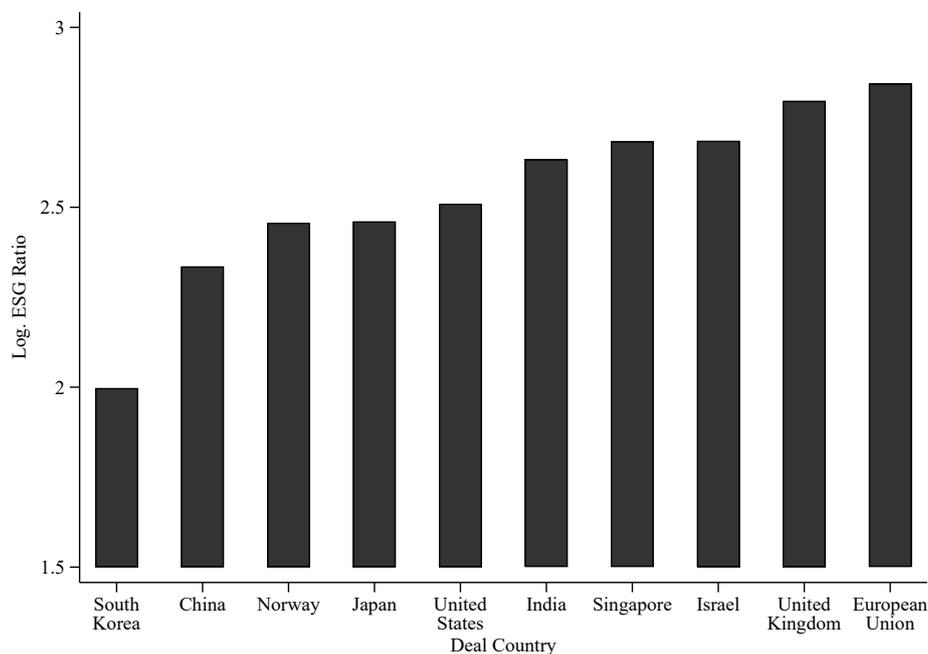
(D) PE Firm ESG Disclosures by Size (AuM)



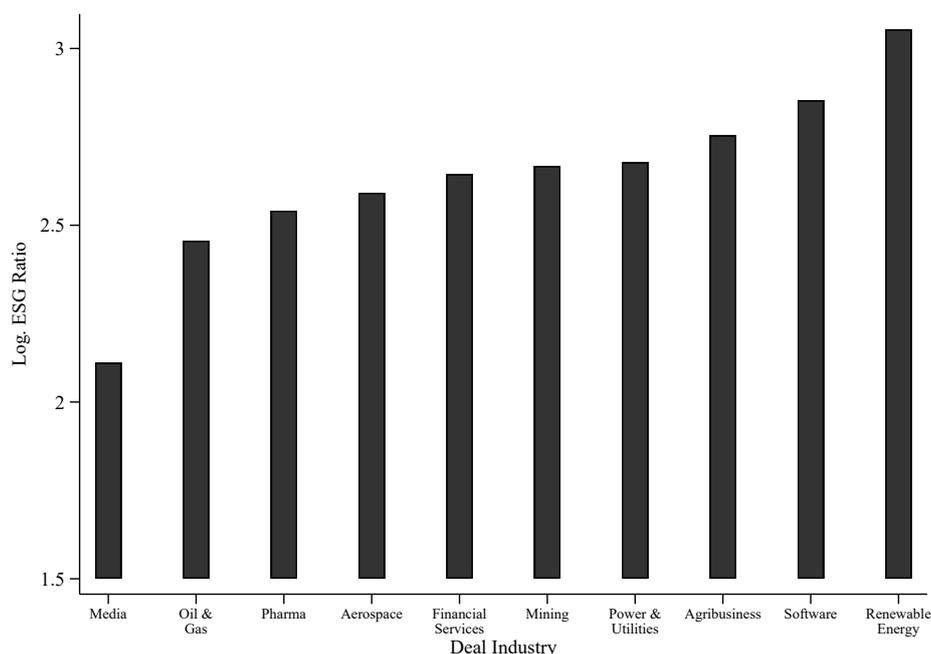
Notes: The first figure presents the average values of *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website) for different subsamples. Panels A to D present the number of observations in each subsample in parentheses in the figures' legends. Panel A presents the average *Log.ESG Ratio* for different PE firm headquarter countries in the years 2001, 2011, and 2021. Panel B presents average *Log. ESG Ratio* values for different PE firm main investment strategies according to Preqin's classification (buyout, growth, venture capital or others) in the years 2001, 2011 and 2021. Panel C presents average *Log. ESG Ratio* values for publicly listed versus non-listed PE firms in the years 2001, 2011, and 2021. Panel D presents average *Log. ESG Ratio* values for quintiles based on PE firm size measured by assets under management (AuM) from the Preqin database in the years 2001, 2011, and 2021.

**Figure 4: ESG Disclosures and PE Firm's Investment Portfolio Characteristics**

**(A) PE Firm's Country for Investments**



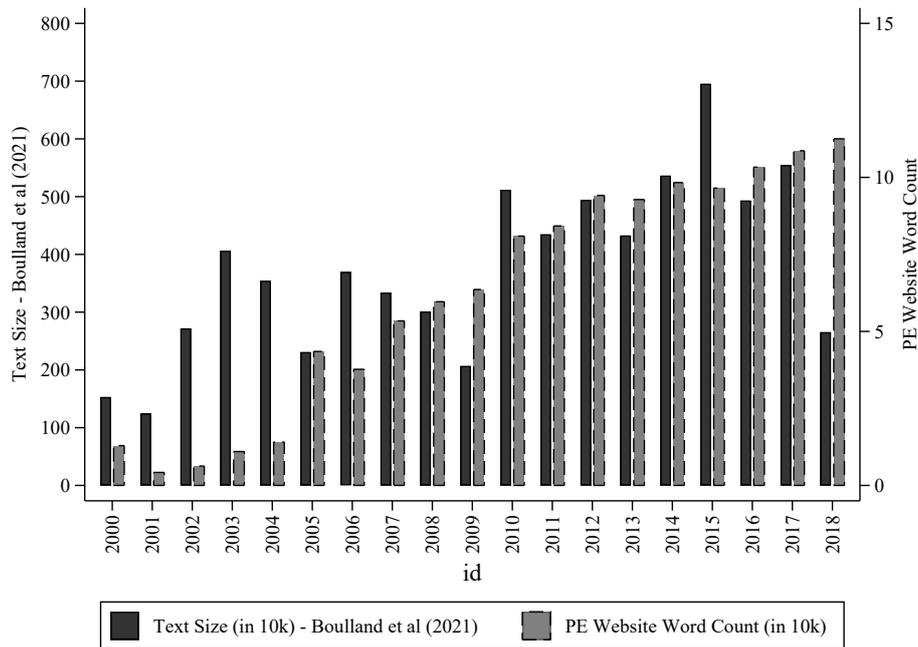
**(B) PE Firm's Industry for Investments**



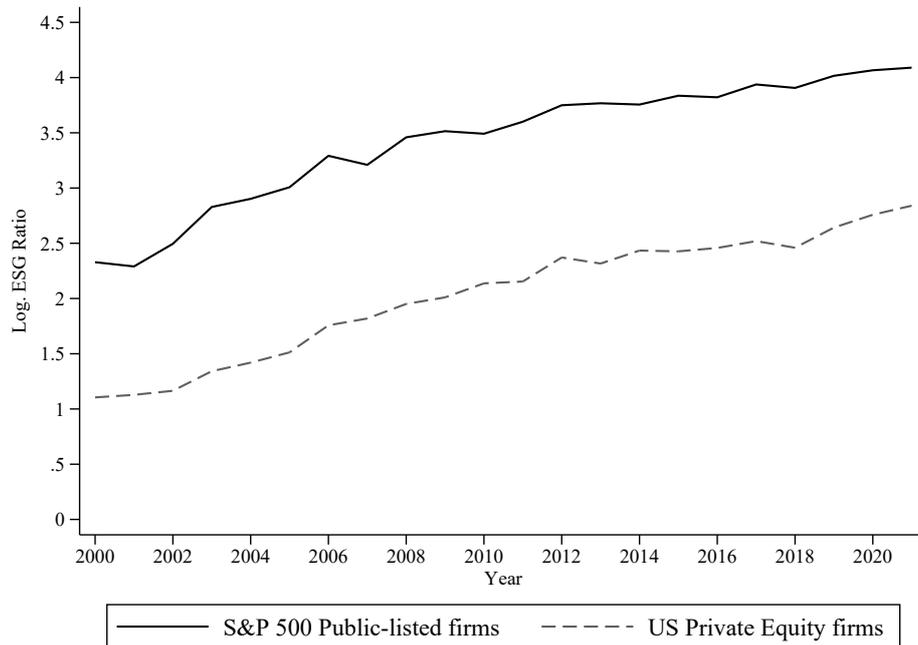
*Notes:* The first figure presents average values in *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website) by PE firms' (1) country where portfolio companies are headquartered (Panel A) and (2) industry of portfolio companies (Panel B) over the entire sample period (2000-2021). We calculate the average *Log. ESG Ratio* for each country by taking the simple mean of the *Log. ESG Ratio* across all PE firms that engaged in a private equity deal in a particular country. Similarly, we calculate the average *Log. ESG Ratio* for each investment industry by taking the simple mean of the *Log. ESG Ratio* across all PE firms that engaged in a private equity deal in that particular industry.

**Figure 5: PE Firm Ebsite Disclosures versus Public Firm Benchmarks**

**(A) US PE Firms' and Public Firms' Website Disclosures**

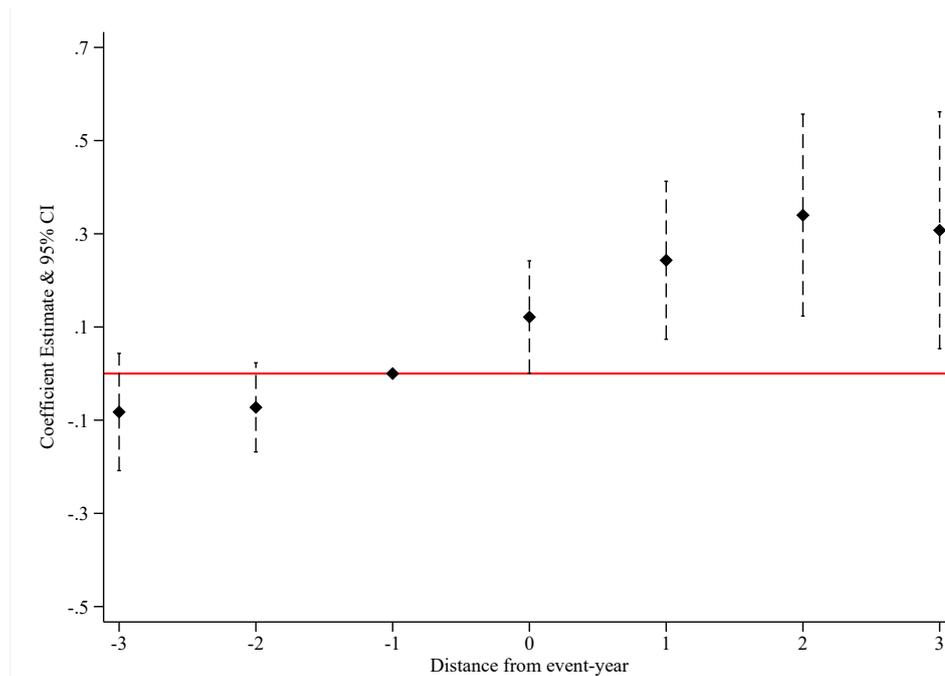


**(B) US PE Firms' and Public Firms' Website ESG Disclosures**



*Notes:* The figures compare website disclosures of US-based PE firms with similar disclosures provided by publicly listed firms. Panel A shows the annual average of the total word count of PE firm websites used in our analysis (dashed bars) and the website disclosures (in bytes) of publicly listed firms' websites as used in [Boulland, Bourveau, and Breuer \(2021\)](#) (solid bars). The sample stops in 2018, the last year in [Boulland, Bourveau, and Breuer \(2021\)](#) sample. Panel B shows the evolution in the average annual values of *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website) for our sample of US based PE firms (dashed line) and ESG related words computed similarly for publicly listed firms in the S&P 500 index (solid line). For the S&P 500 sample in this figure, we included all firms that were part of the S&P 500 index anytime between 2000 and 2021 and removed firms with missing websites, leading to a sample of 411 firms.

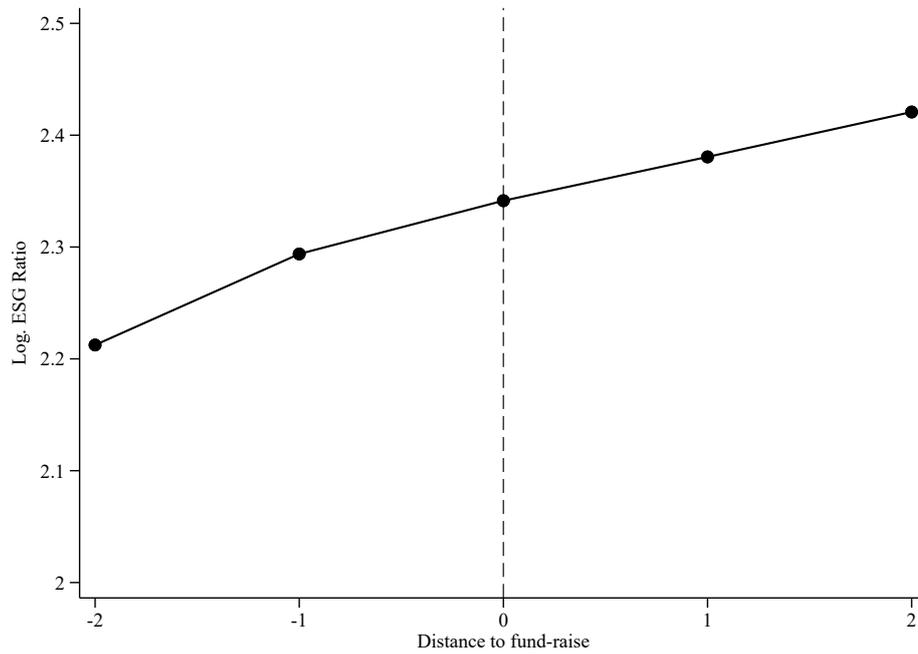
**Figure 6: PE Firm ESG Disclosures and Signing up to UN-PRI**



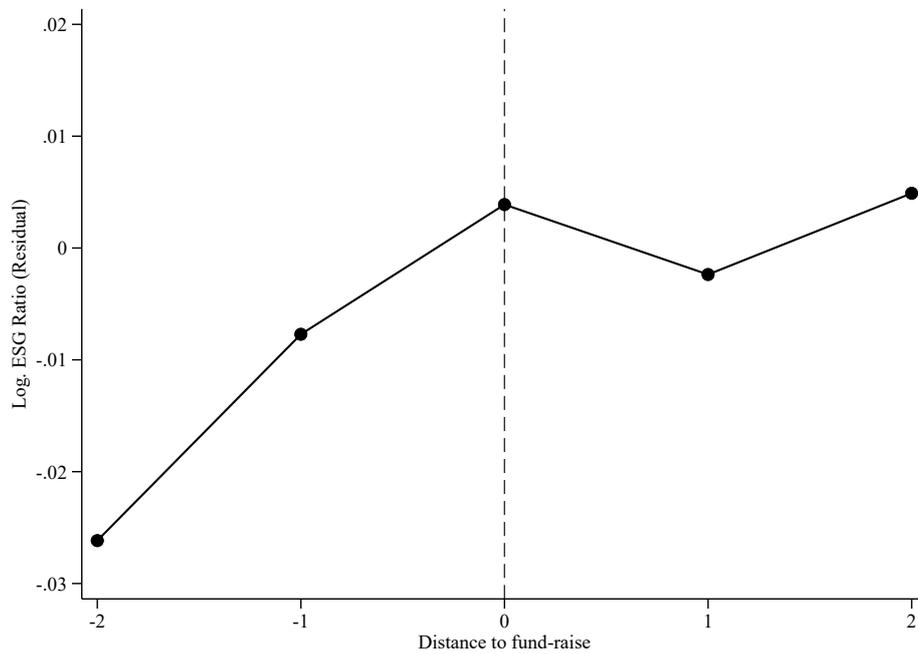
*Notes:* This figure shows event-study coefficient estimates from an OLS regression of *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website) using a staggered difference-in-difference test design with the treatment event being a PE firm signing up to the United Nations Principles of Responsible Investment (UN-PRI). The *y-axis* shows the coefficient estimate and the 95% confidence intervals for the outcome variable (*Log. ESG Ratio*). The *x-axis* shows the year relative to the treatment (year  $t = 0$  is the year of signing up to the UN-PRI pledge). We present estimates for 3 years after and 3 years prior to the treatment year. The diamond markers represent the estimate for the difference in *Log. ESG ratio* between treated and control PE firms for years  $t = -3$  to  $t = 3$ . The dotted vertical capped lines represent the 95% confidence interval. The pre-treatment year  $t = -1$  serves as the baseline year for the regression. The specification includes control variables as defined for Eq. (2) (macroeconomic controls Log. GDP, GDP Growth, Log Population, Labor Force (%), and Female Representation (%)) and website-based controls Log. Positive Words Ratio and Log. Valuation Words Ratio). Variable definitions are provided in Appendix A. The specification also includes country-year, PE firm and website size group-year fixed effects. Standard errors are clustered at the PE Firm level.

**Figure 7: PE Firm ESG Disclosures and Fundraising**

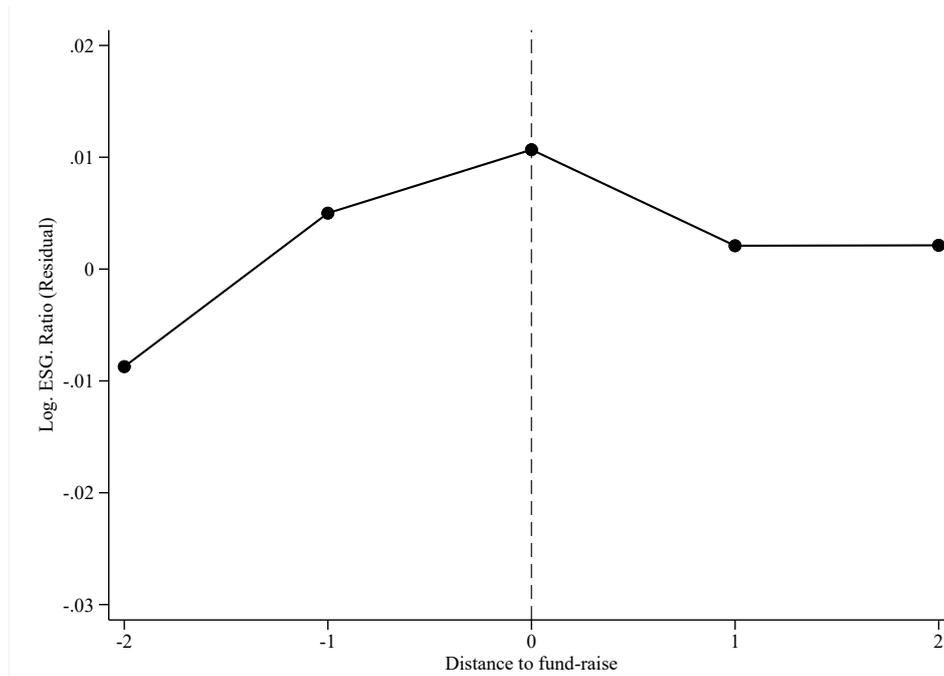
**(A) Average Log. ESG Ratio around Fundraising Years**



**(B) Log. ESG Ratio after Firm Fixed Effects around Fundraising Years**



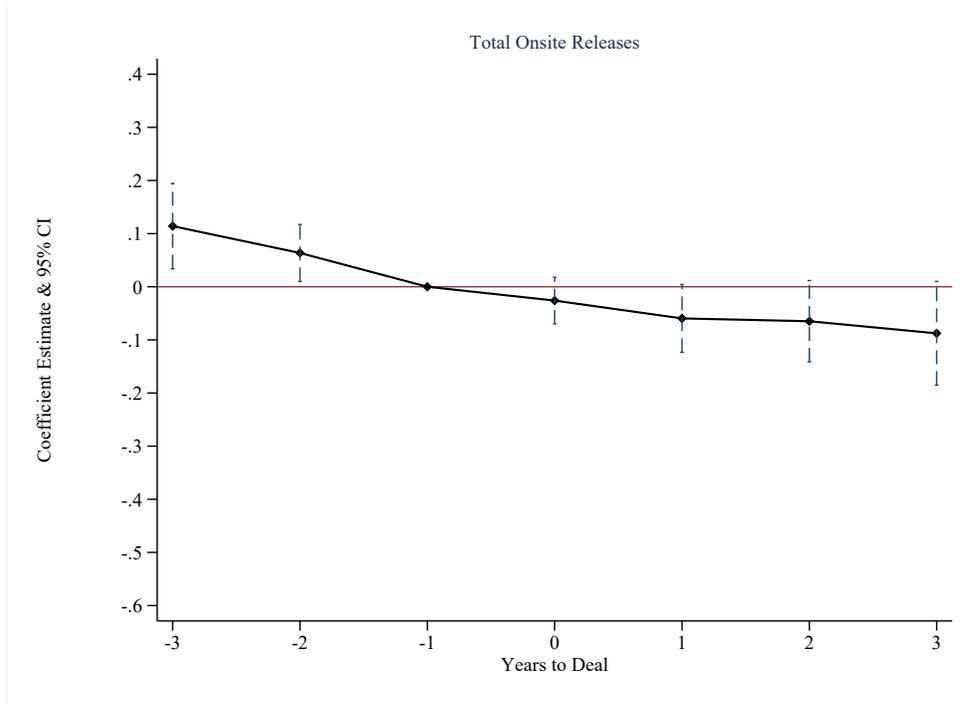
(C) Log. ESG Ratio after Firm & Year Fixed Effects around Fundraising Years



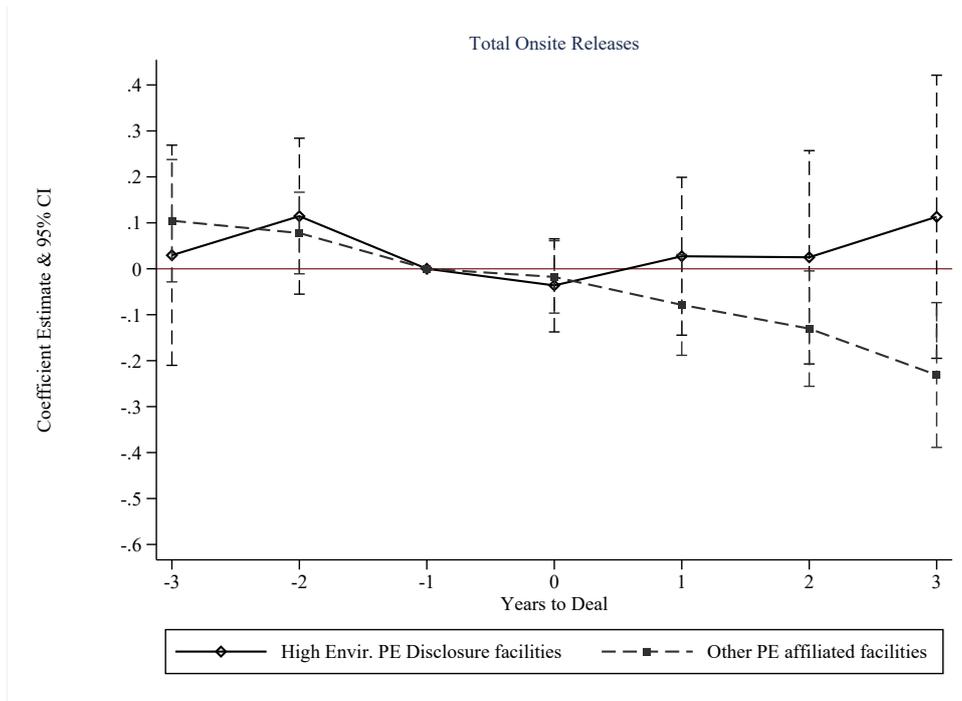
*Notes:* The figures show PE firm ESG disclosures around the year of large fundraising events. A year is considered as a year with a large fundraising event if the PE Firm raises funds in that year and the funds raised exceed any funds raised in the immediate prior year and the subsequent year. We use time-series information on PE fundraising from Preqin. Panel A plots the evolution of average annual values in *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website) for fundraising PE firms in the two years before, in the year of the fundraising, and in the two years after the fundraising. Panel B plots the average annual residual values of *Log. ESG Ratio* after regressing *Log. ESG Ratio* on a PE firm's natural logarithm of the total website word count (*Log. Word Count*) and PE firm fixed effects. Panel C plots of average annual residual values of *Log. ESG Ratio* after regressing it on a PE firm's natural logarithm of the total website word count (*Log. Word Count*), PE firm fixed effects, and year fixed effects.

**Figure 8: PE Firm ESG Disclosures and PE-owned Facilities' Environmental Pollution**

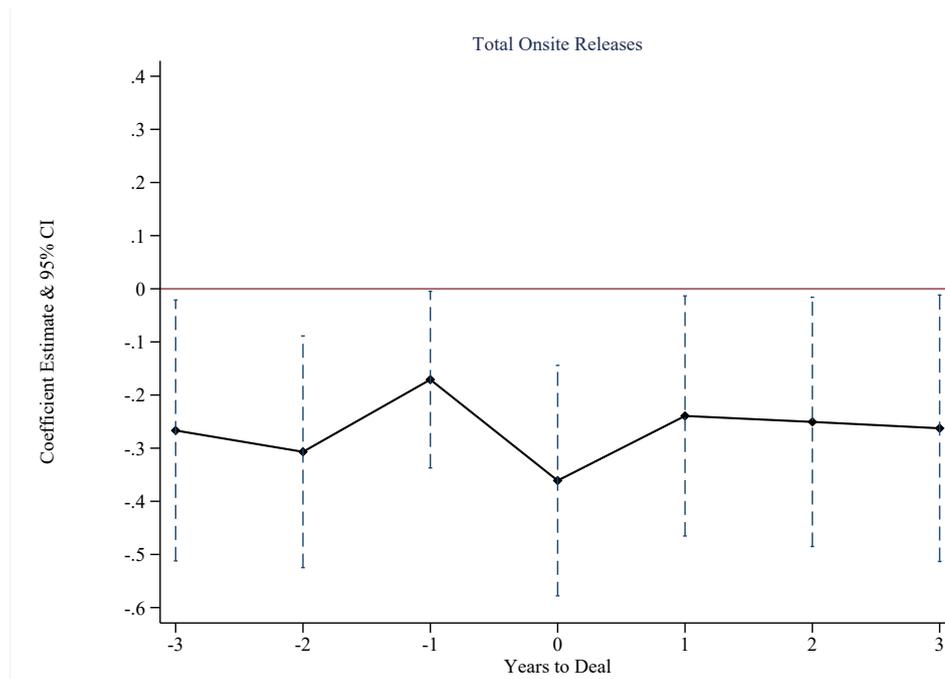
**(A) Portfolio Company PE Investments and Facilities' Emissions**



**(B) Portfolio Company PE Investments and Facilities' Emissions - High PE Environmental Discl. vs. Others**



(C) Portfolio Company PE Investments and Facilities' Emissions Conditional on PE Firm ESG Disclosures



*Notes:* The figures present results of different event-study coefficient estimates from OLS regressions of the facility-level chemical releases on PE portfolio company indicators and PE firms' ESG disclosures using difference-in-differences and triple differences specifications. The unit of observation is the facility-year in the period 2000-2021, where a facility is a US based production entity that reports to the US Environmental Protection Agency's (EPA) Toxic Release Inventory (TRI). A facility is considered as treated if it belongs to a portfolio company acquired by a PE firm (i.e., when the facility becomes PE-owned). The relative event year  $t = 0$  indicates that a PE firm invested in a portfolio company which owns a given facility in a given calendar year. The outcome variable is *Log. Total Onsite Releases*, defined as the natural logarithm of the total amount of all chemicals released by a given facility on its site in a given year (in pounds). In all specifications, we include a benchmark control variable defined as the natural logarithm of average across all facilities of the total chemical onsite releases within a facility's industry and year (see Eq. (3)). We also include facility and year fixed effects. Standard errors are clustered by facility. The y-axis shows coefficient estimates and the 95% confidence interval. The x-axis shows the year relative to the treatment. We present estimates for 3 years following and 3 years prior to the treatment year. The pre-treatment year at  $t = -1$  serves as the baseline year for the regression. Panel A presents results from a baseline regression of *Log. Total Onsite Releases* on the relative event-year indicators (independent of a PE firms' environmental disclosures) using a staggered difference-in-differences design. Panel B presents results from two separate staggered difference-in-differences regressions based on the model presented in Panel A using two different subsamples. The continuous line shows coefficients for facilities acquired by PE Firms with relatively high environmental disclosures (PE firm being in the highest quartile in the sample distribution of *Log. Envir. Ratio* in the year of the acquisition), labelled as *High Envir. PE Disclosure = 1*. The control firms in this regression are all facilities that have not been acquired by a PE firm in a given year. The dotted line shows coefficient estimates for facilities acquired by PE Firms which are not in the top quartile of the distribution of *Log. Envir. Ratio* in the year of acquisition (labelled as *High Envir. PE Disclosure = 0*). Panel C presents results from a triple differences regression where the relative event-year indicators are interacted with the continuous environmental disclosure variable (*Log. Envir. Ratio*) of the PE firm as of the year of the PE deal. The line shows the coefficient estimates and the 95% confidence intervals for the interaction term of *Log. Envir. Ratio* and relative event year indicators. In this specification, the coefficient on the baseline year  $t = -1$  is still omitted, but the triple differences design allows us to estimate a coefficient for the difference in chemical releases across facilities acquired by PE firms with different levels of environmental disclosures in year  $t = -1$ .

**Table 1: Sample Selection**

<i>Panel A</i> <b>Sample Selection: PE Firms &amp; Website Data</b>	<b>Unique PE Firms</b>		
(1) Unique PE Firms in Preqin with website and domicile information	22,886		
<i>less</i> PE Firms with non-English language website or website Alexa rank $\leq 10,000$	9,847		
<i>less</i> PE Firms with missing website data on the Wayback Machine	7,166		
(2) Unique PE Firms with website data	5,873		
<i>Panel B</i> <b>Sample Selection: Regression Samples</b>	<b>Unique PE Firms</b>	<b>Observ.</b>	<b>Unit</b>
<i>less</i> PE Firms without data on investments in portfolio companies in Preqin	3,390		
<i>less</i> PE Firm-years with missing control variables	36		
<b>Mandatory ESG Disclosure Sample - Table 3</b>	2,447	22,898	PE Firm-Year
<i>less</i> PE Firms without data on investments in portfolio companies in Preqin	3,390		
<i>less</i> PE Firm-years with missing control variables	21		
<b>UN-PRI Signatory Sample - Table 4</b>	2,462	23,987	PE Firm-Year
<i>less</i> PE Firms with portfolio company investments only in industries not covered by the EPA's TRI	2,064		
<i>less</i> PE Firms with portfolio company investments only outside the US	1,173		
<i>less</i> PE Firms with no portfolio companies matched to facility-owner firms in TRI database	2,279		
<i>less</i> facility-years with missing control variables	46		
<b>EPA Toxic Release Inventory Sample - Table 5</b>	311	424,893	Facility-Year
<i>less</i> PE Firms without fund-performance data	4,697		
<i>less</i> PE Fund-quarters with missing control variables	573		
<b>Fund Performance Sample - Table 6</b>	603	51,756	PE Fund-Quarter

*Notes:* This table shows the sample construction steps for our analysis of PE firms' website ESG disclosures. The period covered is 2000-2021. In Panel A, we present the sample construction of website disclosures from the Wayback Machine for PE firms available in the Preqin database. In Panel B, we present the sample construction for the separate regression samples in our analysis. We show the sample selection steps starting from the baseline sample of PE firms for which we observe website disclosures (line (2) in Panel A). We also present the number of observations and the unit of observation for each regression sample.

**Table 2: Summary Statistics**

<i>Variable</i>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>P5</b>	<b>Median</b>	<b>P95</b>
<i>- PE Firm Website Disclosure Variables</i>						
Log. ESG Ratio	51,441	2.35	1.59	0.00	2.79	4.60
Log. Envir. Ratio	51,374	0.77	1.00	0.00	0.00	2.85
Log. Social Ratio	51,391	0.68	1.01	0.00	0.00	2.90
Log. Gov. Ratio	51,398	0.33	0.67	0.00	0.00	1.93
<i>- Variables of Interest</i>						
ESG Regulation Exposure	23,414	0.22	0.34	0.00	0.03	1.00
Envir. Regn Exp	23,414	0.26	0.36	0.00	0.06	1.00
Social Regn Exp	23,414	0.24	0.35	0.00	0.05	1.00
Gov. Regn Exp	23,414	0.23	0.34	0.00	0.04	1.00
Post UN-PRI Pledge	24,531	0.03	0.18	0.00	0.00	0.00
<i>- Toxic Release Variables from EPA-TRI</i>						
Log. Total Onsite Releases	440,987	5.21	4.37	0.00	5.52	12.20
(CERCL Act)	393,897	5.30	4.32	0.00	5.59	12.00
(Clean Air Act)	383,920	4.79	4.27	0.00	4.31	11.69
(Safe Drinking Water Act)	374,292	4.15	4.08	0.00	3.04	11.32
(Other Chemicals)	73,222	5.31	3.96	0.00	5.56	11.44
<i>- PE Fund Financial Performance from Preqin</i>						
Net IRR (%)	49,389	13.95	16.05	-7.73	12.08	41.64
Abnormal IRR	44,594	1.05	1.82	-0.93	0.98	3.27
Net Multiple (X)	50,402	1.60	0.70	0.83	1.47	2.82
Abnormal Multiple	45,628	1.04	0.31	0.60	1.00	1.57
Distribution to Paid-in (%)	50,945	94.76	85.04	2.01	78.41	241.11
Abnormal DPI	45,938	4.82	48.96	-64.81	0.39	85.41
<i>- Control Variables</i>						
Log. Positive Words Ratio	51,428	4.40	1.82	0.00	5.08	5.86
Log. Valuation Words Ratio	51,381	3.54	1.70	0.00	4.05	5.40
Fund Age	52,483	8.10	4.62	2.00	8.00	16.00
Market ESG	52,483	0.77	0.74	0.07	0.49	2.50
Log. GDP (World Bank)	92,097	29.24	1.51	26.25	29.96	30.67
GDP growth (World Bank)	92,115	2.42	2.61	-2.93	2.42	6.22
Log. Population (World Bank)	92,115	18.84	1.17	16.59	19.44	19.78
Labor force (%) (World Bank)	92,115	66.33	21.08	0.00	73.15	77.84
Female Representation (%) (World Bank)	92,115	20.03	7.98	8.33	18.90	35.28

*Notes:* This table presents summary statistics for the main variables used in the analyses. We provide variable definitions in Appendix A. The table is structured by different types of variables used in the analysis: PE firm website disclosure variables, variables of interest (determinants of PE ESG disclosures), toxic release variables level from EPA-TRI, PE Fund financial performance variables from Preqin, and control variables from Preqin, the World Bank, and ADV. The toxic release variables are measured at the individual facility-year level. The PE fund performance variables are measured at the individual PE fund-calendar quarter level.

**Table 3: Effect of Mandatory Disclosures on PE ESG Disclosures**

<i>Panel A</i>	(1)	(2)	(3)
	Log. ESG Ratio		
ESG Regulation Exposure	0.31*** (0.10)	0.19** (0.08)	0.16** (0.08)
Log. Positive Words Ratio		0.32*** (0.02)	0.31*** (0.02)
Log. Valuation Words Ratio		0.19*** (0.02)	0.20*** (0.02)
Log. GDP		-0.17 (0.14)	-0.22 (0.14)
GDP Growth		0.00 (0.01)	0.00 (0.01)
Log. Population		1.94* (1.05)	1.93* (1.06)
Labor Force (%)		0.01 (0.00)	0.00 (0.00)
Female Representation (%)		-0.01 (0.01)	-0.01 (0.01)
Observations	22,815	22,815	22,815
Adj. R2	0.492	0.654	0.655
PE Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	No
Size Group-Year FE	No	No	Yes

<i>Panel B</i>	(1)	(2)	(3)
	Log. Envir. Ratio	Log. Social Ratio	Log. Gov. Ratio
ESG Regulation Exposure	0.12** (0.06)	0.35*** (0.06)	0.38*** (0.08)
Controls	Yes	Yes	Yes
Observations	22,682	22,684	22,584
Adj. R2	0.576	0.619	0.575
PE Firm FE	Yes	Yes	Yes
Size Group-Year FE	Yes	Yes	Yes

<i>Panel C</i>	(1)	(2)	(3)
	Log. Envir. Ratio	Log. Social Ratio	Log. Gov. Ratio
Envir. Regn Exp	0.23*** (0.08)		
Social Regn Exp		0.41*** (0.08)	
Gov. Regn Exp			0.40*** (0.07)
Controls	Yes	Yes	Yes
Observations	22,682	22,684	22,584
Adj. R2	0.576	0.618	0.575
PE Firm FE	Yes	Yes	Yes
Size Group-Year FE	Yes	Yes	Yes

*Notes:* This table presents the results of OLS regressions of Eq. (1), which models PE firms' ESG disclosures as a function of PE firms' exposure to mandatory ESG disclosure regulation around the world. The unit of observation is the PE firm-year from 2000 to 2021. In Panel A, the dependent variable is *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website). The independent variable of interest is *ESG Regulation Exposure*, defined as the sum-product of a PE firm's investment exposure in a given country and an indicator variable equal to one if the respective country imposes mandatory ESG disclosures on publicly listed firms in a given year. A PE firm's investment exposure is defined as the number of portfolio company acquisitions in a given country scaled by the total number of all portfolio company acquisitions in the sample year. Panel B presents results of re-estimating Eq. (1) for ESG disclosure variables computed like *Log. ESG Ratio* but separately capturing PE firms' disclosures of environmental, social, and governance-related words. In Panel C, the dependent variables are the different ESG disclosure variables for environmental, social, and governance related words. The independent variables are Regulation Exposure for environmental, social, and governance regulation. Control variables include *Log. Positive Words*, *Log. Valuation Words* (from the website text), and macroeconomic variables *Log. GDP*, *GDP Growth*, *Log. Population*, *Labor Force (%)* and *Female Representation (%)*. The macroeconomic variables are investment-weighted analogously to the ESG regulation exposure variable and vary at the PE firm-year level. Robust standard errors are clustered at the PE firm level and are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

**Table 4: PE ESG Disclosures and UN-PRI Signatories**

<i>Panel A</i>	(1)	(2)	(3)
	Log. ESG Ratio		
Post UN-PRI Pledge	0.24*** (0.08)	0.31*** (0.07)	0.30*** (0.07)
Log. Positive Words Ratio		0.32*** (0.02)	0.32*** (0.02)
Log. Valuation Words Ratio		0.19*** (0.02)	0.19*** (0.02)
Log. GDP		-0.07 (0.16)	-0.09 (0.17)
GDP Growth		0.01 (0.01)	0.01 (0.01)
Log. Population		0.59 (0.93)	0.69 (0.92)
Labor Force (%)		0.00 (0.01)	0.00 (0.01)
Female Representation (%)		-0.00 (0.01)	-0.00 (0.01)
Observations	23,431	23,431	23,431
Adj. R2	0.486	0.647	0.647
PE Firm FE	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes
Size Group-Year FE	No	No	Yes

<i>Panel B</i>	(1)	(2)	(3)
	Log. Envir. Ratio	Log. Social Ratio	Log. Gov. Ratio
Post UN-PRI Pledge	0.19*** (0.06)	0.29*** (0.07)	0.25*** (0.06)
Controls	Yes	Yes	Yes
Observations	23,281	23,300	23,168
Adj. R2	0.586	0.626	0.585
PE Firm FE	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes
Size Group-Year FE	Yes	Yes	Yes

*Notes:* This table presents the results of OLS regressions of Eq. (2), which models PE firms' ESG disclosures as a function of whether they are a signatory to the United Nations Principles of Responsible Investment (UN-PRI). The unit of observation is the PE firm-year from 2000 to 2021. In Panel A, the dependent variable is *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website). The independent variable of interest is Post UN-PRI Pledge which is an indicator variable that codes as 1 for PE firms that have signed the UN-PRI pledge starting from the year in which they signed the pledge and 0 otherwise. Panel B presents results of re-estimating Eq. (2) for ESG disclosure variables computed like *Log. ESG Ratio* but separately capturing PE firms' disclosures of environmental, social, and governance-related words. Control variables include Log. Positive Words, Log. Valuation Words (from the website text), and macroeconomic variables Log. GDP, GDP Growth, Log. Population, Labor Force (%) and Female Representation (%). The macroeconomic variables are investment-weighted analogously to the ESG regulation exposure variable (used in Eq. (1)) and vary at the PE firm-year level. Robust standard errors are clustered at the PE firm level and are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

**Table 5: PE ESG Disclosures and Portfolio Firm Toxic Releases**

<i>Panel A</i>	(1)	(2)	(3)	(4)
	Log. Total Onsite Releases			
High Envir. Quartile <sub>t0</sub> * Pre-Deal Period	-0.34*** (0.13)			
Pre-Deal Period	0.26*** (0.06)			
Log. Envir. Ratio <sub>t0</sub>		-0.19** (0.08)	-0.59*** (0.16)	-0.34** (0.16)
Log. ESG Ratio <sub>t0</sub>			0.19*** (0.07)	0.17** (0.08)
Industry-Year Benchmark Release	0.90*** (0.01)	0.89*** (0.01)	0.89*** (0.01)	0.79*** (0.03)
Observations	424,893	393,727	388,095	1,784
Adj. R2	0.838	0.307	0.337	0.282
Facility FE	Yes	No	No	No
Year FE	Yes	Yes	No	Yes
County-Year FE	No	No	Yes	No
Sample: Only Deal Year	No	Yes	Yes	Yes
Sample: Only PE-acquired Facilities	No	No	No	Yes
<i>Panel B</i>	(1)	(2)	(3)	(4)
	Log. Total Onsite Releases			
	CERCL Act	Clean Air Act	Safe Drinking Water Act	Other Chemicals
Log. Envir. Ratio <sub>t0</sub>	-0.61*** (0.17)	-0.67*** (0.17)	-0.54*** (0.17)	0.49 (0.37)
Log. ESG Ratio <sub>t0</sub>	0.20*** (0.07)	0.24*** (0.07)	0.15** (0.07)	-0.22* (0.13)
Industry-Year Benchmark Release	1.00*** (0.01)	0.84*** (0.01)	0.76*** (0.01)	0.82*** (0.02)
Observations	345,804	336,018	328,426	56,424
Adj. R2	0.326	0.346	0.309	0.276
County-Year FE	Yes	Yes	Yes	Yes
Sample: Only Deal Year	Yes	Yes	Yes	Yes

**Table 5: PE ESG Disclosures & Portfolio firm toxic releases (Contd.)**

*Notes:* This table provides results of the association between facility-level onsite toxic chemical releases, as provided by the EPA Toxic Releases Inventory (TRI) dataset, and the environmental disclosure choice made by PE firms. In all specifications the unit of observation is facility-year and the sample spans the period from 2000 to 2021. Panel A presents tests where the dependent variable is *Log. Total Onsite Release* which is the natural logarithm of the total amount of all chemicals released by a given facility onsite in a given year (in pounds). In column (1) the tests follow a staggered difference-in-differences specification. The independent variable is the interaction between *High Envir. Quartile<sub>t0</sub>* and *Pre-Deal Period*. *High Envir. Quartile<sub>t0</sub>* is an indicator variable coded as 1 if the *Log. Envir. Ratio* (the natural logarithm of one plus the number of environmental-related words per 10,000 words on a PE firm website) of the PE firm that acquired the facility is in the top quartile of its distribution in the year of the PE acquisition and 0 otherwise. *Pre-Deal Period* is an indicator variable coded as 1 for facilities that have been acquired by a PE firm in the period prior to the acquisition and 0 otherwise. This specification includes an industry benchmark control variable defined as the natural logarithm of the average total chemical onsite releases across all facilities by industry and year. Columns (2), (3) and (4) provide the results of OLS regressions in Eq. (3). The dependent variable is *Log. Total Onsite Release* and the independent variable is *Log. Envir. Ratio<sub>t0</sub>* which is the natural logarithm of the Environmental Ratio (refer to Appendix A) in the year of the PE acquisition of the facility. The specifications in columns (2) to (4) include as control the *Log. ESG Ratio* and the industry toxic release benchmarks. Panel B re-estimates the OLS regression in Eq. (3) but disaggregates the total onsite release by different categories of chemicals. The dependent variable *Log. Total Onsite Release* aggregates the amounts of all chemicals that belong to the respective category - column (1) for the Comprehensive Environmental Response, Compensation and Liability (CERCL) Act chemicals, column (2) for Clean Air Act chemicals, column (3) for Safe Drinking Water Act chemicals and column (4) for all other chemicals. The unit of observation is facility-year. Robust standard errors are clustered at the facility level and are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

**Table 6: PE ESG Disclosures & Fund Performance**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Net IRR (%)			Net Multiple (X)			Distribution to Paid-in Ratio (%)		
	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>
Log. ESG Ratio	0.56*** (0.18)	0.55** (0.23)	0.07*** (0.02)	0.02** (0.01)	0.02*** (0.01)	0.01** (0.00)	1.82** (0.72)	1.63** (0.78)	1.69*** (0.65)
Market ESG	-3.77* (2.24)	-2.65 (2.51)	0.17 (0.25)	-0.20* (0.11)	-0.15 (0.11)	-0.01 (0.05)	-16.98 (10.78)	-16.85 (11.34)	7.40 (9.31)
Fund Age	0.26** (0.11)	0.26** (0.11)	0.00 (0.01)	0.06*** (0.00)	0.06*** (0.00)	0.00*** (0.00)	13.87*** (0.39)	13.87*** (0.39)	0.77*** (0.25)
Log. Positive Words Ratio		-0.21 (0.29)	0.03 (0.02)		-0.01 (0.01)	0.00 (0.01)		-0.19 (0.85)	-0.22 (0.65)
Log. Valuation Words Ratio		0.32 (0.25)	-0.03 (0.03)		0.01 (0.01)	0.00 (0.01)		0.66 (0.85)	0.63 (0.81)
Log. GDP		-4.06 (2.52)	-0.51** (0.23)		-0.24** (0.12)	-0.08* (0.05)		-6.87 (12.09)	-14.87* (8.20)
GDP growth		0.19 (0.14)	-0.00 (0.02)		0.00 (0.01)	0.01** (0.00)		-0.65 (0.44)	-0.36 (0.44)
Log. Population		2.25* (1.20)	0.08 (0.10)		0.18*** (0.06)	-0.00 (0.03)		6.79 (5.36)	-0.14 (3.66)
Labor force (%)		-0.02 (0.04)	-0.00 (0.00)		0.00 (0.00)	0.00 (0.00)		0.24 (0.22)	0.31** (0.16)
Female Representation (%)		-0.16 (0.27)	-0.00 (0.02)		-0.00 (0.01)	-0.00 (0.00)		0.53 (0.92)	-0.41 (0.77)
Observations	48,691	48,691	44,051	49,646	49,646	45,064	50,184	50,184	45,368
Adj. R2	0.207	0.208	0.098	0.335	0.337	0.254	0.582	0.582	0.210
PE Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Strategy FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calendar-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes:* This table presents the results of OLS regression of Eq. (4) which examines the fund level performance as a function of the PE firms' ESG disclosures. The unit of observation is PE Fund-Calendar quarter and spans the period from 2000 to 2021. The dependent variables are Net IRR (%) in columns (1) and (2), which is the money weighted return of the fund expressed as a percentage, Abnormal IRR in column (3), which is the ratio of Net IRR to peer funds' Benchmark IRR, Net Multiple (X) in columns (4) and (5), where Net Multiple (X) is the ratio of the sum of distributions and unrealized fund value to the total called capital, Abnormal Multiple in column (6), which is the ratio of Net Multiple to peer funds' Benchmark Multiple, Distribution to paid-in ratio (%) in columns (7) and (8), defined as the ratio of fund distributions to capital called, and Abnormal DPI in column (9), defined as the difference between fund DPI and peer funds' benchmark DPI. The independent variable is *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website). Please refer to Appendix A for variable definitions. Control variables include Market ESG, Fund Age, Log. Positive Words, Log. Valuation Words (from the website text), and macroeconomic variables Log. GDP, GDP Growth, Log. Population, Labor Force (%) and Female Representation (%). The macroeconomic variables and the Market ESG variable are investment-weighted analogously to the ESG regulation exposure variable (used in Eq. (1)) and vary at the PE firm-year level. Robust standard errors are clustered at the PE firm level and are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

## **Online Appendix**

### **ESG Disclosures in the Private Equity Industry**

This version: November 1, 2022

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**Table OA.1: Dictionaries used to Construct ESG Website Disclosures**

Dictionaries	
ESG	
1. active ownership	46. climate finance
2. ad hoc group on article 13	47. climate financial forum
3. afforestation	48. climate financial risk forum
4. anti-competitive behavior	49. climate fund
5. anti-trust	50. climate risk
6. bali action plan	51. climate transition
7. bali road map	52. coal exposure
8. berlin mandate	53. coalition for rainforest nations
9. biodiversity	54. code of ethics
10. biofuel	55. collective bargaining
11. biomass	56. community
12. board evaluation	57. community impact
13. bonn agreements	58. community investing
14. brazilian proposal	59. compulsory labor
15. bunker fuel	60. conference of the parties
16. carbon	61. conflict of interest
17. carbon biological sink	62. conservation
18. carbon capture	63. controversial business involvement
19. carbon dioxide	64. convention on biological diversity
20. carbon disclosure	65. corporate citizenship
21. carbon disclosure project	66. corporate governance
22. carbon footprint	67. corporate responsibility
23. carbon market	68. corporate social responsibility
24. carbon neutral	69. corruption
25. carbon offsetting	70. cumulative voting
26. carbon price	71. customer health
27. carbon pricing	72. customer safety
28. carbon sequestration	73. dark green
29. carbon sink	74. decarbonisation
30. carbon storage	75. deforestation
31. carbon trust	76. director evaluation
32. cartagena dialogue	77. director pay
33. certification	78. distress
34. child labor	79. distressed
35. chlorofluorocarbon	80. diversity
36. circular economy	81. double bottom line
37. clean development mechanism	82. due diligence
38. clean tech	83. effluent
39. cleantech	84. emission
40. climate	85. emission intensity
41. climate action	86. emission reduction
42. climate change adaptation	87. emissions
43. climate change mitigation	88. emissions intensity
44. climate clock	89. emissions reduction
45. climate disclosure standards board	90. emissions trading

**Table OA.1: Dictionaries used to Construct ESG Website Disclosures (contd.)**

<b>Dictionaries</b>	
<b>ESG</b>	
91. energy and ecological transition for the climate	131. green bond principles
92. energy efficiency	132. green building
93. environment	132. green climate
94. equality	133. green climate fund
95. equator principal	133. green deal
96. esg certification	134. green finance
97. ethical investing	134. green finance institute
98. ethics	135. green hydrogen
99. eu action plan for financing sustainable growth	135. green investing
100. eu emissions trading system	136. green lease
eu green bonds standard	136. green loan
101. eu taxonomy	137. green loan principles
102. european green deal	137. green mortgage
103. exclusionary screening	138. green project
104. external audit	138. green tagging
105. fair pay	139. greenhouse gas
106. fair share	139. greenwashing
107. fiduciary duty	140. groundwater pollution
108. food sustain	140. hazardous waste
109. food sustainability	141. human capital
110. forced labor	141. human rights
111. forest	142. hydrofluorocarbon
112. forest degradation	142. impact investing
113. fossil fuel	143. inclusion
114. fraud	143. independent
115. freedom of association	144. independent audit
116. fsb roadmap for addressing climate-related financial risks	144. independent auditor
117. gender equality	145. independent director
118. gender pay	145. indigenous people
119. global climate observing system	146. interfaith center on corporate responsibility
120. global environment facility	147. intergovernmental panel on climate change
121. global impact investing network	148. internal audit
122. global ocean observing system	149. internal control
123. global real estate sustainability benchmark	150. international climate change partnership
124. global reporting initiative	151. international council of local environmental initiatives
125. global sustainable finance council	152. international integrated reporting council
126. global warming	153. international integrated reporting framework
127. governance	154. international union for conservation of nature
128. green	155. investor environmental health network
129. green america	
130. green bond	

**Table OA.1: Dictionaries used to Construct ESG Website Disclosures (contd.)**

<b>Dictionaries</b>	
<b>ESG</b>	
156. investor network on climate risk	201. related parties
157. kyoto protocol	202. related party
158. land use	203. renewable
159. landfill	204. renewable energy
160. light green	205. responsible investment
161. local communities	206. rio conventions
162. local community	207. sasb materiality map
163. marrakesh accords	208. science based targets
164. material esg	209. science-based target
165. methane	210. shareholder advocacy
166. millennium development goals	211. sin stocks
167. minimum wage	212. slavery
168. modern slavery	213. social
169. montreal protocol	214. social bond
170. moskowitz prize	215. social impact bonds
171. negative screening	216. social justice
172. net zero	217. social loan
173. network for greening the financial system	218. social responsibility investing
174. nitrous oxide	219. social sustainability
175. non-discrimination	220. socially responsible
176. norms-based screening	221. socially screened
177. occupational health	222. stewardship
178. occupational safety	223. stewardship code
179. oil spill	224. stranded asset
180. ozone	225. sulphur hexafluoride
181. ozone depeletion	226. sustainability
182. ozone depleting	227. sustainability accounting standards board
183. parental leave	228. sustainability coordinator
184. paris agreement	229. sustainability framework
185. pay disparity	230. sustainability linked loan
186. pay gap	231. sustainability performance targets
187. perfluorocarbon	232. sustainability reporting
188. platform on sustainable finance	233. sustainability reporting framework
189. pollution	234. sustainability structuring agent
190. poseidon principles	235. sustainable
191. positive screening	236. sustainable bond
192. principles for responsible investment	237. sustainable companies
193. principles of responsible investing	238. sustainable development
194. prior and informed consent	239. sustainable development goals
195. proxy voting	240. sustainable finance
196. rainforest	241. sustainable finance action plan
197. recycle	242. sustainable finance disclosure regulation
198. recycling	243. sustainable investing
199. reforestation	244. sustainable supply chains
200. regulatory compliance	245. sustainable technology

**Table OA.1: Dictionaries used to Construct ESG Website Disclosures (contd.)**

<b>Dictionaries</b>	
<b>ESG</b>	
246. task force on climate-related financial disclosures	277. worker representative
247. tax avoidance	278. work-related hazard
248. tax payments	279. work-related injury
249. technical expert group on sustainable finance	280. world climate conference
250. thermal coal	281. CDFI
251. third-party assurance	282. CFC
252. transition risk	283. CFC11
253. trichlorofluoromethane	284. CFRF
254. triple bottom line	285. CH4
255. un global compact	286. CO2
256. un sustainable development goals	287. COP
257. under-represented	288. CSR
258. united nations conference on environment and development	289. ESG
259. united nations convention to combat desertification	290. FPIC
260. united nations environment programme	291. GHG
261. united nations environment programme finance initiative	292. GIIN
262. united nations framework convention on climate change	293. GRESB
263. united nations global compact	294. GRI
264. voting rights	295. HFC
265. vulnerable group	296. ICCR
266. waste disposal method	297. IEHN
267. water	298. IIRC
268. water consumption	299. INCR
269. water discharge	300. N2O
270. water pollution	301. PEC
271. water stewardship	302. SASB
272. water storage	303. SDG
273. water stress	304. SF6
274. water withdrawal	305. SRI
275. worker consultation	306. TCFD
276. worker participation	307. UN PRI
	308. UNCCD
	309. UNCED
	310. UNEP
	311. UNFCCC
	312. UNPRI
	313. WCC

*Notes:* This table shows the list of words used to construct the ESG dictionary. These words/phrases have been sourced from the United Nations Principles of Responsible Investing Reporting Framework glossary, the United Nations Framework Convention on Climate Change, and from glossaries provided by industry associations and practitioners: the Loan Market Association (LMA) Green Lending Glossary, Allianz Global Investors ESG Glossary, Alliance Bernstein glossary of responsible investment terms, Global Affairs Associates ESG glossary, First Affirmative Financial Network glossary of responsible investment, and Nuveen ABCs of responsible investing glossary.

**Table OA.2: Dictionaries (Environment) used to Construct ESG Website Disclosures**

<b>Dictionaries</b>	
<b>Panel A: Environment</b>	
1. afforestation	49. global warming
2. biodiversity	50. green america
3. biofuel	51. green bond
4. biomass	52. green building
5. bunker fuel	53. green climate
6. carbon biological sink	54. green deal
7. carbon capture	55. green finance
8. carbon dioxide	56. green hydrogen
9. carbon disclosure	57. green investing
10. carbon footprint	58. green lease
11. carbon market	59. green loan
12. carbon neutral	60. green mortgage
13. carbon offsetting	61. green project
14. carbon price	62. green tagging
15. carbon pricing	63. greenhouse gas
16. carbon sequestration	64. greenwashing
17. carbon sink	65. groundwater pollution
18. carbon storage	66. hazardous waste
19. carbon trust	67. hydrofluorocarbon
20. chlorofluorocarbon	68. landfill
21. circular economy	69. light green
22. clean tech	70. methane
23. cleantech	71. net zero
24. climate action	72. nitrous oxide
25. climate change adaptation	73. oil spill
26. climate change mitigation	74. ozone depletion
27. climate clock	75. ozone depleting
28. climate finance	76. perfluorocarbon
29. climate financial forum	77. pollution
30. climate financial risk forum	78. rainforest
31. climate fund	79. recycle
32. climate risk	80. recycling
33. climate transition	81. reforestation
34. coal exposure	82. renewable energy
35. conservation	83. science based targets
36. dark green	84. stranded asset
37. decarbonisation	85. sulphur hexafluoride
38. deforestation	86. thermal coal
39. effluent	87. trichlorofluoromethane
40. emission intensity	88. waste disposal method
41. emission reduction	89. water consumption
42. emissions intensity	90. water discharge
43. emissions reduction	91. water pollution
44. emissions trading	92. water stewardship
45. energy efficiency	93. water storage
46. environment	94. water stress
47. forest degradation	95. water withdrawal
48. fossil fuel	

**Table OA.2: Dictionaries (Social) used to Construct ESG Website Disclosures**

<b>Dictionaries</b>	
<b>Panel B: Social</b>	
1. anti-competitive behavior	46. socially screened
2. anti-trust	47. under-represented
3. child labor	48. voting rights
4. collective bargaining	49. vulnerable group
5. community impact	50. worker consultation
6. community investing	51. worker participation
7. compulsory labor	52. worker representative
8. controversial business involvement	53. work-related hazard
9. corporate citizenship	54. work-related injury
10. corporate social responsibility	
11. customer health	
12. customer safety	
13. diversity	
14. ethical investing	
15. fair pay	
16. forced labor	
17. freedom of association	
18. gender equality	
19. gender pay	
20. human rights	
21. impact investing	
22. inclusion	
23. indigenous people	
24. local communities	
25. local community	
26. minimum wage	
27. modern slavery	
28. non-discrimination	
29. occupational health	
30. occupational safety	
31. parental leave	
32. pay disparity	
33. pay gap	
34. prior and informed consent	
35. responsible investment	
36. sin stocks	
37. slavery	
38. social	
39. social bond	
40. social impact bonds	
41. social justice	
42. social loan	
43. social responsibility investing	
44. social sustainability	
45. socially responsible	

**Table OA.2: Dictionaries (Social) used to Construct ESG Website Disclosures**

<b>Dictionaries</b>
<b>Panel C: Governance</b>
1. code of ethics
2. conflict of interest
3. corporate governance
4. corporate responsibility
5. corruption
6. external audit
7. fraud
8. governance
9. independent auditor
10. internal control
11. related parties
12. related party
13. shareholder advocacy
14. tax avoidance
15. tax payments
16. third-party assurance

*Notes:* This table shows the list of words used to construct the Environmental, Social and Governance dictionaries. These words/phrases have been sourced from the United Nations Principles of Responsible Investing Reporting Framework glossary, the United Nations Framework Convention on Climate Change, and from glossaries provided by industry associations and practitioners: the Loan Market Association (LMA) Green Lending Glossary, Allianz Global Investors ESG Glossary, Alliance Bernstein glossary of responsible investment terms, Global Affairs Associates ESG glossary, First Affirmative Financial Network glossary of responsible investment, and Nuveen ABCs of responsible investing glossary.

**Table OA.3: Dictionary of Valuation Words**

Dictionaries		
Valuation		
1. adjusted book value method	46. fairness opinion	91. price/earnings multiple
2. adjusted net asset method	47. financial risk	92. rate of return
3. appraisal	48. forced liquidation value	93. redundant assets
4. appraisal approach	49. going concern	94. report date
5. appraisal date	50. going concern value	95. required rate of return
6. appraisal method	51. goodwill	96. residual value
7. appraisal procedure	52. goodwill value	97. return on equity
8. arbitrage pricing theory	53. guideline public company method	98. return on invested capital
9. asset approach	54. income (income-based) approach	99. risk premium
10. asset-based approach	55. intangible assets	100. rule of thumb
11. beta	56. internal rate of return	101. special interest purchasers
12. blockage discount	57. intrinsic value	102. sustaining capital reinvestment
13. book value	58. invested capital	103. systematic risk
14. business	59. invested capital net cash flows	104. tangible assets
15. business enterprise	60. investment risk	105. terminal value
16. business risk	61. investment value	106. transaction method
17. business valuation	62. key person discount	107. unlevered beta
18. capital asset pricing model	63. limited appraisal	108. unsystematic risk
19. capital structure	64. liquidation value	109. valuation
20. capitalization	65. liquidity	110. valuation approach
21. capitalization factor	66. majority control	111. valuation date
22. capitalization of earnings method	67. majority interest	112. valuation method
23. capitalization rate	68. market approach	113. valuation procedure
24. cash flow	69. market capitalization of equity	114. valuation ratio
25. common size statements	70. market capitalization of invested capital	115. value to the owner
26. control	71. market multiple	116. voting control
27. control premium	72. market-based approach	117. weighted average cost of capital
28. cost approach	73. marketability	118. CAPM
29. cost of capital	74. marketability discount	119. WACC
30. debt-free	75. merger and acquisition method	
31. discount for lack of control	76. mid-year discounting	
32. discount for lack of marketability	77. minority discount.	
33. discount for lack of voting rights	78. minority interest	
34. discount rate	79. multiple	
35. discounted cash flow method	80. net book value	
36. discounted future earnings method	81. net cash flows	
37. economic life	82. net present value	
38. effective date	83. net tangible asset value	
39. enterprise	84. nonoperating assets	
40. equity	85. normalized earnings	
41. equity net cash flows	86. normalized financial statements	
42. equity risk premium	87. orderly liquidation value	
43. excess earnings	88. portfolio discount	
44. excess earnings method	89. premise of value	
45. fair market value	90. present value	

**Table OA.3: Dictionary of Positive Words**

<b>Dictionaries</b>			
<b>Positive</b>			
1. able	46. benefited	91. delightfully	136. enjoyably
2. abundance	47. benefiting	92. delighting	137. enjoyed
3. abundant	48. benefitted	93. delights	138. enjoying
4. acclaimed	49. benefitting	94. dependability	139. enjoyment
5. accomplish	50. best	95. dependable	140. enjoys
6. accomplished	51. better	96. desirable	141. enthusiasm
7. accomplishes	52. bolstered	97. desired	142. enthusiastic
8. accomplishing	53. bolstering	98. despite	143. enthusiastically
9. accomplishment	54. bolsters	99. destined	144. excellence
10. accomplishments	55. boom	100. diligent	145. excellent
11. achieve	56. booming	101. diligently	146. excelling
12. achieved	57. boost	102. distinction	147. excels
13. achievement	58. boosted	103. distinctions	148. exceptional
14. achievements	59. breakthrough	104. distinctive	149. exceptionally
15. achieves	60. breakthroughs	105. distinctively	150. excited
16. achieving	61. brilliant	106. distinctiveness	151. excitement
17. adequately	62. charitable	107. dream	152. exciting
18. advancement	63. collaborate	108. easier	153. exclusive
19. advancements	64. collaborated	109. easily	154. exclusively
20. advances	65. collaborates	110. easy	155. exclusiveness
21. advancing	66. collaborating	111. effective	156. exclusives
22. advantage	67. collaboration	112. efficiencies	157. exclusivity
23. advantaged	68. collaborations	113. efficiency	158. exemplary
24. advantageous	69. collaborative	114. efficient	159. fantastic
25. advantageously	70. collaborator	115. efficiently	160. favorable
26. advantages	71. collaborators	116. empower	161. favorably
27. alliance	72. compliment	117. empowered	162. favored
28. alliances	73. complimentary	118. empowering	163. favoring
29. assure	74. complimented	119. empowers	164. favorite
30. assured	75. complimenting	120. enable	165. favorites
31. assures	76. compliments	121. enabled	166. friendly
32. assuring	77. conclusive	122. enables	167. gain
33. attain	78. conclusively	123. enabling	168. gained
34. attained	79. conducive	124. encouraged	169. gaining
35. attaining	80. confident	125. encouragement	170. gains
36. attainment	81. constructive	126. encourages	171. good
37. attainments	82. constructively	127. encouraging	172. great
38. attains	83. courteous	128. enhance	173. greater
39. attractive	84. creative	129. enhanced	174. greatest
40. attractiveness	85. creatively	130. enhancement	175. greatly
41. beautiful	86. creativeness	131. enhancements	176. greatness
42. beautifully	87. creativity	132. enhances	177. happiest
43. beneficial	88. delight	133. enhancing	178. happily
44. beneficially	89. delighted	134. enjoy	179. happiness
45. benefit	90. delightful	135. enjoyable	180. happy

**Table OA.3: Dictionary of Positive Words**

<b>Dictionaries</b>			
<b>Positive</b>			
181. highest	226. inventor	271. prospered	316. strengthen
182. honor	227. inventors	272. prospering	317. strengthened
183. honorable	228. leadership	273. prosperity	318. strengthening
184. honored	229. leading	274. prosperous	319. strengthens
185. honoring	230. loyal	275. prospers	320. strengths
186. honors	231. lucrative	276. rebound	321. strong
187. ideal	232. meritorious	277. rebounded	322. stronger
188. impress	233. opportunities	278. rebounding	323. strongest
189. impressed	234. opportunity	279. receptive	324. succeed
190. impresses	235. optimistic	280. regain	325. succeeded
191. impressing	236. outperform	281. regained	326. succeeding
192. impressive	237. outperformed	282. regaining	327. succeeds
193. impressively	238. outperforming	283. resolve	328. success
194. improve	239. outperforms	284. revolutionize	329. successes
195. improved	240. perfect	285. revolutionized	330. successful
196. improvement	241. perfected	286. revolutionizes	331. successfully
197. improvements	242. perfectly	287. revolutionizing	332. superior
198. improves	243. perfects	288. reward	333. surpass
199. improving	244. pleasant	289. rewarded	334. surpassed
200. incredible	245. pleasantly	290. rewarding	335. surpasses
201. incredibly	246. pleased	291. rewards	336. surpassing
202. influential	247. pleasure	292. satisfaction	337. transparency
203. informative	248. plentiful	293. satisfactorily	338. tremendous
204. ingenuity	249. popular	294. satisfactory	339. tremendously
205. innovate	250. popularity	295. satisfied	340. unmatched
206. innovated	251. positive	296. satisfies	341. unparalleled
207. innovates	252. positively	297. satisfy	342. unsurpassed
208. innovating	253. preeminence	298. satisfying	343. upturn
209. innovation	254. preeminent	299. smooth	344. upturns
210. innovations	255. premier	300. smoothing	345. valuable
211. innovative	256. premiere	301. smoothly	346. versatile
212. innovativeness	257. prestige	302. smooths	347. versatility
213. innovator	258. prestigious	303. solves	348. vibrancy
214. innovators	259. proactive	304. solving	349. vibrant
215. insightful	260. proactively	305. spectacular	350. win
216. inspiration	261. proficiency	306. spectacularly	351. winner
217. inspirational	262. proficient	307. stability	352. winners
218. integrity	263. proficiently	308. stabilization	353. winning
219. invent	264. profitability	309. stabilizations	354. worthy
220. invented	265. profitable	310. stabilize	
221. inventing	266. profitably	311. stabilized	
222. invention	267. progress	312. stabilizes	
223. inventions	268. progressed	313. stabilizing	
224. inventive	269. progresses	314. stable	
225. inventiveness	270. progressing	315. strength	

*Notes:* This table shows the list of valuation and positive words. Valuation words have been taken from the Valuation glossary provided by the AICPA (American Institute of Certified & Public Accountants). The list of positive words are taken from the Loughran-McDonald dictionary.

**Table OA.4: PE Firms with ESG Website Data by Country and Year**

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
United States	477	743	824	883	1,074	1,074	1,014	1,138	1,303	1,316	1,400	1,852	1,684	2,234	2,427	2,502	2,928	3,059	3,425	3,039	3,523	3,374	<b>41,293</b>
United Kingdom	58	92	108	121	157	146	138	171	189	194	225	288	295	331	366	382	441	471	511	448	511	500	<b>6,143</b>
Canada	29	46	45	62	67	67	66	72	78	83	85	113	106	144	150	145	176	179	212	192	222	207	<b>2,546</b>
Germany	31	50	50	57	70	70	60	59	66	67	70	101	94	118	124	126	151	149	168	149	176	175	<b>2,181</b>
China	9	13	19	21	30	34	26	33	33	35	35	59	64	80	97	112	144	174	191	189	195	151	<b>1,744</b>
India	4	11	12	15	20	20	18	30	36	40	50	68	71	86	95	108	130	142	170	162	183	158	<b>1,629</b>
Australia	7	11	13	17	21	21	26	29	37	40	45	54	55	78	86	86	112	127	150	132	143	132	<b>1,422</b>
Israel	8	19	24	28	33	34	30	32	34	34	34	49	52	67	71	81	87	97	107	98	124	128	<b>1,271</b>
Singapore	7	12	13	12	19	16	14	26	29	30	34	49	41	59	61	70	94	104	122	108	124	127	<b>1,171</b>
France	7	15	18	22	21	22	20	26	32	32	37	45	44	51	61	66	79	86	90	87	114	115	<b>1,090</b>
Netherlands	6	14	14	17	22	22	20	32	31	30	38	46	39	57	59	61	75	80	92	78	90	90	<b>1,013</b>
Switzerland	13	19	19	20	24	25	22	26	31	30	28	34	36	44	50	55	66	64	73	65	87	84	<b>915</b>
South Africa	3	7	13	14	12	13	11	18	27	24	26	30	32	48	47	49	64	73	84	74	72	63	<b>804</b>
Hong Kong	6	7	11	11	18	16	16	14	17	23	21	33	31	42	48	42	61	61	79	58	78	68	<b>761</b>
Spain	5	7	10	14	17	17	17	20	24	22	24	28	25	35	39	36	45	57	60	48	71	66	<b>687</b>
Sweden	7	12	13	14	12	12	11	12	17	20	22	25	25	31	33	38	47	46	51	51	54	56	<b>609</b>
Japan	3	5	8	9	14	14	15	15	19	20	22	25	25	32	36	37	44	46	41	38	44	47	<b>559</b>
South Korea	7	9	11	12	13	11	7	8	9	7	15	19	16	33	41	29	42	40	56	46	57	47	<b>535</b>
Italy	2	7	8	7	11	11	12	14	15	21	21	24	23	36	37	34	40	43	41	37	45	37	<b>526</b>
Finland	4	11	12	15	13	14	13	15	19	18	19	20	21	24	27	30	34	37	40	39	41	41	<b>507</b>
United Arab Emirates	1	2	2	3	3	5	5	8	10	11	12	21	19	30	32	33	38	45	47	48	51	40	<b>466</b>
Belgium	7	10	13	17	17	17	14	14	16	19	15	19	18	20	21	22	28	31	28	27	34	34	<b>441</b>
Luxembourg	4	8	8	5	5	4	3	6	8	9	10	14	12	17	29	25	25	27	32	30	34	32	<b>347</b>
Austria	5	8	9	12	12	12	9	8	12	9	11	12	12	17	23	21	25	24	27	22	26	26	<b>342</b>
Norway	1	7	7	8	10	10	10	15	15	16	13	16	14	18	19	15	19	21	26	18	25	27	<b>330</b>
Denmark	3	6	7	6	11	8	6	11	11	10	10	14	13	18	19	17	23	28	28	23	26	23	<b>321</b>
Russia	2	2	3	3	4	4	4	4	6	5	8	12	10	20	22	26	31	30	33	29	31	26	<b>315</b>
Poland	1	2	3	4	2	2	4	5	11	8	9	12	12	13	15	18	20	21	27	26	29	25	<b>269</b>
Ireland	3	5	5	4	5	7	7	10	10	9	11	11	10	13	14	16	20	19	21	21	25	22	<b>268</b>
Rest of the world	30	51	55	75	86	93	81	102	118	128	148	198	195	258	302	318	383	438	500	479	544	495	<b>5,077</b>
<b>Total</b>	<b>750</b>	<b>1,211</b>	<b>1,357</b>	<b>1,508</b>	<b>1,823</b>	<b>1,821</b>	<b>1,699</b>	<b>1,973</b>	<b>2,263</b>	<b>2,310</b>	<b>2,498</b>	<b>3,291</b>	<b>3,094</b>	<b>4,054</b>	<b>4,451</b>	<b>4,600</b>	<b>5,472</b>	<b>5,819</b>	<b>6,532</b>	<b>5,861</b>	<b>6,779</b>	<b>6,416</b>	<b>75,582</b>

Notes: This table shows the number of PE firms headquartered in each country and with available website information in each year (Source: Wayback Machine).

**Table OA.5: Mandatory Adoption of ESG Disclosure Rules**

(1)	(2)	(3)
<b>Portfolio Firm Country</b>	<b>Mandatory ESG disclosure year</b>	<b>Total Deals</b>
Argentina	2008	125
Australia	2003	2,349
Austria	2016	440
Canada	2004	6,047
Chile	2015	163
China	2008	4,439
France	2001	8,248
Germany	2016	5,746
Greece	2006	100
Hong Kong	2015	491
Hungary	2016	100
India	2015	3,264
Indonesia	2012	182
Ireland	2016	672
Italy	2016	3,227
Malaysia	2007	197
Netherlands	2016	3,139
Norway	2013	1,094
Pakistan	2009	18
Peru	2016	102
Philippines	2011	71
Poland	2016	695
Portugal	2010	416
Singapore	2016	603
Slovenia	2015	74
South Africa	2010	911
Spain	2012	2,176
Turkey	2014	290
United Kingdom	2013	13,022

*Notes:* This table shows the year in which countries adopted mandatory ESG disclosure regulations and the total number of PE Buyout deals in these countries. Source: The year of adoption is taken from [Krueger et al. \(2022\)](#) and the total number of country-wide buyout deals are from Preqin.

**Table OA.6: PE Firm Signatories to the UN Principles of Responsible Investment (UN PRI)**

Year	(1)	(2)	(3)	(4)
	<b>Total Count</b>	<b>Matched with Preqin</b>		
		<b>Count</b>	<b>Cumulative Count</b>	<b>Cumulative Percentage</b>
2006	27	2	2	0.0
2007	34	4	6	0.1
2008	47	5	11	0.2
2009	72	10	21	0.4
2010	76	13	34	0.6
2011	77	11	45	0.8
2012	98	16	61	1.0
2013	84	14	75	1.3
2014	103	12	87	1.5
2015	98	17	104	1.8
2016	132	11	115	2.0
2017	204	30	145	2.5
2018	275	25	170	2.9
2019	452	59	229	3.9
2020	677	73	302	5.1
2021	959	119	421	7.2

*Notes:* This table shows the number of investment managers that have signed the United Nations Principles of Responsible Investment (UN-PRI) pledge over the years from 2006 to 2021. These have been sourced from the following website: <https://www.unpri.org/signatories/signatory-resources/signatory-directory>. Column (2) shows the number of investment managers who signed the UN-PRI pledge in that particular year and have been mapped to PE firms in Preqin with website data. Column (3) shows the cumulative count and column (4) the cumulative percentage of investment managers that are signatories to the UN-PRI until (including) that particular year and have been matched to the Preqin firms for which we have website data.

**Table OA.7: Industry-Level ESG Ratio.**

<b>Primary Industry</b>	<b>Log. ESG Ratio</b>
Renewable Energy	3.054
Rail Transport	2.976
Environmental Services	2.925
Energy Storage & Batteries	2.856
Software	2.853
It Security/Cybersecurity	2.824
Internet	2.803
It Infrastructure	2.798
Healthcare It	2.773
Agribusiness	2.754
Biotechnology	2.733
Information Services	2.726
Hardware	2.688
Insurance	2.683
Power & Utilities	2.678
Business Support Services	2.669
Mining	2.667
Healthcare Specialists	2.660
Transportation Services	2.656
Consumer Services	2.655
Financial Services	2.644
Healthcare	2.638
Outsourcing	2.633
Real Estate Development & Operating Companies	2.627
Construction	2.609
Heating, Cooling & Ventilation Equipment And Services	2.595
Aerospace	2.592
Education/Training	2.589
Forestry & Timber	2.581
Biopolymers	2.578
Chemicals	2.563
Food	2.552
Pharmaceuticals	2.541
Travel & Leisure	2.514
Retail	2.510
Industrial Machinery	2.510
Materials	2.503
Packaging	2.490
Marketing/Advertising	2.480
Medical Devices & Equipment	2.470
Semiconductors	2.467
Automobiles, Other Vehicles & Parts	2.462
Defence	2.462
Oil & Gas	2.456

**Table OA.7: Industry-Level ESG Ratio.**

<b>Primary Industry</b>	<b>Log. ESG Ratio</b>
Logistics & Distribution	2.437
Electronics	2.432
Commercial Property	2.422
Consumer Products	2.421
Ship Building & Repair	2.377
Telecoms	2.355
Bottling	2.248
Media	2.111

*Notes:* This table provides the average value of the Log. ESG Ratio by industry across the entire sample.

**Table OA.8: PE ESG Disclosures and Year Effects**

	(1)	(2)	(3)
	Log. ESG Ratio		
Year (Count variable; Year 2000 = 0)	0.09*** (0.00)	0.01*** (0.00)	0.01** (0.00)
Log. Word Count		0.22*** (0.01)	0.23*** (0.01)
Positive words		0.14*** (0.01)	0.13*** (0.03)
Valuation words		0.15*** (0.01)	0.13*** (0.03)
Observations	49,499	49,499	12,374
Adj. R2	0.489	0.707	0.691
PE Firm FE	Yes	Yes	Yes
Sample	Full	Full	Balanced 2008-2021

*Notes:* This table shows the results of the OLS regression which models *Log. ESG Ratio* as a function of a time trend and other website characteristics. The unit of observation is the PE firm-year for the period 2000 to 2021. The dependent variable is *Log. ESG Ratio* (the natural logarithm of one plus the number of ESG-related words per 10,000 words on a PE firm website). The independent variable of interest is *Year* which is an ordinal variable that takes the value 0 for the year 2000 and then increases by 1 for every year forward till the year 2021. Robust standard errors are clustered at the PE firm level and are reported in parentheses. \*\*\*, \*\*, and \* denote statistical significance at the 1%, 5%, and 10% levels (two-tailed), respectively.

**Table OA.9: PE ESG Disclosures - Alternative Outcome Variable Definition (IHS)**

<i>Panel A</i>	(1)	(2)	(3)	
	IHS. ESG Ratio			
ESG Regulation Exposure	0.35*** (0.12)	0.21** (0.09)	0.17* (0.09)	
Observations	22,815	22,815	22,815	
Adj. R2	0.482	0.652	0.653	
Controls	Yes	Yes	Yes	
PE Firm FE	Yes	Yes	Yes	
Year FE	Yes	Yes	No	
Size Group-Year FE	No	No	Yes	
<i>Panel B</i>	(1)	(2)	(3)	
	IHS. ESG Ratio			
Post UN-PRI Pledge	0.25*** (0.09)	0.34*** (0.08)	0.32*** (0.08)	
Observations	23431	23431	23431	
Adj. R2	0.474	0.644	0.644	
Controls	Yes	Yes	Yes	
PE Firm FE	Yes	Yes	Yes	
Country-Year FE	Yes	Yes	Yes	
Size Group-Year FE	No	No	Yes	
<i>Panel C</i>	(1)	(2)	(3)	(4)
	Log. Total Onsite Releases			
High Envir. Quartile <sub>t0</sub> * Pre-Deal Period	-0.34*** (0.13)			
Pre-Deal Period	0.26*** (0.06)			
IHS. Env Ratio <sub>t0</sub>		-0.15** (0.07)	-0.46*** (0.13)	-0.25** (0.13)
Observations	424,893	393,727	388,095	1,784
Adj. R2	0.838	0.307	0.337	0.281
Controls	Yes	Yes	Yes	Yes
Facility FE	Yes	No	No	No
Year FE	Yes	Yes	No	Yes
County-Year FE	No	No	Yes	No
Sample: Only Deal Year	No	Yes	Yes	Yes
Sample: Only PE-acquired Plants	No	No	No	Yes

**Table OA.9: PE ESG Disclosures - Alternate Measurement**

<i>Panel D</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Net IRR (%)			Net Multiple (X)			Distribution to Paid-in (%)		
	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>	<i>Raw</i>	<i>Raw</i>	<i>Abnormal</i>
IHS. ESG Ratio	0.49*** (0.16)	0.49** (0.19)	0.06*** (0.02)	0.02** (0.01)	0.02*** (0.01)	0.01** (0.00)	1.55** (0.62)	1.40** (0.66)	1.48*** (0.56)
Observations	48,691	48,691	44,051	49,646	49,646	45,064	50,184	50,184	45,368
Adj. R2	0.207	0.208	0.098	0.335	0.337	0.254	0.582	0.582	0.210
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PE Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fund Strategy FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Calender-Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

*Notes:* This table shows results of replicating the main results of our study when using the inverse hyperbolic sine transformation of the ESG ratio, *IHS. ESG Ratio*, (instead of *Log. ESG Ratio*) as the variable of interest. Panel A replicates the results of Table 3 Panel A, Panel B replicates the results of Table 4 Panel A, Panel C replicates the results of Table 5 Panel A, and Panel D replicates the results of Table 6.