

Untangling ESG in Private Equity: Do ESG Commitments Affect Target Firm Choice in LBOs?

By

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Abstract

Scholars have conducted various studies looking at the impact of ESG commitments on public market investors' investment strategies and portfolio compositions, but insights on Private Equity (PE) funds remain to be explored. The lack of transparency in PE and well-established ESG measurement tools pose significant challenges. This paper looks at 390 LBO transactions and the target firms' respective RepRisk ESG risk ratings to uncover whether buyout preferences shift towards lower ESG-risk firms once a PE fund makes ESG commitments. The results from this study find positive (increase in risk exposure) but insignificant effects on the ESG risk rating of new acquisitions post-commitment. Confounding due to factors such as time and industry are addressed, but the results exist under multiple data constraints. This finding might reflect a bias in the selected sample since the analysis may already be restricting it to firms with strong ESG ratings acquired by established PE funds.

Keywords:

ESG, private equity, corporate social responsibility, CSR, institutional investors, active investors, LBO, Reprisk, PRI, ESG ratings, corporate finance

Introduction

Year 2020 has been a tipping point for sustainability in the corporate world, especially in Finance. As the world gripped with a pandemic, climate-induced natural disasters, and social reckonings, the importance of socially responsible investing became clearer than ever for both the public and the investors. A United Nations-promoted framework to manage businesses and invest in them is called “ESG integration & screening”, which includes emphasizing and considering environmental, social, and governance factors while evaluating any firm or project. Although ESG considerations used to be bucketed under Corporate Social Responsibility and shunned by Wall Street until recent times, more than forty years’ of academic research and evidence has demonstrated that there is a positive connection between company financial performance and ESG performance, leading to further value creation (Fateemi, 2015).

Capital markets have been aware of this: Just in the first half of 2020, net investments (\$21B) in ESG-focused equity funds nearly surpassed the total amount of investments in all of 2019. (Hale, 2020). Furthermore, various sources highlighted how sustainability-focused funds have been outperforming their non-sustainable counterparts during the market selloff in the first quarter of this year. Morningstar (2020) reported 89% of their ESG-screened indices outperformed the broader market, while Blackrock (2020) also reported 88%. The popularity of ESG funds with a strong momentum has also been observed in the private markets for a while; more than 4,400 ESG-committed private capital funds, including PE, raised over \$3.06tn since 2011, and \$264bn until September this year alone, representing 43% of all capital raising so far in 2020 (Preqin, 2020).

Yet, studies show that there has been a significant opacity in private markets, compared to public, and that despite rising interest from private equity funds (PE) in ESG integration, there is limited understanding of these funds' motivations, results, methods or challenges. The lack of easily accessible ESG data unlike for public equities lead to concerns over greenwashing, or paying lip service to ESG investing. This is both due to the "private" nature of PE, and the lack of maturity in the ESG assessment systems. Most of the data on PE is at a portfolio-level and not public information, and ESG measurement tools can still be considered noisy and lacking standardization. Hence, there is no database yet that connects private equity transactions to an ESG dimension or rates the funds themselves on ESG characteristics. Therefore, this paper tries to fill that gap by hand collecting and assembling PE transactions and associated ESG data from multiple data sources. Thus, although the limited availability and usefulness of ESG data in the PE context makes this study challenging, it can provide valuable insights for the Limited Partners (LP) and other stakeholders as well as the PE funds themselves.

The focus question is whether publicly-announced ESG commitments from PE funds are effective in changing the target firm choice in the subsequent LBOs of the committed PE funds, prompting them to acquire firms with lower ESG risk exposure. Control groups are selected both as transactions done by the treatment funds in the pre-period, as well as transactions done by non-ESG committed PE funds in the same time frame. The data is hand coded on R and Python and also cleaned up manually to match the different databases with each other.

The dataset is a combination of:

- 390 leveraged buyout (LBO) transactions done by 55 PE funds starting 2007 from Thompson One

- Ratings for the target companies whose ESG risk exposure is rated at / shortly before the time of transaction by Reprisk using news / incidents-based data
- ESG disclosure markers on selected PE funds obtained from online sources, Preqin and PRI (“*Is the company a signatory of the PRI network at the time of LBO - (Yes / No)*”)

The results overall indicate little statistical and economic significance, hinting in fact at a slight worsening in the ESG profiles of acquired firms post-commitment. The findings of this study should be evaluated under the awareness of data restrictions such as the sample only being limited to prominent PE funds and their transactions, which may be resulting in a selection bias in the sample (acquiring low ESG risk companies by default) as the difference in mean ratings across different groups are all relatively small (Low ESG risk in the overall dataset).

Furthermore, there are potential confounders such as the timing and industry of the deals as evidenced by regressions. These may prompt alternative explanations for why the coefficient may be positive (worsening ESG) and why the variation between groups and periods may be so small overall. The paper will look into first the literature around how investors engage with ESG issues, their incentives and the impact of their commitments, and then discuss the data and methods that were employed leading up to the results and conclusion.

Literature Review & Hypothesis Development

The aforementioned trends in the capital markets, both on the public and private side, are mostly driven by the adoption of a socially responsible investing framework from many limited partners, which are institutional investors such as pension funds or large asset managers. These institutional investors are adapting to client demands and stricter supranational regulations that

require them to consider their social responsibility and improve their ESG monitoring. For instance, the new Sustainable Financial Disclosure Requirements will require any fund manager or asset owner (both LP and GPs) to provide sustainability-related disclosures if they have any operations or fundraising in Europe. (Bergman et al., 2020) According to a 2019 survey by UBS of over 600 asset owners in 46 countries, 78 percent of LPs are already integrating ESG principles into their investment processes. (Uhrynuk, 2020) The engagement of those investors particularly increased after the Paris Climate Agreement in 2016, which accelerated the number of signatories for the UN's Principles for Responsible Investment (PRI) network. PRI signatories commit to incorporate ESG factors into their investment and management decisions, but these commitments are not enforceable and member data is self-reported. (Kim, 2020). Still, making some form of an ESG commitment is de rigueur in today's competitive markets.

With a record amount of dry powder and its active ownership approach, Private Equity has a big role to play in socially responsible investing. For active investors both in private and public markets, ESG considerations are not really foreign. Hagelberg (2020) notes how the role of activism has been traditionally disciplining floundering managers and mitigating governance ("G") failures to maximize shareholder value. Yet, for instance, only less than 10% of the 8,810 global private equity firms are signatories to the UNPRI. (Pucker et al., 2020) PE is nevertheless becoming increasingly more engaged in the space; according to a recent survey with 23 prominent PE fund managers in Europe, 72.7% of them overwhelmingly agree that they consider ESG factors "more important than they did 5 years before", and 52.4% of them attribute their ESG adoption to increasing pressure from LPs and other stakeholders. (Zaccone, 2020)

As LPs become more selective in their asset allocations, PE firms feel compelled to move into

the ESG space for their fundraising efforts. For instance, Yoon and Kim (2020) documented that on average, active funds experienced a 4.3% increase in fund flows per quarter in the six months before and after they committed to PRI. Ex-post, LPs should then expect meaningful improvements from their GPs on either the selection of investments or their active management in terms of ESG performance. Yet, although fundraising is a driver when implementing ESG strategies to attract more capital, once that capital is obtained, funds may not necessarily keep up to their ESG promises and “walk the talk”. (Prequin, 2020). In this study, I aim to shed more light into the aftermath of PE funds’ ESG commitments which LPs need to better understand in order to respond to changing regulatory and public demands.

Since ESG is such a new area of study with most of its expansion happening very recently, there is limited academic evidence for the portfolio consequences of socially responsible investing commitments. (Brandon et al., 2019). Brandon et al. (2019) study the changes in fund-level ESG scores post-signing PRI: They conduct a difference-in-difference regression to analyze whether portfolio-level ESG footprints improve after institutions sign the PRI, as compared to the footprints of non-signatory institutions and the same institutions themselves before they signed the PRI. They conclude that there is statistically significant evidence that institutions who are signatories of PRI have better ESG footprints in their equity portfolios than non-signatories, and that the signatories significantly improved their footprints after they had signed up. However, this statistically significant difference doesn’t hold true for U.S.- based institutions, which usually have different fiduciary duty interpretations. This study groups the sample into asset owners (pension funds, endowments, sovereign wealth funds, insurance firms, and governmental agencies) and investment managers (bank investment divisions, investment funds, advisers, and

hedge funds), but reaches the same conclusions for both without giving intragroup breakdowns. (No information about private equity and active investors specifically).

Another study from Kim and Yoon (2020) focuses on active equity funds in the U.S. with voting rights to study whether there are ESG improvements after signing the PRI; they find that despite a significant increase in fund flow to signatory investors regardless of their prior fund-level ESG scores, the signatories neither change their portfolio holdings to improve their ESG footprint, nor engage more with their portfolio companies on ESG issues. The researchers also wanted to test whether the signatory funds weren't improving post-commitment because they were already high-scorers on ESG. However, their ESG scores were not significantly higher before commitment either than non-signatories or than S&P 500. In fact, they found that when controlling for size, the signatory funds had lower ESG scores than non-signatory funds. Given the active stewardship approach both common to PE investors and active equity investors, we could question whether there would also be legitimate greenwashing concerns for the LPs which are invested in ESG-committed PE funds.

Bellon (2020), on the other hand, focuses specifically on private equity firms in the oil & gas space. He aims to measure the net impact of PE ownership on portfolio firms' pollution and explore the economic drivers behind this impact. He notes certain difficulties, especially finding data on pollution for private firms, and isolating the impact of the PE firm's active ownership on the firm's pollution. He concludes that PE ownership leads to a 70% reduction in the baseline rate of toxic pollution. Initially, this paper was aiming to replicate Bellon's research focus, which is the impact of PE ownership on portfolio firm's ESG performance ex-post. Yet, due to limited

sample size where both a pre & post-ownership ESG measurement would be present for enough number of transactions, the focus shifted towards understanding the impact of ESG commitments and disclosures on the investment / target firm choice for PE funds. ('pre' ESG score is enough.)

There are a few reasons to believe that the behavior of PE funds could be different than those of active equity funds, making ESG integration more likely for the PE firms both in the investment selection and investment operational management process. First of all, for both investor types, the biggest reason to pay attention to ESG seems to be risk management besides fundraising. [(Zaccone, 2020) (Brandon, 2019)]. For PE players, the risk management incentive is stronger than the value creation one based on interviews and surveys with top PE players (Pedrini et al., 2020), and Crifo & Forget (2013) confirmed that investors predominantly see socially responsible investing as a risk management tool while only 43% of their survey respondents saw it as a value creation tool. ESG risks, in the form of negative incidents and hurting business prospects, would affect the returns mainly through its consequences on the exit value of the invested firm. In the public equity markets, negative ESG incidents can depress the stock price at real time, and investments with negative ESG incidents were found to generate -3.5% negative alpha for the investors. (Gloßner, 2017) However, in the presence of heightened material ESG events (such as a changing regulation or strikes) or negative ESG-related news / controversies, active funds can easily exit in a liquid market, while PE funds can't, which is why they need to focus more heavily on ESG risks before investment.

Secondly, the most important driver in PE returns for a deal is the exit value, which is linked to the long-run valuation of the company as it's passed on to the next buyer despite the short holding period of the PE fund itself (Indahl. 2019). In terms of business prospects and valuation, greener assets maximize PE exit value by making the portfolio more attractive to investors by reducing risk and increasing liquidity, and that this is the primary motivation for PE firms. Similarly, negative externalities would exacerbate down-side scenarios (such as stranded assets), commanding higher risk premiums. This medium-term and ownership focused approach is fundamentally different from an active equity investor's strategy as their returns come from selling at a higher price than they bought it, which could depend on market momentum and sentiment (for instance, impacted by a positive news regardless of underlying ESG prospects). Therefore, given the short holding period of active funds, they wouldn't value sustainability efforts and related capital expenditures that create ESG value in the long-run like the PE investors do, which is why PE firms may also be more careful about ESG considerations.

Given the saliency of ESG risks in investment decisions, one might expect the most common approach to be negative screening, the exclusion of non-ESG compliant companies from investment criteria to make portfolios more 'ESG-safe'. However, although this passive approach does mitigate certain risks, it also limits private equity's opportunities to create additional value through active ownership and make a greater positive impact. (Braverman, 2020) In this study, the paper expects investment decisions to be motivated by negative screening more so than turning companies around on ESG matters at ownership which has been Bellon's (2020) focus. Hence, we interpret ESG commitments as seeking out firms with lower ESG risks.

Likewise, it should be noted that ESG can also be seen as a value creation tool which may not go hand-in-hand with negative screening; ESG integration can increase top-line growth, reduce costs, prevent legal interventions, and uplift productivity in firms. (McKinsey, 2019) However, although active investors can initiate change with proxy voting, those changes may not be implemented or even if so, may not materialize on time. PE funds, on the other hand, can implement any changes to the company, monitor it, and reap its fruits due to their controlling share and longer investment horizon. This may be another motivation for PE firms to implement ESG-friendly strategies during ownership, either in already high ESG-performing companies or worse ones to turn them around. Overall, it's clear that PE investors have different objectives and constraints than other active and passive investors, so it's important to understand how ESG policies shape their investment behavior and portfolio composition. Yet, unlike the impact of ownership in the ex-post ESG performance (Bellon, 2020), the ESG profiles of PE-bought target companies haven't been studied in the literature, which is why this paper aims to fill this important gap.

The question / hypothesis in this study is therefore the following:

H1: After PE funds make public ESG disclosures / commitments, does that affect their investment preferences in a way that they acquire firms with lower ESG risk?

Data and Methods

As also mentioned before, the data limitation in this space makes the contribution of this paper valuable, but it presents challenges for the conducting of the analysis and its reliability. In order to do an event study on the portfolio outcomes of ESG commitments, one would need data on LBO target firms and measurements of their ESG performance at the time of transaction. Firstly, it is very difficult to collect any public data on PE deals since most of the target firms are naturally private at the time of the transaction, most of the funds are still private entities, and even those who have public disclosures report at portfolio-level rather than entity-level which is the reason why the literature hasn't been as developed. Particularly on the ESG front, there is a significant lack of transparency given that there is no regulation in the U.S. that requires sustainability-related disclosures from PE firms, and such regulation is still underway in Europe. (Uhrynuk, 2020). Some type of disclosure can be expected from PRI signatory PE-firms, which only include a minority of the biggest PE firms, while the majority of firms provide qualitative information. Therefore, most of the LPs usually take the word of their GPs on ESG matters, and the available ESG data is also usually at the fund-level rather than individual portfolio assets. (Preqin, 2020)

In fact, only 1/8th of the PE funds disclosed that they were receiving ESG reports themselves from their portfolio companies on a survey sent to PRI signatories. (Pucker et al., 2020) This study assumes that PE funds make an informed decision about the ESG credentials of the companies they acquire, but that finding may imply otherwise. Therefore, understanding the PE portfolios from an ESG perspective would significantly benefit both the LPs and the GPs.

Furthermore, there are no industry-wide accepted ESG metrics that would be reported on portfolio companies. According to survey respondents from the Zaccane (2020) study, 63.6% reported to conduct their due diligence using proprietary checklists, not ESG ratings or common metrics, to assess risks and compliance to minimum ESG standards. This lack of standardization is partially due to the concerns around different ESG measurement frameworks, and the inconsistency between different providers.

There are 2 main ESG frameworks, ratings-based and incident / news sentiment-based. The oldest ESG methodologies rely on ESG ratings from well-known providers such as MSCI KLD, Sustainalytics, Asset4 or Bloomberg. Usually, ratings firms give scores to public firms on E,S, and G dimensions in a normalized way, and they usually cover firms from 2008 onwards and mostly mid / large-cap firms that belong to the prominent indices. The first issue with the ratings is the discrepancy and inconsistency among them; the correlation among MSCI, Sustainalytics, Bloomberg and RobecoSAM was actually found to be 30%, compared to 99% among the credit ratings agencies. (Edmans, 2020). This is because each ratings agency has different definitions and criteria for different types of impact. Furthermore, these ratings may contain a self-selection bias given that the ratings rely on voluntarily reported data by public firms (Benz, 2020).

Incident / news-based providers take a different approach and usually assign ratings / scores to firms based on their risk exposure to material ESG-related events using past news and event data. These include Reprisk, Truvalue Labs, and Ravenpack. As these don't rely on subjective analyst judgments or self-reported data, they could be considered more reliant and objective.

ESG-related news could be considered better indicators for other reasons as well: Firstly, from a fiduciary duty / fundraising perspective; as also mentioned earlier, institutional investors which are usually the clients of the PE funds as Limited Partners have increasingly higher sensitivity to ESG matters. It was shown that public markets demonstrate an overreaction to negative ESG news events, and that this reaction is more pronounced for firms with higher institutional holding. The concentration of institutional investors hence significantly drop after the negative ESG news, which could imply a similar adverse reaction in the PE context too. (Cui & Docherty, 2020) Secondly, these ratings are also better aligned with the exit-focused PE due diligence, since under negative sentiment caused by negative news, investments related to the sustainability of a firm are undervalued which hurts the exit value. (Serafeim, 2020). The downside of this is that companies may have good ESG prospects and investments, however they might still encounter rare negative ESG-related incidents and subsequently be judged negatively. Therefore, given the saliency of negative sentiment caused by ESG incidents for both fundraising and economic purposes, GPs may be biased to avoid companies with negative incidents despite strong ESG performance and underlying activities. (Serafeim, 2020) That's why, since news-based ESG databases are directly linked to such risk mitigation, we will prefer incident/news-based databases over ESG ratings providers in this study.

Similar to Houston et. al (2020) who study the relationship between banks' lending preferences and their borrowers' ESG performance, this paper uses Reprisk data as an event-based outcome measure to evaluate the ESG risk ratings of various transactions along with certain deal characteristics. RepRisk, a Zurich-based company, has coverage starting from 2007 (including private firms unlike ESG ratings providers), and the firm screens thousands of sources (low and

high-impact print and online media, stakeholder coverage, government filings etc...) on predefined ESG incidents, such as environmental pollution, forced labor, or tax evasion. Those translate into the Reprisk Index scores, which dynamically capture and quantify a company's exposure to reputational risks related to ESG. These are influenced by issues that are material to the company, and the severity of the incidents.

The metric that is used as the dependent variable in this paper is the Reprisk Rating, which ranges from AAA to D, which essentially combines a company's own RRI score with its average country-sector RRI. Therefore, it tries to control for differences in industry and geography, and provide the best metric for benchmarking across different firms. The ratings are varying from AAA (No to low ESG risk exposure), to D (Very high). In the database, the categorical alphabetical ratings have been assigned numerical values from 1 to 10 for statistical analysis purposes, with higher ratings implying higher ESG risk. The study looks at only 390 transactions from a select-group of successful PE funds; in the studied sample, the average mean is 2.2 (Low risk exposure) with a standard deviation of 1.1.

The structure of the database is the following, and snippets have been provided at exhibits 1 & 2:

List of LBO transactions that have associated ESG data, the Reprisk ESG ratings of the target firms at different lags as the dependent variable ($RRR.T$; Time t for same month / year as the transaction date, $t-3$, $t-6$, and $t-9$ to account for the due diligence process), a dummy indicator for whether the acquiring fund has made an ESG commitment / disclosure as of today ($Fund\ ESG?$), a dummy indicator for whether the fund is a PRI signatory ($Fund\ PRI?$), and dummy

indicators for whether the ESG commitment and PRI signature has been made prior to the transaction or not. (*'Post ESG?'*, *'Post PRI?'*) (For transactions where the acquiring fund hasn't made an ESG commitment, the placebo year has been chosen as 2014 which is the median year of all transactions). The ESG indicator and period indicator serve for determining the various treatment and control groups. The dataset also includes other information used as control variables such as target firm industry, Enterprise Value, EBITDA, EV/EBITDA multiple, year.

The following is the rough summary of the steps that were taken: First of all, the whole LBO database was downloaded on *Thompson One* so that the acquirer was a GP PE fund, acquired stake was over 50%, and the merger was either executed or offer was pending. Then, the entire Reprisk Premium database was obtained from Wharton Research Data Services, and a name matching exercise was done between the LBO and Reprisk database. The datasets were cleaned up / standardized (removed common words such as Co., all lower case, trimmed white spaces etc.) and automatically matched on R. Similarly, the ISINs on Reprisk database were converted to 6-digit CUSIPs and were matched with the CUSIPs on the Thompson One database. ISINs are longer versions of CUSIPS and used globally; a 6-digit CUSIP is essentially a 12 digit ISIN stripped of its initial 2-letter country code, and last four digits that indicate the security type and serve as checks. The matched values were excluded from the LBO and Reprisk databases, and the remaining were then uploaded to Open Refine. Open Refine's reconciliation tool semi-automates the matching process between 2 databases, and is useful for name matching as it provides a matching score that uses a combination of methods such as computing Levenshtein distances between two words. Around 34,000 matches were found, and when the score was set

70% and above, approximately 7000 rows were identified. Then, those rows were manually checked, and combined with exact name matches and CUSIP matches made on R.

Subsequently, as the next matching criteria, the transaction dates were matched with Reprisk Rating issuance dates on R so that the dataset only includes firms from the Thompson dataset where there would be an associated Reprisk Rating up until 9 months before the transaction. The resulting match dataset included 1,300 transactions, highlighting the overall lack of coverage on ESG databases and difficulty of matching them with other datasets. These were then further filtered to only include buyout-engaging PE funds in the U.S. (for instance no Pension Fund investors). The challenge was that whenever there were more than 1 investor involved, the Thompson database would label it as either “Investor Group” or as the name of the Special Purpose Vehicle formed. The synopsis for such transactions were manually read so that the dataset includes approximately 1,000 rows where every acquiror PE fund was listed one-by-one each row. Having matched the LBO dataset with respective Reprisk ratings issued at the transaction dates (creating the ‘dependent variables’) and identified all the PE funds involved, the next step was to determine the ESG commitment status of the PE funds for each transaction and the ESG commitment date.

Since there is no database where one could find the ESG commitment and its year for a PE fund, creating the treatment variables required additional research. The most helpful database was Preqin, from which fund characteristics such as current AUM or dry powder were also included in the dataset, and where subscribers can view a variable for each PE fund called the “ESG Status: Yes/ No”. According to Preqin, this means that “The firm has an ESG policy or is a

member of one of the PRI, GRESB or SASB associations. (Preqin, 2020) ” Preqin states that they have “a dedicated ESG Research Team to collect ESG Core Data and ESG Informational Data for the Preqin ESG Solutions products”, first collecting information from public domain and offering the option for their clients (GP and LPs) to reach out to them with updates. This paper assumes that the funds with a “Yes” for ESG status on Preqin are indeed ESG committed, however those that were marked as “No” have been manually checked again. If there was some sort of ESG policy disclosure online or affirmation that ESG issues were considered in the due diligence by the PE funds, then they were also marked as “Yes”. Since the date of ESG commitment is not found on Preqin, we manually researched each fund’s websites and other resources to estimate a date which has been a subjective process.

We distinguished between other types of ESG commitments / disclosures and becoming a PRI signatory. Becoming a PRI signatory member is an important step for the investors: Firstly, the commitment is made and announced at the very senior level (CEO) of a fund, and the funds sign a declaration to adhere to explicitly include ESG issues in investment analysis and decisions. The only mandatory requirement for the funds is to publicly report their responsible investment activity, and they’re also asked to expand their responsible investment policy to >50% of their AUM. (Kim & Yoon, 2020). For the PRI signature indicator, this information is sourced from PRI’s member database and the commitment date was easily found on the member database.

Because determining whether a PE fund has any ESG commitment / disclosure in place (therefore in the ‘treatment’ group) is a time-consuming and limiting exercise, only 55

well-known funds and their LBOs were selected which represented more than 40% of the available database. Those were picked so that each fund had enough representation in the dataset (more than 4 deals), large enough fund sizes, and available ESG information. As a result, only 410 transactions were remaining in the dataset. The data is also filtered so that the top 13 deals with an EV of above \$10 Bn and less than \$250 MM are dropped as a robustness check, particularly since 2007 had outliers with mega transactions.

The final dataset has 390 transactions total, each row representing 1 unique acquiror and 1 target firm. The LBO transactions start from 2007 (when Reprisk coverage starts) and includes transactions from 55 well-known PE funds selected based on their representation in the database and then average deal size. This restricts the sample mostly into successful firms that have already passed through a set of due diligence criteria by the PE funds. The dependent variable is the Reprisk Rating of the target firm at the transaction time, and the main independent (treatment) variables are the presence of an ESG commitment for the PE fund (or PRI signature), and whether the deal has been executed post-commitment. The summary statistics of the dataset can be found in Exhibit 3 for different treatment and control groups based on ESG indicators. As can be seen, 71.3% of deals have been executed by PE funds with an ESG commitment either before or after the deal, and 38.7% of them are executed by PRI signatories.

Results & Analysis

As a reminder, the hypothesis studied in the paper is:

H1: After PE funds make public ESG disclosures / commitments, does that affect their investment preferences in a way that they acquire firms with lower ESG risk?

There are 3 tests that can help us empirically answer this question:

Test 1: PE funds with ESG disclosures / commitments target firms with lower ESG risk after their commitment compared to before

Test 2: PE Funds with ESG disclosures / commitments target firms with lower ESG risk after their commitment compared to the funds without any public ESG disclosures / policies in place

Test 3: Being a signatory of the PRI network is a better indicator than other ESG disclosures / commitments when assessing *H1 and H2*

For *T1*, the ESG risk ratings of target firms bought out by funds with ESG commitments at any point are regressed over the “Pre / post” dummy to understand whether the difference in means before / after commitment is statistically significant. For *T2*, the paper will be conducting a difference - in - differences analysis to look at the effect of the treatment (ESG commitment) over two time periods (pre / post commitment). The variables will be put into an OLS regression to assess the significance of the interaction term between the two treatment variables. For *T3*, although no formal statistical analysis is done, the regression results using both variables as treatment is compared as well as the means in various sample groups. In order for us to understand the isolated impact of ESG commitments, we would need to assume that between the ESG committed and non-esg committed funds, there are no inherent differences that affect investment preferences, and that there are no exogenous factors affecting ESG ratings over time.

Starting with some simple descriptive graphics, it can be seen from Exhibit 4 that more PE funds have been making ESG commitments every year aligned with our initial discussions around the importance of this trend. This histogram distinguishes new PRI signatures from ESG

commitments outside of PRI, however in the dataset, a fund automatically has a “True” for “ESG?” dummy if it has a “True” for “PRI?”. Notably, we see the most amount of new commitments in 2009 in the wake of the financial crisis, and then in 2020 amidst the pandemic and various social movements. It’s interesting to see how investors seem like they feel more compelled to make these commitments right after big global market meltdowns, potentially as a way to boost their image in times of need when their investments and performance may be questioned by both the public and their clients.

There seems to be some confounding effect of fund size on fund ESG commitment at first glance. As seen in Exhibit 5, we can see that funds with ESG commitments tend to be much larger than those without (Mean AUM for ESG committed funds is \$132,442 Bn versus \$21,190 Bn for without). This manifests itself in the aggregate statistics for deal count and size. As seen in Exhibit 6, ESG-committed funds have more deals in total and a much larger total deal size every year. However, as seen in Exhibit 7, if we look at the averages, we can see that the average number of deals undertaken is almost the same for both types of funds, and we can’t say anymore that ESG-committed funds have larger deals on average. Overall, while there is a concern that funds with ESG commitments tend to be larger, at the deal level, the differences are relatively muted, assuaging omitted variable bias concerns.

Next, Exhibit 6, 7 and 8 present time series patterns as well. Most of the deals are undertaken in boom times as seen by the aggregate transaction volumes, also market conditions and competition may have changed PE behavior as we observe smaller deals after 2010 on Exhibit 7 (with less focus on financial engineering and more on operational improvement due to

Dodd-Frank leverage restrictions (Lakhotia, 2019)), and we can see on Exhibit 8 that both the deal size and deal count drop as we move away from the commitment date for the funds (Most notably for deal volume, since we don't have enough data to sample each ESG-committing fund for an equal amount of time pre / post commitment). This lack of balance in the panel as seen in Exhibit 8, potential cyclical and industry changes after the GFC may be affecting firms' target choices regardless of their ESG commitments, for instance when there is a market downturn. When we look at the time series of ESG risk ratings over time in Exhibit 9, however, we don't see a clear pattern except a slight increase over time, indicating higher ESG risk exposure.

As a first step in our empirical tests, we are looking at a means table sampled in different groups in Exhibit 10. (Based on treatment vs control, pre vs post, and PRI or others as treatment indicator). Overall, given a whole sample standard deviation of 1.13, there seems to be no statistically significant difference across any groups with all of them averaging out between 2 - 2.5 on a scale of 10. This already hints at how ESG commitments may not be effective in shaping investment preferences. For T1, we are looking at whether the mean ESG risk rating for PE funds decreases after treatment within the treatment group, $M_{post} - M_{pre} < 0$. The regression analysis conducted on the treatment group using the "Post?" dummy as the independent variable is shown in Exhibit 11, Column 1. It is seen that the effect is not very much statistically significant (at the 0.05 level) with a p-value of 0.09. It's implied that after funds make their commitments, their ESG risk rating actually increases by 0.24 on average which is the opposite of our expectations.

As the next test, we are comparing the effect of treatment by comparing the treatment vs control groups across the pre / post periods. The variance in ratings over time may be due to exogenous factors as well, so in order to rule out differences common to both groups across time as well inherent differences between the treatment and control groups, we will be looking at the difference in differences similar to Houston et al. (2020) where lending activities are analyzed across two groups pre/post treatment. On Exhibit 12, the differences between the Treatment and Control in the Pre period and the post period are shown. The difference in differences for the groups is 0.15. When we regress ESG risk ratings over the “ESG?” treatment dummy, “Post?” dummy, as well as the interaction between the two, the coefficient of the interaction equals 0.15. As can be seen in Exhibit 11 Column 2, treatment funds on average have a slightly lower ESG risk rating (0.09), and ESG risk ratings increase slightly in the post period. However, the lack of statistically significant variables, the positive interaction coefficient and a 0 adj. R-square values seem to overall fail to reject our hypothesis that commitments improve ESG considerations when investing. When we swap the ESG commitment dummy by the PRI dummy as seen on Exhibit 11 Column 3, we get a similar conclusion, and in fact, becoming a PRI signatory increases the ESG risk rating slightly according to the regression. This similarly casts doubt on the effectiveness of PRI signatures, debunking *T3*. This paper was actually expecting PRI commitments to be effective, at least more effective than other types of commitments, in affecting a firm’s investment decisions.

As the next step, more control variables are introduced to the regression. The problem with our diff-and-diff is that it is staggered, in the sense that there is not a single year marking “post”, but each treatment fund has a different commitment date. That’s why, we will first introduce year

dummies to isolate the effect of time variance, by one-hot-encoding each year. We see in Exhibit 11 Column 4 that the interaction term grows while the p-value drops, so when years are controlled, the effect of treatment becomes more pronounced. The results of the regression (not shown in exhibits) indicate that certain years have p-value less than 0.05, and therefore timing seems to be a confounding factor indeed. Subsequently, we introduce the “Target Industry Sector”, “Fund AUM”, and “Enterprise Value” controls one by one. As a robustness check, only industries which occur more than 3 times (10% of the sample size) are kept in the dataset. It’s shown that when Fund AUM is introduced, there is not much of a difference than the base regression (we had shown how funds engage in similar size deals regardless of their sizes in Ex. 7), but when industries are controlled for, the interaction term loses significance and magnitude. This may imply that although the Reprisk ratings readily benchmark each firm to their respective sector and country, ESG issues may matter more for investors and be correlated to other performance measures more directly in certain sectors than others. Since many PE funds are industry- focused, this may also create a confounding effect. When enterprise value is introduced, the picture changes, and we see the interaction term increasing in magnitude and statistical significance considerably, same in the combined regression (Exhibit 13). This finding may be misleading because only around 147 firms out of the 390 in the sample have enterprise values disclosed, so we’re working with a different sample in this scenario, potentially with different characteristics (such as being public before acquisition since private firms may mostly not have their EVs announced when bought out, and therefore ruled out in this sample.) Overall, we can clearly see that the statistical and economic significance of our results is very low due to the low coefficients and p-values of various tests. Although we observe the effect of ESG commitments and disclosures to be shaping preference towards slightly higher ESG risk

companies post-treatment, there isn't enough evidence to make a conclusive generalization for funds' compliance to ESG commitments, so we fail to reject our hypothesis and our tests as a result of our analysis.

Conclusion

Given the data constraints and lack of academic literature around the ESG footprints of PE funds and the portfolio consequences of their commitments, this study aims to be one of the first publications to tackle these timely questions and prompt further research with more robust samples in order to benefit GPs and LPs as they're increasingly interested in this field. From our study, we've confirmed that ESG commitments and disclosures are being adopted by more and more PE firms every year. Despite a size differential between treatment and control funds, the annual volume and size of their deals were similar, leading to the expectation to see the treatment in effect. Yet, we couldn't find enough evidence to prove any of our empirical tests, and in fact, the analyses show that the data implies the opposite of our expectations in almost all cases. First of all, both the underlying transaction data and the ESG ratings are noisy. We've seen that timing of transactions and their industries are confounding factors, as well as the enterprise value / size of the companies. When controlling for the last one, the sample size drops by more than 60%. That's why, although we've observed that within that smaller sample, ESG commitments have a statistically significant impact on fund's target firm choices after commitment, this can't be generalized conclusively due to potential confounders and small sample size. In each case, however, both for PRI and other indicators of the funds' ESG commitments, an increase in the ESG risk rating of the chosen target companies has been documented post-commitment. These findings are coherent with Kim and Yoon's (2020) findings on how public investors that are PRI

signatories on average do not exhibit improvements in fund-level ESG scores after signing, and their ESG credentials actually worsen post-signing.

The most obvious potential explanation is that both active public investors and PE funds engage in ‘greenwashing’, use ESG disclosures and commitments strategically to improve their fundraising and deal sourcing efforts. However, there are a couple differences between the two investor types; firstly, although we’ve observed that PRI signatures aren’t effective in improving ESG credentials of investors, we’re not sure how PE funds engage with their portfolio firms post-acquisition on ESG issues unlike Kim & Yoon’s documentation of active investors since they were able to look at their proxy votes. Secondly, the nature of investments is simply different because public equities have much more ESG disclosure and 3rd party information compared to private firms bought by PE funds.

There are other reasons why this phenomenon simply shouldn’t be interpreted as ‘greenwashing’. First and foremost, Reprisk ESG ratings aren’t that widely used by PE firms, the effectiveness of ESG ratings in general are still debated, and PE firms may simply not have access to the right ESG data to make an informed decision as also stated in surveys done with them. (Pedrini et al., 2020). Secondly, there is no information about how Reprisk ratings have evolved over time; as the sensitivity around ESG issues grow as well as available data points and sources, the ratings may simply worsen due to factors that aren’t caused by the firms themselves. Thirdly, the secret sauce of PE managers is ‘information arbitrage’, allowing them to make smart investments with private information obtained through detailed due diligences. Those managers may get a better picture of the actual ESG risks and performance of their companies, and report them more

accurately to their LPs then one would understand by simply looking at ratings which are based on publicly-reported ESG news and events. Lastly, it may be the opposite, and that the presence of negative ESG sentiment around their target firms may be a way of arbitrage. (Cui & Docherty, 2020) document that contrarian investors can benefit from overreactions to ESG news in stocks and then the eventual mean reversion by buying low and selling high. Similarly, in private markets, valuations may be hurt in such cases, and contrarian investors may see an opportunity to exploit the lower prices. Hence, although this paper has assumed that investors prefer negative screening (Adversity to esg-negative firms due to potential esg-risks), savvy investors may actually buy those worse ESG-performing firms and implement changes that would make them more ESG-compliant, and in the process maximize the exit value and satisfy their LPs. (Similar to Bellon (2020)). Therefore, an ESG commitment may mean increasingly targeting poor-ESG firms to engage with them post-ownership, rather than increasingly avoiding poor-ESG firms. It should be then noted that this paper only focuses on the LBO entry, and therefore doesn't paint the full picture on how the companies look like at the PE exit.

Lastly, and most remarkably, it should be noted that the only way to sustain the high returns for PE funds is to buy inherently good businesses and improve them; having an average rating varying between 2-2.5 (out of 10) already implies that the bought-out firms are usually better than their sector / country peers on ESG matters according to Reprisk. That's why the difference may be so small between the different treatment & control groups since they are all sampled from PE buyouts. As can be seen on Exhibit 14, the share of firms with the lowest Reprisk Ratings is much higher than compared to S&P500 and MSCI Europe; 72% of the PE study sample are ranked A or AA compared to only 33% for S&P500 and 28% for MSCI Europe

stocks. (Chahine, 2020). More research is needed on the investment behavior of PE funds post-ESG commitments, particularly how the ESG performance / risks of their portfolio companies change during the ownership compared to before purchase, which would answer some of the questions posed in this chapter. In that regard, ESG data tools and access should be improved for further research, and a broader sample should be used which includes more LBO transactions with more control variables added.

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Exhibits

Exhibit 1: Database Variables Related to Target Firm

Variables Related to Target Firm

Target Name	RRR.T.#	RRR.T-3#	RRR.T-6#	RRR.T-9#	Enterprise.Value	EBITDA	EV/EBITDA	Target.Industry.Sector	Target.Nation
Antas Srl	6	6	6	6		17.79		Business Services	Italy
Api Technologies	3	3	4	4	304.94	20.24	15.065264	Electronic and Electrical Equipment	United States
Apple Leisure	2	2	2	2				Transportation and Shipping (except air)	United States
Apria Healthcare	2	2	2	2	1571.17	299.88	5.2392975	Health Services	United States
Apttus	2	2	2	2				Prepackaged Software	United States

Exhibit 2: Database Variables Related to the Funds and the Deal

Fund & Deal Information											
Acquiror	Fund ESG?	Fund PRI?	Post PRI?	Post ESG?	ESG at T-deal?	PRI at T-deal?	AUM (USD MN)	PE: ESTIMATED DRY POWDER (USD MN)	PE: TOTAL FUNDS RAISED LAST 10 YEARS (USD MN)	Deal Announcement Date (T)	Deal Year
Eqst	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	56456.58	7006.55	33290.34	2019-07-04	2019
Jf Lehman	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	0.00	1073.60	2758	2016-02-29	2016
Kkr	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	207000.00	31854.01	81640.92	2016-12-13	2016
Blackstone	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	584400.00	11296.49	85759.8	2008-06-19	2008
Thoma Bravo	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	70000.00	23667.83	52950.5	2018-09-04	2018

Exhibit 3: Summary Statistics of Database

	<u>ESG True</u>	<u>ESG False</u>	<u>PRI True</u>	<u>PRI False</u>
<u># Transactions</u>	278	112	151	239
<u>% of Transactions</u>	71.3%	28.7%	38.7%	61.3%
<u>% of Funds</u>	61.8%	38.2%	32.7%	67.3%
<u>Mean EV</u>	\$ 4,794	\$ 3,752	\$ 5,556	\$ 3,658
<u>Mean AUM</u>	\$ 132,442	\$ 21,190	\$ 132,833	\$ 79,702
<u>Mean EV/EBITDA</u>	14.9 x	38.8 x	16.8 x	26.9 x
<u>Top 5 Industries:</u>	Business Services, Investment & Commodity Firms, Prepackaged Software, Health Services, Chemicals	Business Services, Prepackaged Software, Retail Trade (Apparel), Food and Kindred Products, Investment & Commodity Firms	Business Services, Retail Trade (Apparel), Chemicals, Drugs, Food and Kindred Products	Business Services, Prepackaged Software, Investment & Commodity Firms, Retail Trade (Apparel), Health Services

Exhibit 4: Number of New ESG Commitments Every Year

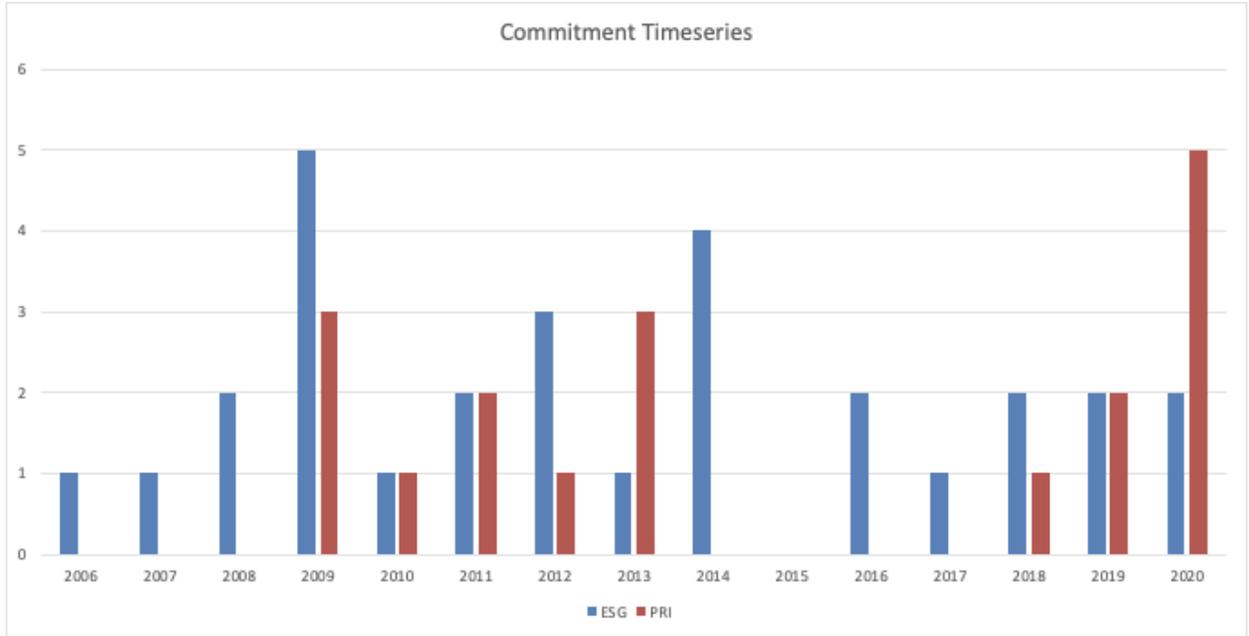


Exhibit 5: Boxplot for Fund Sizes between Treatment and Control Groups

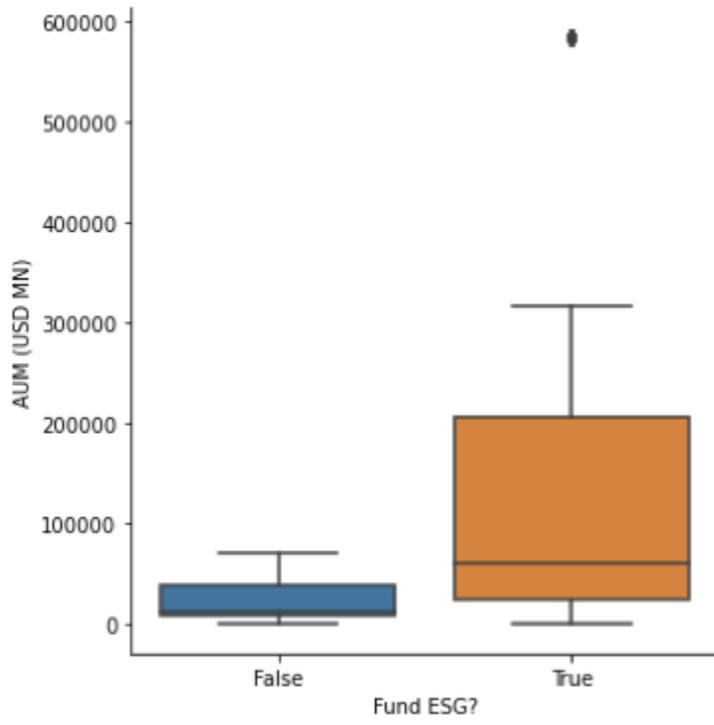


Exhibit 6: Aggregate Transaction Statistics for Treatment and Control Groups

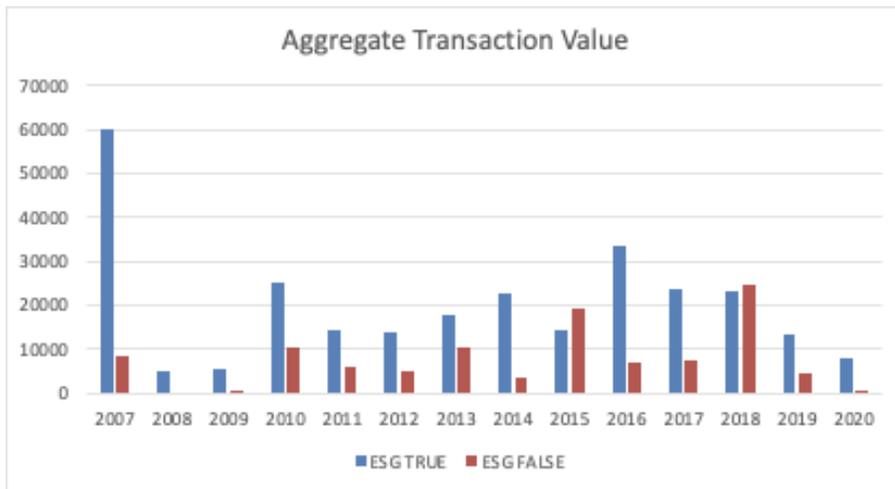
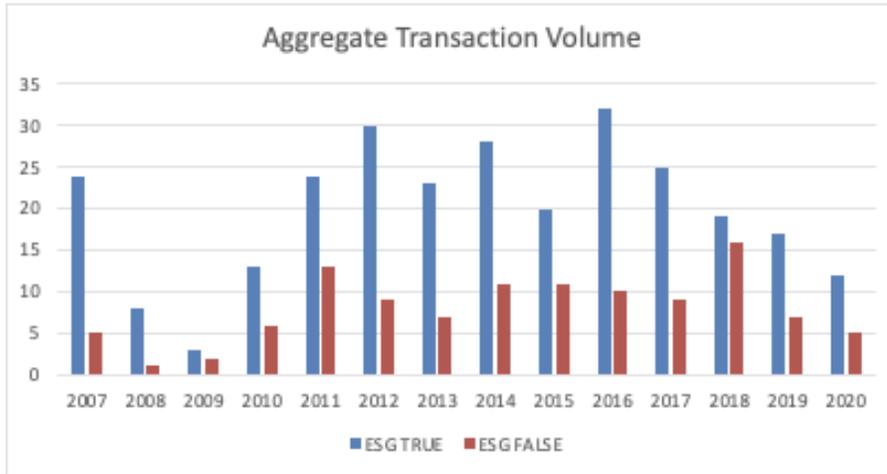


Exhibit 7: Average Transaction Statistics for Treatment and Control Groups

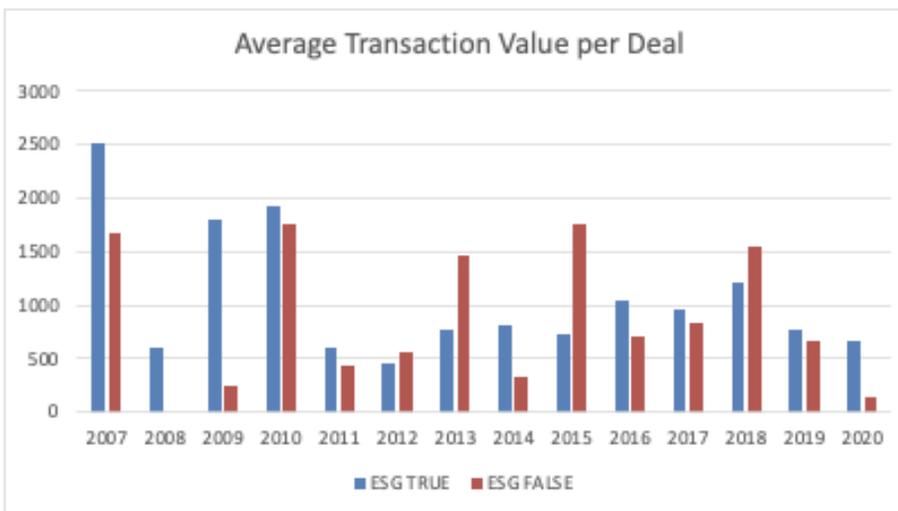
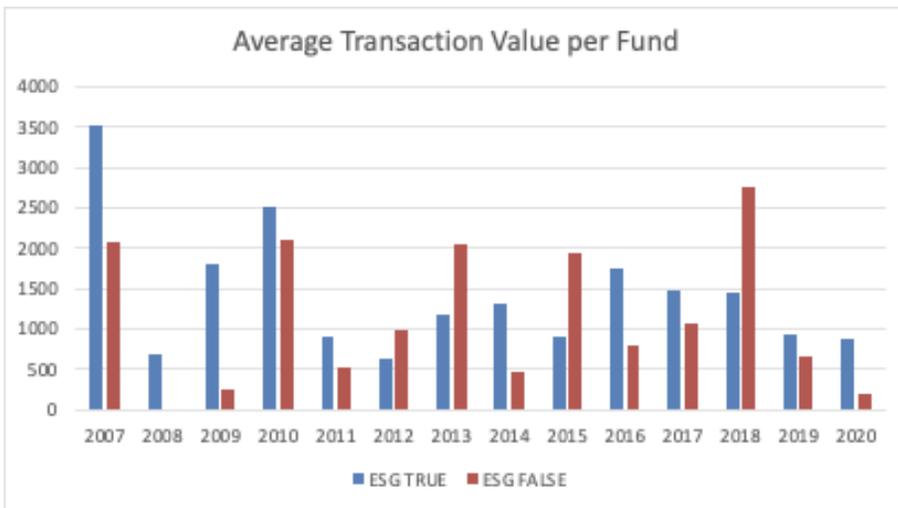
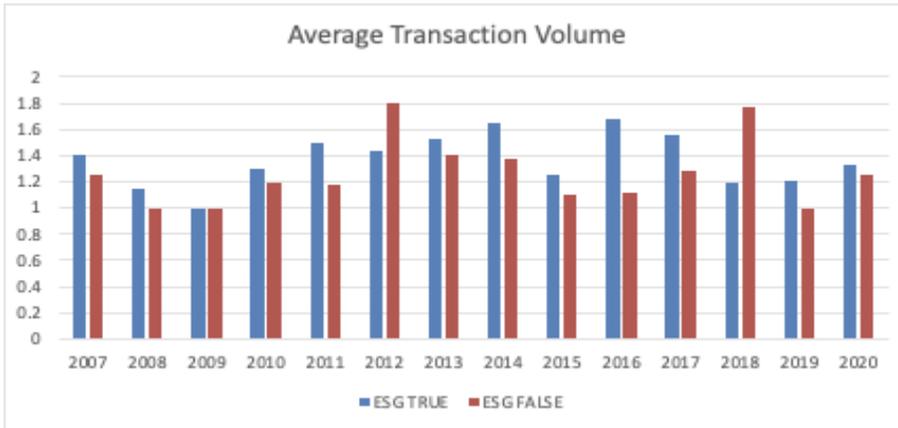
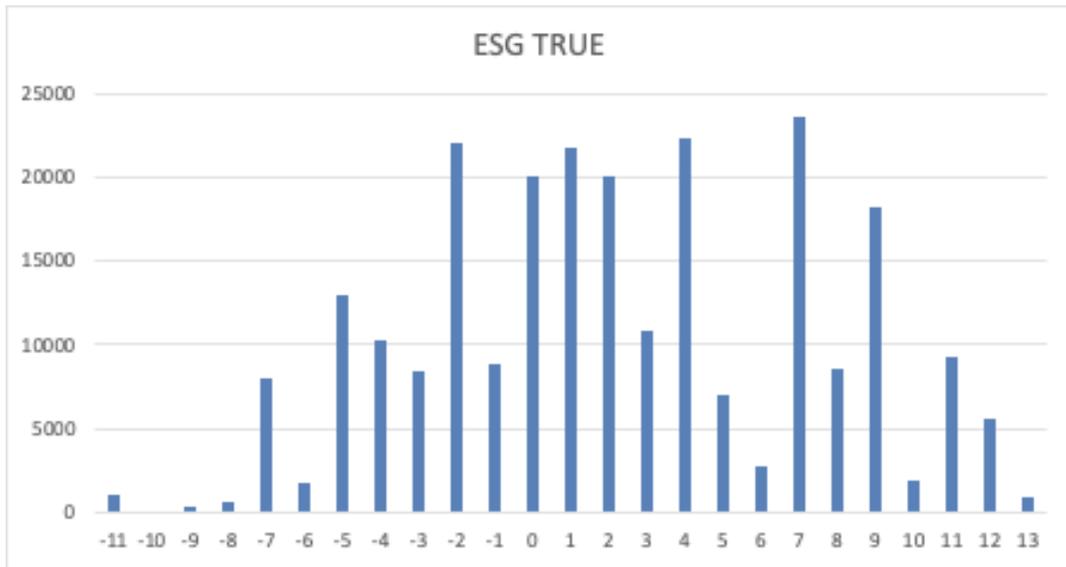
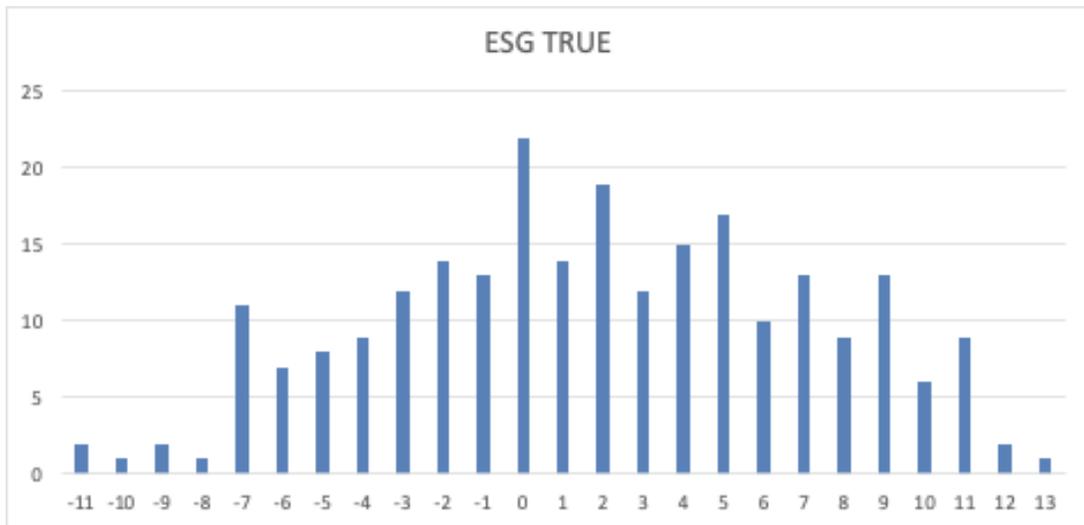


Exhibit 8: Transaction Statistics for the Treatment Group Centered at Treatment Date



Aggregate Transaction Value Time Series (centered at treatment date)



Aggregate Transaction Volume Time Series (centered at treatment date)

Exhibit 9: ESG Ratings Time Series Across Treatment vs Control Groups

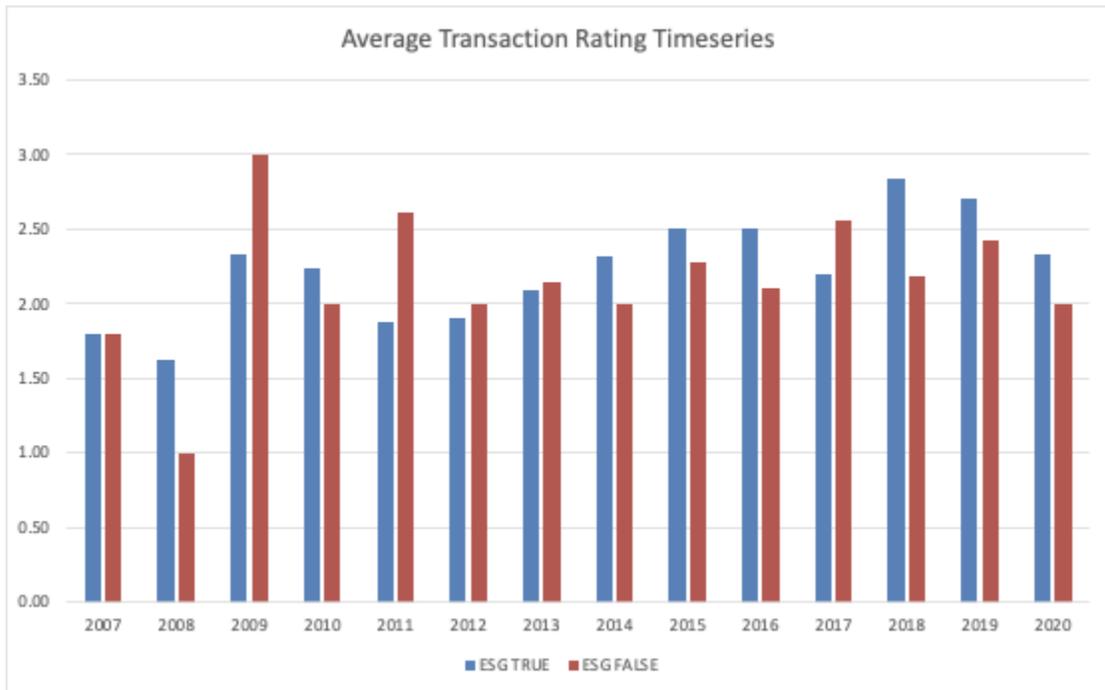


Exhibit 10: Comparison of Means Across Different Treatment / Control Groups

	Comparison of Means												All Firms			
	ESG Funds			Non ESG			Non PRI but ESG			PRI FUNDS				Non PRI		
	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall		Pre	Post	Overall
Panel A: Dependent Variables																
Ratings t	2.08	2.32	2.23	2.17	2.26	2.21	2.05	2.22	2.17	2.09	2.59	2.28	2.05	2.35	2.19	2.23
t-3	2.07	2.32	2.23	1.98	2.26	2.13	2.05	2.24	2.18	2.08	2.56	2.27	1.98	2.35	2.16	2.20
t-6	2.11	2.31	2.24	1.94	2.29	2.13	2.03	2.20	2.15	2.17	2.54	2.32	1.97	2.32	2.14	2.21
t-9	2.11	2.29	2.23	2.02	2.29	2.17	2.06	2.18	2.14	2.12	2.54	2.30	2.00	2.31	2.15	2.21
Panel B: Control Variables																
EV	2359.75	2766.82	2614.64	1831.44	2676.14	2253.79	2568.13	2954.99	2835.25	2518.26	2375.38	2472.10	2336.75	2794.99	2525.14	2502.90
EBITDA	218.82	835.63	607.18	200.74	235.12	220.27	262.09	514.50	439.92	1047.46	101.18	722.17	422.09	229.34	330.10	495.18
EV/EBITDA	21.22	11.08	15.02	9.76	67.14	42.13	10.28	11.61	11.19	19.76	12.33	18.09	10.51	49.72	28.18	24.55
PE AUM	72396.56	159386.10	127469.07	20035.50	22325.79	21221.54	64132.54	157723.28	127508.94	132887.56	118934.09	127435.54	86249.06	67675.64	77700.62	96956.96
Sample size (n)	102	176	278	54.00	58.00	112.00	41.00	86.00	127.00	92.00	59.00	151.00	129.00	110.00	239.00	390.00

Exhibit 11: Regression Results Summary

Summary of Regressions								
	1	2	3	4	5	6	7	8
ESG [True]								
<i>Coefficient</i>	-	-0.09	-	-0.13	-0.06	0	-0.6	-0.5
<i>P-Value</i>	-	0.643	-	0.52	0.74	0.99	0.03	0.14
Post ESG [True]								
<i>Coefficient</i>	0.24	0.09	-	-0.36	0.09	0.1	-0.73	-1
<i>P-Value</i>	0.09	0.67	-	0.16	0.66	0.65	0.02	0.02
ESG [True]:Post ESG [True] Interaction								
<i>Coefficient</i>	-	0.15	-	0.41	0.19	0.04	0.82	1
<i>P-Value</i>	-	0.56	-	0.14	0.47	0.87	0.03	0.04
N	278	390	390	390	390	373	147	147
Adjusted R-Squared	0.007	0	0.02	0.02	0	0.06	0.02	0.04
Time Controls (Year)	N	N	N	Y	N	N	N	Y
Fund Controls (AUM)	N	N	N	N	Y	N	N	Y
Industry Controls	N	N	N	N	N	Y	N	Y
Firm Controls (Enterprise Value)	N	N	N	N	N	N	Y	Y
PRI [True]								
<i>Coefficient</i>			0.04					
<i>P-Value</i>			0.79					
Post PRI [True]								
<i>Coefficient</i>			0.3					
<i>P-Value</i>			0.03					
PRI [True]:Post PRI [True] Interaction								
<i>Coefficient</i>			0.2					
<i>P-Value</i>			0.4					

1 - Regression for Test T1, sample limited to the treatment group and ratings regressed over “Post ESG?”

2- Regression on treatment variables and their interaction. Treatment variable “ESG [True]” signifies “presence of any public ESG commitment / disclosure” (including PRI)”

3- Regression on treatment variables and their interaction. Treatment variable “PRI [True]” signifies “becoming an official signatory member of the PRI network”

4-8 - Control variables are introduced along with the “ESG” and “Post ESG?” treatments

7-8 - Sample size for EV and combined regression is 147 due to lack of EV data in all transactions

Exhibit 12

Comparison of Means for RepRisk Ratings at Time t (Transaction Year) - Treatment “ESG?”

	<u>Pre-Period</u> ³	<u>Post-Period</u>	<u>Differences in Pre-Post</u>
<u>Treatment</u> ¹	2.08	2.32	0.24
<u>Control</u> ²	2.17	2.26	0.09
<u>Differences in T-C</u>	-0.09	0.06	Diff-in-Diff: 0.15

Comparison of Means for RepRisk Ratings at Time t (Transaction Year) - Treatment “PRI?”

	<u>Pre-Period</u> ³	<u>Post-Period</u>	<u>Differences in Pre-Post</u>
<u>Treatment</u> ¹	2.09	2.59	0.50
<u>Control</u> ²	2.05	2.35	0.30
<u>Differences in T-C</u>	0.04	0.24	Diff-in-Diff: 0.20

Standard Deviation of Reprisk Ratings at Time t : 1.13

1: Treatment if ESG Commitment / Policy Exists

2: Control if the fund lacks of an ESG policy or disclosure about its consideration in investment process

3: Before the ESG commitment / policy disclosure year for treatment funds, and a placebo year for the control funds which is the sample median transaction year

Exhibit 13: Regression on Interaction and Treatments with All Controls Combined

OLS Regression Results

Dep. Variable:	Q('RRR.T.#')	R-squared:	0.353
Model:	OLS	Adj. R-squared:	0.036
Method:	Least Squares	F-statistic:	1.113
Date:	Thu, 29 Apr 2021	Prob (F-statistic):	0.322
Time:	14:14:26	Log-Likelihood:	-180.57
No. Observations:	147	AIC:	459.1
Df Residuals:	98	BIC:	605.7
Df Model:	48		
Covariance Type:	nonrobust		

	coef	std err	t	P> t	[0.025	0.975]
Intercept	4.1434	0.773	5.364	0.000	2.610	5.676
Q('Fund ESG?')[T.True]	-0.4933	0.335	-1.474	0.144	-1.158	0.171
Q('Post ESG?')[T.True]	-1.0445	0.427	-2.445	0.016	-1.892	-0.197
Q('Target.Industry.Sector')[T.Amusement and Recreation Services]	-2.0062	0.909	-2.206	0.030	-3.811	-0.201
Q('Target.Industry.Sector')[T.Business Services]	-2.0672	0.800	-2.583	0.011	-3.655	-0.479
Q('Target.Industry.Sector')[T.Chemicals and Allied Products]	-1.5875	1.021	-1.555	0.123	-3.614	0.439
Q('Target.Industry.Sector')[T.Computer and Office Equipment]	0.2812	0.981	0.287	0.775	-1.666	2.228
Q('Target.Industry.Sector')[T.Construction Firms]	-2.3692	1.415	-1.674	0.097	-5.177	0.439
Q('Target.Industry.Sector')[T.Credit Institutions]	2.779e-11	1.26e-11	2.211	0.029	2.85e-12	5.27e-11
Q('Target.Industry.Sector')[T.Drugs]	-2.2384	0.938	-2.386	0.019	-4.100	-0.376
Q('Target.Industry.Sector')[T.Electric, Gas, and Water Distribution]	-1.1068	1.090	-1.016	0.312	-3.269	1.056
Q('Target.Industry.Sector')[T.Electronic and Electrical Equipment]	-1.5069	1.108	-1.360	0.177	-3.705	0.691
Q('Target.Industry.Sector')[T.Food and Kindred Products]	-2.2940	0.954	-2.405	0.018	-4.187	-0.401
Q('Target.Industry.Sector')[T.Health Services]	-1.7270	0.884	-1.953	0.054	-3.482	0.028
Q('Target.Industry.Sector')[T.Hotels and Casinos]	-1.9933	1.001	-1.991	0.049	-3.980	-0.006
Q('Target.Industry.Sector')[T.Insurance]	-2.0015	1.001	-1.999	0.048	-3.988	-0.015
Q('Target.Industry.Sector')[T.Investment & Commodity Firms,Dealers,Exchanges]	-1.8798	0.895	-2.101	0.038	-3.655	-0.104
Q('Target.Industry.Sector')[T.Leaner and Leather Products]	-2.3477	1.350	-1.739	0.085	-5.027	0.332
Q('Target.Industry.Sector')[T.Machinery]	-1.4532	1.125	-1.292	0.199	-3.686	0.779
Q('Target.Industry.Sector')[T.Measuring, Medical, Photo Equipment; Clocks]	-1.8555	0.951	-1.951	0.054	-3.742	0.031
Q('Target.Industry.Sector')[T.Metal and Metal Products]	-2.1735	0.976	-2.226	0.028	-4.111	-0.236
Q('Target.Industry.Sector')[T.Mining]	5.842e-16	6.35e-16	0.920	0.360	-6.75e-16	1.84e-15
Q('Target.Industry.Sector')[T.Miscellaneous Manufacturing]	-2.3473	1.369	-1.714	0.090	-5.064	0.370
Q('Target.Industry.Sector')[T.Miscellaneous Retail Trade]	-2.1306	0.987	-2.159	0.033	-4.089	-0.172
Q('Target.Industry.Sector')[T.Oil and Gas; Petroleum Refining]	-2.2858	1.010	-2.262	0.026	-4.291	-0.281
Q('Target.Industry.Sector')[T.Prepackaged Software]	-1.5452	0.832	-1.857	0.066	-3.196	0.106
Q('Target.Industry.Sector')[T.Radio and Television Broadcasting Stations]	-9.393e-16	6.03e-16	-1.558	0.122	-2.14e-15	2.57e-16
Q('Target.Industry.Sector')[T.Retail Trade-Eating and Drinking Places]	-2.4176	1.012	-2.388	0.019	-4.426	-0.409
Q('Target.Industry.Sector')[T.Retail Trade-Food Stores]	-2.1107	0.946	-2.231	0.028	-3.988	-0.234
Q('Target.Industry.Sector')[T.Retail Trade-General Merchandise and Apparel]	-1.3104	0.854	-1.534	0.128	-3.005	0.385
Q('Target.Industry.Sector')[T.Retail Trade-Home Furnishings]	2.174e-16	4.29e-16	0.506	0.614	-6.35e-16	1.07e-15
Q('Target.Industry.Sector')[T.Sanitary Services]	-1.0278	1.007	-1.021	0.310	-3.026	0.970
Q('Target.Industry.Sector')[T.Soaps, Cosmetics, and Personal-Care Products]	-2.758e-16	3e-16	-0.920	0.360	-8.71e-16	3.19e-16
Q('Target.Industry.Sector')[T.Stone, Clay, Glass, and Concrete Products]	-5.961e-17	1.98e-16	-0.301	0.764	-4.52e-16	3.33e-16
Q('Target.Industry.Sector')[T.Telecommunications]	-1.5670	0.968	-1.619	0.109	-3.488	0.354
Q('Target.Industry.Sector')[T.Textile and Apparel Products]	-1.4985	1.163	-1.289	0.201	-3.806	0.809
Q('Target.Industry.Sector')[T.Transportation Equipment]	-5.43e-16	3.5e-16	-1.551	0.124	-1.24e-15	1.52e-16
Q('Target.Industry.Sector')[T.Transportation and Shipping (except air)]	-2.7434	0.931	-2.948	0.004	-4.590	-0.897
Q('Target.Industry.Sector')[T.Wholesale Trade-Durable Goods]	-2.1350	1.057	-2.019	0.046	-4.233	-0.037
Q('Target.Industry.Sector')[T.Wholesale Trade-Nondurable Goods]	-1.517e-16	1.79e-16	-0.846	0.400	-5.08e-16	2.04e-16
Q('Target.Industry.Sector')[T.Wood Products, Furniture, and Fixtures]	-1.1609	1.144	-1.015	0.313	-3.431	1.109
Q('Fund ESG?')[T.True]:Q('Post ESG?')[T.True]	1.0116	0.489	2.068	0.041	0.041	1.982
Q('Enterprise.Value')	1.209e-05	4.91e-05	0.246	0.806	-8.53e-05	0.000
Q('AUM (USD MN)')	3.82e-07	8.24e-07	0.464	0.644	-1.25e-06	2.02e-06
Q('Deal.Year_2007')	-0.3514	0.346	-1.015	0.313	-1.039	0.336
Q('Deal.Year_2008')	-0.2656	0.669	-0.397	0.692	-1.593	1.061
Q('Deal.Year_2009')	0.7628	0.635	1.201	0.233	-0.498	2.023
Q('Deal.Year_2010')	0.3608	0.328	1.099	0.274	-0.290	1.012
Q('Deal.Year_2011')	0.2543	0.361	0.705	0.482	-0.461	0.970
Q('Deal.Year_2012')	0.5649	0.367	1.541	0.127	-0.163	1.292
Q('Deal.Year_2013')	-0.0943	0.372	-0.253	0.801	-0.833	0.644
Q('Deal.Year_2014')	-0.1481	0.450	-0.329	0.743	-1.041	0.745
Q('Deal.Year_2015')	0.5973	0.415	1.439	0.153	-0.226	1.421
Q('Deal.Year_2016')	0.5072	0.317	1.602	0.112	-0.121	1.136
Q('Deal.Year_2017')	0.4308	0.339	1.270	0.207	-0.243	1.104
Q('Deal.Year_2018')	1.0124	0.315	3.210	0.002	0.386	1.638
Q('Deal.Year_2019')	0.2451	0.398	0.615	0.540	-0.546	1.036
Q('Deal.Year_2020')	0.2673	0.509	0.526	0.600	-0.742	1.276

Exhibit 14: Comparison of Reprisk Rating Distribution - PE Sample vs Benchmarks

