

## **ESG in Private Equity:**

*ESG Portfolio Footprints, Operational Levers and Financial Returns*

## **ABSTRACT**

Socially responsible investing (SRI) has seen a sharp rise among institutional investors in recent times. Also private equity (PE) investors are increasingly integrating ESG considerations in their investment processes. This study explores the relationship between PE portfolio ESG footprints and fund-level financial returns. We examine what operational measures PE professionals can utilize to foster ESG development at portfolio companies. Our sample consists of 206 buyout funds with no concrete ESG focus and comprises data for the time period 2010-2022. We provide evidence that better portfolio ESG scores result in higher financial returns. PE houses can promote positive ESG development and financial returns through centralised ESG management, the implementation of ESG value enhancement plans as well as rigorous ESG impact controlling. This study adds to the yet scarce body of literature on SRI in the PE industry.

**JEL Classification:** G24; G34; L21; M14

**Keywords:** Private equity; Socially responsible investment; ESG; corporate finance; strategy

## INTRODUCTION

ESG-compliant investment products have become increasingly important cornerstones of today's asset management industry (Daugaard, 2020; Widyawati, 2020). Institutional investors in particular show increasing interest in incorporating ESG considerations in their investment strategies (García-Sánchez, Rodríguez-Ariza, Aibar-Guzmán, & Aibar-Guzmán, 2020). Although various studies point at positive effects of incorporating ESG in investment processes (Wagemans, van Koppen, & Mol, 2013; Widyawati, 2020), institutional investors' motivation for ESG considerations is still mostly driven by the demands of regulators and clients (Baid & Jayaraman, 2022; Galbreath, 2013).

Also, the private equity (PE) industry has been subject to a rise in adoption of ESG practices over recent years (Indahl & Jacobsen, 2019) due to client' demands (McCahery, Pudschedl, & Steindl, 2022). The unique feature that PE buyout investors usually hold majority stakes in their portfolio companies puts this asset class into a particularly interesting light from an impact perspective as scholars demonstrate that shareholder engagement is an important pillar for institutional investor for fostering ESG development (Kölbel, Heeb, Paetzold, & Busch, 2020). This leaves the question whether PE investors actually make use of their shareholder rights for promoting ESG transformations at their portfolio companies.

We therefore identify the following two research gaps. First, ... (lacking research on ESG and Impact in PE?). Second, ... (if and how PE investors promote ESG transformations of their portfolio companies?). We work to answer to this this research gap by exploring the implications of ESG portfolio footprints on financial returns in the PE space, and what operational measures PE investors can use to execute successful ESG transformations in their portfolio companies.

Our research question, therefore, is: (insert; look at other papers in the targeted finance journal in how they structure the intro and formulate their RQ)

Our study builds on a PitchBook dataset of 206 buyout funds with overall more than 2,000 portfolio companies in their entire fund lifecycle. We use the RepRisk database to compute fund-level ESG portfolio footprints which allow us to capture ESG development in PE portfolios over time. We also incorporate UN PRI survey data to account for PE investors' ESG management operations.

We provide evidence that fund-level financial returns increase with better ESG portfolio footprints. We conduct various robustness checks by applying different financial performance metrics or creating subsamples. Our analysis furthermore shows that PE investors should focus on ESG management centralisation and the adoption of ESG value enhancement plans. We show that ESG portfolio footprints improve with the application of both operational measures. In contrast, ESG reporting frequency and ESG impact controlling have no impact.

As previous studies mostly focus on the broader asset management industry or other asset classes, this study fills the yet scarce literature on ESG practices in the PE industry. Reference studies present evidence for the positive return effects of RI (e.g. Cornett, Erhemjamts, & Tehranian, 2016; Flammer, 2015). Our research avenue on the relationship between RI and financial performance is however still untouched. Previous scholars also report that operational ESG management systems are important levers at PE houses (Cumming & Johan, 2007; Zaccone & Pedrini, 2020). With this contribution we are answering the key questions on the presence of financial return implications of ESG portfolio footprints as well as the most efficient ESG operational measures for ESG portfolio transformations.

The remainder of this article is structured as follows: The next section takes a comprehensive look at the literature on the role of ESG for institutional investors as well as specifically for PE investors. Next, we explain the construction of the data set as well as the estimation methodology. It is followed by the presentation and discussion of results. The last section concludes.

## **LITERATURE REVIEW**

Over the last decade, responsible investing (RI) of institutional investors has been increasingly subject to research studies. Studies on RI in the private equity (PE) industry are however very limited as scholars predominantly focus on public markets investors (Dai, 2022). We provide an overview of the overall RI literature and contextualise what scholars explored for the PE industry.

RI is known as the practice of incorporating sustainability criteria in investment decision-making (Widyawati, 2020) which follows both ethical as well as financial paradigms (Widyawati, 2020). Yet, there is still vagueness in the exact definition of RI and what investment strategies can be associated with it (Berry & Junkus, 2013; Friede, 2019). Although,

there are a number of research initiatives trying to add clarity and structure to the RI research landscape (e.g. Fan, Omura, & Roca, 2022; Koeningsmarck & Geissdoerfer, 2021), the ESG-themed literature is still marked by a certain fuzziness (Edmans, 2022). This unclarity may also translate into a barrier for investment firms where institutional investors have to strive against distrust by investors in “green” investment products (Gutsche & Zwergel, 2020).

In the following, we give an overview about institutional investors’ motives for RI, the relationship between RI and financial performance as well as ESG portfolio performance.

### *Motivation for Responsible Investments*

Although RI is increasingly on the research agendas of scholars, findings about the underlying motivations to conduct RI are scarce. For many institutional investors their RI approach tends to be driven by both long-term returns as well as risk mitigation considerations (Benson & Humphrey, 2008; Galema, Plantinga, & Scholtens, 2008; Jansson & Biel, 2011). Amel-Zadeh and Serafeim (2017) report that the majority of institutional investors conduct RI because it is material to the financial performance of their investments.

Renneboog, Horst, and Zhang (2011), however, report that it is non-financial issues that are relevant for investors’ decision-making. RI reflects the objective to create impact on the society, the environment and sustainable development (Rizzi, Pellegrini, & Battaglia, 2018). To achieve these ethical goals, institutional investors are also willing to accept suboptimal returns in some cases (Renneboog, Horst, & Zhang, 2008b). This is backed by Hong and Kacperczyk (2009), arguing that investors which follow an RI approach have a different underlying utility model than those investors which do not invest responsibly.

According to Amel-Zadeh and Serafeim (2017), institutional investors also show an active ownership motivation for RI, where Dimson, Karakas, and Li (2015) present evidence how this turns into an active role for shaping companies’ ESG performance. RI can also be seen as institutional investors’ answer to the growing demand of corporate social responsibility (CSR) in the financial sector (Barigozzi & Tedeschi, 2015). Also, the regulatory environment plays a role for institutional investors’ move towards RI (Himick & Adousset-Coulier, 2016; Renneboog, Horst, & Zhang, 2008a; Sievänen, 2014).

Only three studies examine motivations of PE investors to conduct RI. Crifo and Forget (2013) provide evidence that PE firms’ move to RI is driven by the search of new value creation possibilities and risk management. Through RI, PE firms also want to differentiate themselves

from competitors, which may help them in their fundraising. Zaccone and Pedrini (2020) confirm the importance of value creation and risk management for PE investors' RI practices. In addition, they also report that PE investors' motivation is driven by regulatory pressure as well as the growing public attention by media and other stakeholders for ESG. Cumming and Johan (2007) argue that RI among PE houses is much more likely when ESG strategies are subject to a centralised internal organizational structure and the investment focus is rather international.

### *Responsible Investments & Financial Returns*

With a growing body of literature on ESG and its relationship on financial returns, Gillan, Koch, and Starks (2021) conclude that the findings regarding the presence and magnitude of an effect remain ambiguous. Prior scholars allow diverging conclusions: While some studies point at a positive impact of ESG considerations on financial returns (e.g. Cornett et al., 2016; Flammer, 2015; Lins, Servaes, & Tamayo, 2017), others propose a value destructive effect of ESG (e.g. Buchanan, Cao, & Chen, 2018; Masulis & Walid Reza, 2015) or show mixed findings (Bauer, Koedijk, & Otten, 2005).

With regards to RI strategies, there are two schools of thought on its impact on financial returns. On one side, Diaz, Ibrushi, and Zhao (2021), Maiti (2021) and Becchetti, Ciciretti, and Dalo (2018) assess the consideration of ESG factors for RI approaches as a risk premia which are being priced in return expectations. The integration of ESG in the investment process thereby accounts for an additional risk factor which is not reflected by other risk factors.

Edmans (2011) proposes a different view, where ESG provides investors with fundamental information about companies which allows better return forecasting. Through an RI approach investor can price this information into their investment decisions. ESG information also helps investors to predict market reactions to ESG news (Serafeim & Yoon, 2022). A number of research studies present evidence that ESG ratings serve as predictors for corporate returns, e.g. Avramov, Cheng, Lioui, and Tarelli (2022) and Bolton and Kacperczyk (2021).

Prior scholars also present evidence that the magnitude of RI outperformance depends on the economic cycle where outperformance is much higher in bearish market periods (Henke, 2016). Kempf and Osthoff (2007) argue that the financial returns of RI strategies are exceptionally high when investors focus on companies which are already behaving very socially responsible. Several studies also state that RI returns are diverging by sector (Kumar et al., 2016; X. Zhang, Zhao, & He, 2022). Additionally, scholars explain the inconclusive results in effect magnitude

and direction by the heterogeneity in RI approaches (Revelli & Viviani, 2015) as, for instance, the intensity of non-financial screens moderates systematic and overall risk of investments (Lee, Humphrey, Benson, & Ahn, 2010).

Considering the investment horizon of PE investors and the time frame in which ESG transformations take place, it is, however, difficult to determine the relationship between RI and financial returns at PE firms (Cappucci, 2018). As the first-ever study with a distinct focus on PE, Crifo, Forget, and Teyssier (2015) analyse how the consideration of ESG information impacts PE professionals' financial valuations for target companies. They present evidence that PE investors lower firm valuations for companies which act socially irresponsibly. The lack of comprehensive PE return data (Harris, Jenkinson, & Stucke, 2012) may have served as an obstacle for further related studies in the past.

### *ESG Portfolio Performance*

Several scholars analyse how institutional investors are promoting sustainability at their portfolio companies. Kölbel et al. (2020) conclude that shareholder engagement is the most effective way for them to foster ESG development in their portfolios. Barko, Cremers, and Renneboog (2022) and Dyck, Lins, Roth, and Wagner (2019) both present evidence that companies' ESG ratings improve following shareholder engagements and make a strong argument for active ownership approaches as a strategy for institutional investors to promote ESG development.

Brandon, Gloßner, Krueger, Matos, and Steffen (2022) demonstrate that investors with significant commitment to ESG also depict better portfolio-level ESG scores. This effect is, however, only visible for institutional investors outside the United States (US). Kim and Yoon (2022) confirm the findings on the US market with a US-focused study. Investors engaging on ESG matters also contribute to downside risk reductions for their portfolio companies (Hoepner, Oikonomou, Sautner, Starks, & Zhou, 2020).

The subject has not yet been studied for PE portfolios.

### *ESG Integration in Investment Practices*

Sciarelli, Cosimato, Landi, and Iandolo (2021) argue that integrating ESG factors in investment decision-making contributes to a more sustainable investment approach. According to Eccles, Kastropeli, and Potter (2017), the most prominent ESG investing strategies are value-based exclusions, best-in-class selection as well as thematic investing. Most institutional investors use

ESG information in their investment processes for red-flagging and risk management (Van Duuren, Plantinga, & Scholtens, 2016) as ESG screens and filters have proved as reliable tools for most investment strategies (Verheyden, Eccles, & Feiner, 2016). Investors also use ESG information for shareholder engagements as well as an input for firm valuation models (Amel-Zadeh & Serafeim, 2017). Krueger, Sautner, and Starks (2020) confirm the importance of non-financial information on climate risks for valuation models.

Long and Johnstone (2021) and Salerno (2021) conclude that it is important for PE investors to have a holistic understanding of ESG management. The integration of ESG factors have to take place along the entire PE value chain, ranging from origination, portfolio management to exits. According to Zaccone and Pedrini (2020) the most common ESG management practices at PE firms are ESG due diligences and portfolio monitoring. Another lever is centralised ESG management, e.g. with a single Chief Investment Officer (Cumming & Johan, 2007). Thus, it is important for PE firms to build-up expertise in new areas (Indahl & Jacobsen, 2019).

## **DATA AND METHODOLOGY**

### **Data**

Our data sample comprises 103 PE firms with overall 206 buyout funds which we identified via PitchBook, a reliable source for PE data (Sharma, 2017). 74% of the sample funds are advised by US-headquartered PE houses, the remainder of 26% belong to European PE firms. US funds are included in our sample when they either had a strict investment mandate for Europe (e.g. KKR European Fund IV, Bain Capital Europe Fund IV) or a strong investment footprint overseas (e.g. One Equity Partners VII, Blackstone Capital Partners VIII). Among the funds advised by Europe-headquartered PE firms, most funds' PE backers were located in the United Kingdom (44%), France (15%) as well as the Nordics and Benelux (each 12%). The majority of the sample consists of large cap funds: 23% had a fund size of more than €5bn, 33% between €1bn and €5bn and 44% showed fund sizes of less than €1bn. These funds had in total 2,184 portfolio companies (excl. add-on companies).

This study strictly focuses on buyout strategies and excludes all other PE-themed investing strategies, e.g. special situations, growth equity or venture capital. We further exclude PE firms which do conduct investments under a clear fund structure. All sample funds were either closed or fully invested by August 2022. Fund vintages were between 2006 and 2021. According to



the classification scheme presented by Hebb (2013) as well as PE houses' self-declarations, none of the sample PE firms can be considered as impact investors.

PitchBook provided us with data on the financial returns of sample funds. These returns were either reported to them by limited partners or the PE houses themselves. We also sourced further structural data on PE funds via PitchBook (for further details see independent variables section).

For information on portfolio companies' ESG footprints, the database RepRisk provided us with quantitative scores for the reputational risks related to ESG incidents. Many scholars use the RepRisk scores as a variable to directly measure ESG footprints, e.g. Schiemann and Tietmeyer (2022) or Gloßner (2019). The underlying methodology of RepRisk ESG scores is described in more detail in the dependent variables and independent variables sections. The methodology of aggregating the ESG footprints of all portfolio companies on a fund level is also explained in the methodology section.

The United Nations Principles for Responsible Investment (UN PRI) is one of the leading initiatives for promoting responsible investing. Institutional investors become signatories of UN PRI and there have to acknowledge certain ESG standards. Signatories also have to participate in an annual mandatory survey where they give comprehensive information about their ESG strategy. Most survey questions are in a quantitative format where signatories for instance rank the importance or level of integration for certain ESG management techniques. UN PRI granted us access to these confidential survey results. This allows us to incorporate internal ESG considerations of PE houses in our data sample. A number of prior scholars make use of UN PRI annual survey data for empirical analyses, e.g. Brandon et al. (2022) or Majoch, Hoepner, and Hebb (2017). Further information on the exact measurement data is provided in the independent variable section below.

We use the 2022 Environmental Performance Index (EPI) to account for cross-country differences in ESG policies and practices. The EPI uses more than 40 performance indicators to measure the level of sustainability in a given country by comparing sustainability policies with actual developments. EPI has been used by many scholars as a proxy for countries' progress on sustainability, e.g. Balezentis, Li, Streimikiene, and Balezentis (2016) Mei, Wai, and Ahamad (2016).

Please see table 1 & 2 for an overview of descriptive statistics as well as correlation coefficients.

*[Table 1 & 2 near here]*

We applied the Breusch-Pagan and the White test to confirm homoscedasticity in our data. Therefore, we neither applied clustered nor robust standard errors. As visible in table 2, multicollinearity is not an issue for our sample as model variables' bivariate correlation is generally below 0.6 (G. Zhang, 2008).

## **Methodology**

Our study analyses two value creation channels: First, we estimate the effect of fund-level ESG portfolio footprints on fund financial returns (Analysis 1). Second, we focus on the value levers of ESG footprints by determining the impact of various ESG management measures of PE professionals on fund-level ESG portfolio footprints (Analysis 2). With this double tracked research setting, we can conclude how PE firms operationally promote better ESG footprints at their portfolio companies and to what extent this has a financial value impact.

For analysis 1, our dependent variable are the fund-level financial returns (net IRR, benchmark outperformance, investment multiple). To calculate ESG portfolio footprints, we follow the following procedure: First, we determine in which year a given fund started investing. Second, we collect all current and historic portfolio companies of the respective fund. We then calculate for all portfolio companies their annual average RepRisk rating for each year since the fund started investing in the company. Thereafter, we calculate for each year where the fund was active (= all years after their vintage year) the average RepRisk rating across all portfolio companies in which the fund was already invested. Lastly, we average these aggregated annual RepRisk ratings across the fund lifecycle. We thereby arrive at a single measure for the state of ESG development at portfolio companies which we are referring to as “fund-level ESG portfolio footprint”.

We employ several OLS regression specifications for analysis 1 to estimate the cross-sectional effect of ESG portfolio footprints on financial returns. The baseline specification takes the following form:

$$Fund\ Performance_i = \beta_0 + \beta_1 \times Fund\ ESG\ Footprint_i + \beta_i \times X_i + \varepsilon_i \quad (1)$$

$\varepsilon_i$  is the error term and  $X$  represents the vector of control variables which are further described in the independent variable section below.  $\beta_i$  is a vector of regression coefficients for the control variables in vector  $X$ .

For analysis 2, fund-level ESG portfolio footprints now serve as the dependent variable. Independent variables comprise a number of operational ESG management measures: (1) pure public ESG commitment, (2) the use of ESG value enhancement plans, (3) ESG impact controlling as well as (4) portfolio companies' reporting frequency on ESG information. With these variables, we are able to determine the role of ESG across the entire deal lifecycle of PE investments.

We again employ several OLS regression specifications to assess the cross-sectional effect of operational ESG measures on fund-level ESG portfolio footprints. The baseline specification of analysis 2 is as follows:

$$Fund\ ESG\ Footprint_i = \beta_0 + \beta_1 \times ESG\ Considerations_i + \beta_i \times X_i + \varepsilon_i \quad (2)$$

The terminology is the same as under equation 1. ESG considerations represent the aforementioned operational ESG measures. Equation 2 utilizes the same vector of control variables as equation 1.

We look at several subsamples for analysis 1. We estimate the effect by fund size, i.e. fund with less than €1bn assets under management (AuM), between €1bn and €5bn AuM, and more than €5bn AuM. We also test the effect for US-backed and Europe-backed funds separately. As not all funds provide information on their operational ESG measures, our sample size shrinks to limited extent under analysis 2. This however restricts us from creating subsamples which would otherwise be too small for meaningful results.

We follow the framework of Haans, Pieters, and He (2016) to determine the presence of u-shaped effects by regressing our dependent variable (Y) on the independent variable (X) and its squared term ( $Y = \beta_0 + \beta_1 \cdot X + \beta_2 \cdot X^2$ ). Under consideration of the three-step procedure of Lind and Mehlum (2010), we are not able to confirm any non-linear effects.

## **Dependent Variables**

To capture financial value creation effects of PE funds for analysis 1, we use three different measures: (1) Net IRR, (2) investment multiples and (3) benchmark outperformance. Investment multiples are reported in the form of total value paid-in capital (TVPI). All three performance indicators are widely accepted by academia as well as practitioners for providing suitable metrics for comparisons. All performance metrics are on a fund-level, i.e. we do not look at the returns of individual investments / portfolio companies. We cannot calculate the

public market equivalent (PME) which has a number of benefits for PE return analyses (Korteweg & Nagel, 2016; Sorensen & Jagannathan, 2015) because PitchBook does not provide us with cashflow data of the respective funds. Our analysis focuses on the IRR as a dependent variable whereby we cross-check results with the two alternative performance metrics. Although the IRR has several limitations it is the most common PE performance measure which is used by a large variety of prior studies (e.g. Acharya, Gottschalg, Hahn, & Kehoe, 2013; Franzoni, Nowak, & Phalippou, 2012; Sensoy, Wang, & Weisbach, 2014). We use the most recent performance metrics available via PitchBook.

For analysis 2, our dependent variable is the fund-level ESG portfolio footprint which we compose of the portfolio company RepRisk ratings. The procedure of computing the aggregated ESG portfolio footprint is explained in the methodology section. RepRisk ratings consist of companies' own ESG risk exposure as well as the business exposure to industries and regions where the company generates revenues (country-sector matrix). The country-sector matrix measures the average ESG risk by industry as well as country. This allows us to understand ESG footprints for companies with global sales footprints and diversified business models. RepRisk ratings are on a scale from AAA to C which we quantify to a numeric scale from 1 (= AAA) to 9 (=C), i.e. the lower, i.e., better, the ESG portfolio footprint, the lower, i.e., better, the ESG risk exposure.

ESG risk exposure is measured via public ESG incidents. RepRisk ratings are driven by ESG incidents' reach and severity (Kölbel, Busch, & Jancso, 2017). The scoring for the reach of an incidence ranges from low to high, and depends on the publicity and reputation of the media which is reporting about the ESG incident. While international newspaper articles (e.g., Financial Times, Wall Street Journal) have high reach, national media outlets have medium reach (circulation >150k), whereas regional media channels (circulation <150k) show only low reach. Severity is determined via (1) the magnitude of the negative impact, (2) the level of responsibility of the firm for the incidence, as well as (3) the magnitude of irresponsibility. RepRisk ratings have also become a widely used metric for academic work to measure companies' perception about their ESG risk exposure (Hummel & Schlick, 2016; Schiemann & Tietmeyer, 2022).

### **Independent Variables**

For analysis 1, we use RepRisk ratings as fund-level ESG portfolio footprints as our main independent variable. The ESG portfolio footprint variables used for analysis 1 and analysis 2

are the same. While under analysis 1 they serve as an independent variable to measure the effect on financial returns, under analysis 2 they are the dependent variable which we explain via several operational ESG management measures. For this reason, please refer to the dependent variables section for further information on this variable.

For analysis 2, we exploit UN PRI survey data for an inside view on PE firms' operational ESG management. The survey constructs which we consider in our analysis are further explained below.

The ESG commitment ("PRI Signatory Dummy") variable measures the signatory status of the backing PE firm and is treated as a dummy (yes = 1, no = 0). Bauckloh, Schaltegger, Utz, Zeile, and Zwergel (2023) present evidence that signatories integrate ESG criteria more often in their business operations than non-signatories. This shows that the PRI signatory status can be assessed as a proxy for the ESG commitment of PE firms. PRI signatory status have thereby recently become a widely used metric to capture companies' level of ESG commitment, e.g. Kordsachia, Focke, and Velte (2022), Brandon et al. (2022) or Nofsinger and Varma (2022).

The ESG responsibility centralisation ("ESG Responsibility") variable measures to what extent ESG responsibility is bundled at the PE firm internally, instead of delegating power to management teams at the portfolio company itself. The survey construct is indicated by the share of portfolio companies where ESG responsibility is with the portfolio company management team. The scale ranges from 0 to 4, i.e. 0 (0% of portfolio companies have ESG responsibility), 1 (<10% of portfolio companies), 2 (10-50% of portfolio companies), 3 (51-90% of portfolio companies) and 4 (>90% of portfolio companies). For PE firms which did not report of ESG responsibility centralisation, we assumed the share of portfolio companies with ESG responsibility to be 0%. We were pointed to this variable by Cumming and Johan (2007) who state that RI is more common at PE firms where ESG management decisions are centralised. Also Gallagher and Gardner (2006) state that the centralisation of investment management responsibility is important at asset management firms outside the PE industry.

The implementation of the ESG impact controlling ("ESG Controlling") variable assesses whether PE firms apply ESG impact controlling for their portfolio. It is measured as a dummy variable, i.e. 1 (ESG impact controlling) and 0 (no ESG impact controlling). Q. Zhang and Wong (2022), and Cambrea, Paolone, and Cucari (2023), both pointed us at the important role of monitoring / overseeing for effective ESG management. Also Hammami and Zadeh (2020) demonstrate that improved ESG monitoring leads to an enhanced investment efficiency.

The implementation of the ESG value enhancement plans (“ESG Value Enhancement”) variable captures the effect of predefined ESG development plans which PE firms compose and execute for their portfolio companies. The variable is formed as a dummy with 1 for PE firms which utilize ESG value enhancement plans and 0 otherwise. The responses by PE investors to the survey of Zaccone and Pedrini (2020) already revealed that ESG value creation plans are material to many firms. These findings are supported by Indahl and Jacobsen (2019). Also Crifo and Forget (2013) state that shareholder engagement is an important pillar of PE investing strategies. Outside the PE industry, Bizoumi, Lazaridis, and Stamou (2019) argue that the creation of ESG plans help in business operations. On a company-level, Kurznack, Schoenmaker, and Schramade (2021) show that strategy setting and alignment is an important lever of long-term value creation.

The ESG reporting frequency (“ESG Reporting”) variable measures how often portfolio companies have to report to PE firms on their ESG development. The scale ranges from 0 to 4, i.e. 0 (no reporting), 1 (less frequently than annually), 2 (annually), 3 (biannually) and 4 (quarterly or more frequently). We were pointed at this variable by Harymawan, Nasih, Agustia, Putra, and Djajadikerta (2022), who provide evidence that ESG reporting enhances investment efficiencies. Several scholars also confirm the importance of ESG information disclosure for firm performance, e.g., Chen and Xie (2022), and Wen, Ho, Gao, and Yu (2022). According to Arvidsson and Dumay (2022), however, ESG performance is rather driven by the quality of ESG reporting than its quantity.

Our models comprise further control variables which account for PE house characteristics, fund structures and the socio-economic environment. Fund size indicates the funds raised in Euro. Dry powder represents the Euro amount of the fund size which has not yet been invested. The fund number gives us the fund generation of the respective PE house, e.g., the third fund raised by a PE firm would have the fund number three. This provides us with some information on the track record and experience of a PE house. Call down indicates the percentage share of LPs’ capital commitments which have been used by the PE house. The fund net asset value (NAV) is the current value of the portfolio by August 2022. The EPI index provides us with information on the state of ESG policies and actual development in the country where the respective PE firm is headquartered. Control variables were identified in the relevant PE literature (Barber & Yasuda, 2017; Bernstein, Lerner, & Mezzanotti, 2019; Cumming, Fleming, & Schwienbacher, 2009; Phalippou & Gottschalg, 2009).

## RESULTS

In table 1 we regress ESG portfolio footprints against fund financial returns. Model 1 indicates a significant negative effect of worse ESG footprints on the IRR, i.e., a lower (= worse) ESG portfolio footprint also leads to lower financial returns for the respective funds. In model 1-3 we cross-checked these results with other financial return metrics (investment multiples, benchmark outperformance) whereby both models confirmed the previous results. For model 1-3 we use the baseline set of control variables whereby for models 4-6 we apply an extended set of controls. As the extended control variables are not available for all funds in our dataset, the sample size diminishes consequently. Model 4 and model 5 additionally confirm the effect of ESG footprints on IRRs and investment multiples.

*[Table 3 near here]*

We conduct further robustness checks on these results by performing subsample regression analyses. In table 4 we present our findings, clustered by fund size. We divide the sample in funds with a fund size of more than €5bn (model 7 & 10), between €1bn and €5bn (model 8 & 11) and less than €1bn (model 9 & 12). For models 7-9 we again apply the baseline controls whereas models 10-12 use the extended set of control variables. The results are illustrated for net IRR as the dependent variable. Our analysis confirms the value impact of ESG footprints only for funds with fund sizes of more than €1bn. We do not find any significant effects for smaller funds. We also conduct robustness checks with other dependent variables which are available upon request.

*[Table 4 near here]*

We furthermore test for geographic differences by creating subsamples for funds which are backed by US-headquartered PE firms (models 13-15) and European PE investors (models 16-18). This analysis is motivated by Van Duuren et al. (2016), who already stated that ESG investing is more prominent among European than US investors. While our analysis confirms the effect of ESG footprints on IRRs, findings on the other two return metrics are inconsistent. While the baseline control models indicate only a significant effect for investment multiples, the extended models on the other side only point at a significant effect for benchmark outperformance. Our results on regional differences are thus inconclusive.

*[Table 5 near here]*

For analysis 2, table 6 illustrates our results of regressing several operational ESG measures against fund-level ESG portfolio footprints. Model 19 indicates that the PRI signatory status has a negative impact on ESG footprints, i.e., ESG commitments via PRI signing yield better ESG footprints for PE-backed portfolio companies. Our analysis also indicates a strongly significant impact of ESG responsibility centralisation, i.e., PE firms which centralise much of their ESG management in investment- or operations teams realize better ESG footprints. We furthermore identify ESG value enhancement plans as a strong driver of ESG portfolio footprints. Our analysis does not present evidence for any effect of ESG impact controlling or the ESG reporting frequency. All findings are confirmed by model 20 where we again applied the extensive set of control variables.

*[Table 6 near here]*

## **DISCUSSION**

We explore the impact of PE portfolio ESG footprints on the financial returns of those PE funds, as well as the operational measures that PE funds deploy for successful ESG transformations of the firms in their portfolios. We propose that ESG management at PE-backed portfolio companies can indeed be seen as value lever for financial performance. We draw on a number of studies (e.g. Cornett et al., 2016; Flammer, 2015) which found positive effects of RI for investment strategies outside the PE industry. The literature however has poor evidence for PE investment strategies as well as the measures to foster ESG development. We extend the sustainable finance literature with a distinct focus on PE buyout strategies and further arguments around the importance of holistic and well-structured ESG management systems. ESG management has not only become an important value creation instrument in the overall asset management industry but also in the booming PE industry. We fill this research gap with an empirical analysis of more than 200 PE funds which were investing across Europe in the most recent decade.

The positive performance impact of ESG footprint improvements might be driven by a number of factors. It could be easier for PE investors to obtain financing for target companies which are more ESG-compliant (Cornell, 2021). Considering the importance of deal financing for PE transactions, this could have substantial impact on the underlying economics of deal-making. The importance of ESG disclosure for debt financing was also examined by Raimo, Caragnano, Zito, Vitolla, and Mariani (2021).



On the other side, our findings might also support the thesis that ESG management in investing strategies improves the risk exposure of the underlying portfolio (Folqué, Escrig-Olmedo, & Santamaria, 2021). We do, however, propose that RI in PE should not only be looked at as a risk management instrument, but also in regard to the creation of real-world social and environmental impact.

Kölbel et al. (2020) show that shareholder engagement is one of the most essential factors for driving ESG development. In comparison to other asset management firms, PE firms usually take majority stakes in their portfolio companies (Wright, Gilligan, & Amess, 2009), which allows more intense shareholder engagement. We believe that this unique setting allows PE investors do actively drive ESG development at their portfolio companies which can then directly translate into financial value impact. We then interpret our findings in the context of Gompers, Ishii, and Metrick (2003), who presented evidence that increased shareholder right lead higher firm valuations and sales growth. PE firms with maximum level of shareholder rights should be in the best position to drive portfolio companies' valuations and sales growth.

Consequently, our findings might look differently for other PE strategies, such as growth equity or venture capital, where investors usually do not take majority stakes. This assumption would also be backed by McCahery et al. (2022) who state that ESG investing is much more common in the PE / buyout industry than in the venture capital industry.

In addition to the aforementioned impact of RI on portfolio companies' sales growth, we also argue that ESG management at portfolio companies could contribute to cost reductions. The evidence in the literature on this effect is, however, scarce. Yawika and Handayani (2019) argue that the implementation of sustainable management leads to cost reductions, while also Kotsantonis, Pinney, and Serafeim (2016) point at cost savings driven by ESG practices.

Another lever for the financial value impact of ESG portfolio footprints could be increased productivity at portfolio companies. Deng, Li, and Ren (2023) show that labour productivity increases with corporate ESG performance. In fact, Tunio et al. (2021) present evidence that labour productivity has a moderating role for the impact of CSR on the financial performance. Welch and Yoon (2022) go one step further and argue that considering ESG aspects may have corporate resources be allocated more efficiently, creating shareholder value for the company.

Our study adds to the RI literature with emphasis on PE investors. In general, our results show that active ESG management at portfolio companies is important for generating higher financial returns. Going beyond, our results show that centralised ESG management and ESG value

enhancement plans can play an important role for executing successful ESG development at portfolio companies.

Our results come with limitations which we discuss in the following. First, our sample size is relatively small which might cause misleading results. This is, however, mitigated by the fact that it is the most complete and extensive sample which can be created with public databases. Other reference studies with sample sizes of less than 250 funds are Metrick and Yasuda (2010) with 238 funds, Lerner and Schoar (2004) with 243 funds, or Bernile, Cumming, and Lyandres (2007) with 42 funds. Furthermore, our analysis aggregates variables at the fund level because financial returns are not available for each PE transaction. When considering our total sample of portfolio companies this is even larger with more than 2,000 companies. Second, scholars could argue that RepRisk is not an ESG performance measure like the typical ESG rating scores used in manyfold studies, and that it gives only limited insights about ESG transformations at portfolio companies. We argue that, quite the opposite, while ESG ratings are being debated and contested, using RepRisk ESG footprints is one of the key features of this study, because these metrics give a direct insight into the outcomes of companies' ESG policies and -practices in terms of scandals and criticism picked up by media and civil society, as opposed to what those firms provide ESG rating agencies as inputs that then develop their proprietary, and diverging, ratings. Also, in the context of our research focus on private markets, it is important to note that RepRisk ratings are the only available quantitative ESG measure. Many scholars have trusted in the validity of RepRisk ratings for proxying company ESG footprints.

Future research could look at our results at a more granular level for portfolio companies. While our study aggregated ESG footprints at the fund level, it would be interesting to conduct this analysis on the portfolio company level. For this, scholars would have to collaborate with PE investors to access their ESG data of portfolio companies, as granular portfolio company ESG data cannot be found in public databases. In the light of our findings, it should, however, be in the interest of PE practitioners to share this data with researchers to gain further clarity about ESG value creation channels on all levels. We also believe that the operational side of ESG should be more in the focus of scholars. Studies primarily focus on risk or return implications of ESG investing. The operational measures which can contribute to better ESG footprints should however not be left out of future studies. Our study demonstrates that the operational side of ESG is closely interconnected with the return impact of it. Our argument on the benefit of holistic ESG management should also be investigated further: How do PE investors use ESG information most effectively at investment selection, portfolio management or exit

preparations? Giving these answers to PE practitioners provides a real chance to drive ESG development as PE firms have the power to force change through their ownership rights.

## **CONCLUSION**

Our study shows that ESG management and financial value creation are closely interconnected for PE investors. Well-structured ESG management and thus successful ESG transformations have direct impact on the financial returns of PE funds. While most PE investors' motivation for integrating ESG factors is still driven by client demands (McCahery et al., 2022), PE investors should treat ESG management rather as an important instrument for enhancing the financial performance of portfolio companies.

For PE professionals' daily operations, our findings show that it is essential to centralise much of the ESG management at the PE investment or operations team instead of giving responsibility over ESG management to portfolio company management teams. Portfolio company managers should be held accountable for the successful execution of ESG value enhancement plans. The creation and monitoring of such plans are, however, key tasks of the PE house.

There are structural differences among PE houses in how they address the topic of ESG management in their portfolio. Our analysis points at an advantage of scale as funds with bigger fund sizes are able to obtain much easier financial value from their ESG management. Thus, it should also be on the agenda of practitioners to transport ESG management practices to smaller PE houses which are still lacking in implementing ESG successfully.

PE investors are marked by the unique feature that they take majority stakes in their portfolio companies. This power to shape portfolio companies through shareholder engagement should also be driven by ESG considerations.

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## TABLES

**Table 1: Summary Statistics**

Variable	Obs.	Min.	Max.	Mean	Std. Dev.
Net IRR	206	-0.14	1.16	0.23	0.16
Investment Multiple	193	0.45	4.18	1.74	0.56
Benchmark Outperformance	155	-41.40	60.90	2.62	14.71
ESG Footprint	206	1.00	5.09	1.99	0.84
PRI Signatory Dummy	206	0.00	1.00	0.68	0.47
Fund Size	206	32.44	25424.28	3177.04	4308.26
Dry Powder	206	0.00	17027.50	576.58	1635.78
# Portfolio Companies	206	1.00	62.00	12.00	9.76
EPI Index	206	51.10	77.90	65.40	10.81
Call Down	188	18.51	100.00	83.66	21.30
Fund NAV	188	0.00	23202.80	2699.40	4498.19
ESG Responsibility	206	0.00	4.00	0.73	1.44
ESG Impact Controlling	206	0.00	1.00	0.20	0.40
Value Enhancement Plans	206	0.00	1.00	0.17	0.37
ESG Reporting Frequency	206	0.00	4.00	0.50	1.16

**Table 2: Linear Correlation Matrix**  
(Pearson Correlation Coefficient)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) Net IRR	1.00	0.35**	0.80**	-0.12	0.03	0.05	0.23**	-0.13	0.01	0.03	-0.22**	0.07	0.15*	0.22**	0.14*	0.06	-0.03
(2) Investment Multiple		1.00	0.41**	-0.19**	0.02	-0.07	-0.18*	0.18*	0.02	-0.01	0.36**	0.03	-0.05	0.01	-0.06	0.02	-0.09
(3) Benchmark Outperformance			1.00	-0.18*	0.05	0.00	0.09	0.01	-0.05	0.12	0.07	0.00	0.15	0.16*	0.13	0.06	-0.01
(4) ESG Footprint				1.00	-0.14*	0.16*	0.14*	-0.03	0.10	-0.36**	-0.06	0.13	0.03	-0.09	-0.03	0.04	0.08
(5) PRI Signatory Dummy					1.00	-0.17*	-0.08	-0.06	-0.25**	0.70**	-0.05	-0.16*	0.35**	0.31**	0.34**	0.72**	0.30**
(6) Fund Size						1.00	0.66**	0.20**	0.33**	-0.14*	-0.04	0.86**	-0.01	0.02	0.00	0.02	0.02
(7) Dry Powder							1.00	-0.10	0.28**	-0.07	-0.45**	0.41**	0.04	0.08	0.05	0.01	0.01
(8) # Portfolio Companies								1.00	-0.04	-0.02	0.31**	0.18*	0.05	0.09	0.06	0.08	0.12
(9) Fund Number									1.00	-0.30**	-0.07	0.29**	-0.01	0.03	0.01	-0.11	-0.02
(10) EPI Index										1.00	-0.02	-0.12	0.26**	0.27**	0.29**	0.46**	0.19**
(11) Call Down											1.00	0.06	-0.03	-0.08	-0.04	-0.02	0.07
(12) Fund NAV												1.00	-0.07	-0.02	-0.06	-0.01	-0.03
(13) ESG Responsibility													1.00	0.86**	0.97**	0.48**	0.81**
(14) ESG Impact Controlling														1.00	0.89**	0.42**	0.62**
(15) Value Enhancement Plans															1.00	0.48**	0.81**
(16) ESG Investment Selection																1.00	0.42**
(17) ESG Reporting Frequency																	1.00

\* and \*\* indicate statistical significance at 5% and 1% level, respectively.

**Table 3**  
**Results of Regression Analyses I**

This table represents the regression results of analysis 1 in which financial return metrics serve as dependent variables. Model 1-3 use the baseline set of control variables whereas model 4-6 use an extended set of controls. Standard errors are in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% level, respectively.

Variable	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6
ESG Footprint	-0.031** (0.014)	-0.144*** (0.054)	-2.989* (1.659)	-0.40** (0.016)	-0.128** (0.054)	-2.927 (1.801)
PRI Signatory Dummy	0.020 (0.033)	0.110 (0.118)	-1.218 (3.509)	0.053 (0.036)	0.115 (0.120)	0.823 (3.826)
Fund Size	-4.786e-6 (0.000)	4.203e-6 (0.000)	0.000 (0.000)	-1.992e-5*** (0.000)	-5.976e-5** (0.000)	-0.001 (0.001)
Dry Powder	3.221e-5*** (0.000)	-5.047e-5 (0.000)	0.001 (0.001)	4.026e-5*** (0.000)	6.487e-5 (0.000)	0.003** (0.001)
# Portfolio Companies	-0.001 (0.001)	0.009* (0.004)	0.062 (0.136)	-0.001 (0.001)	0.007* (0.004)	-0.027 (0.155)
EPI Index	-0.001 (0.002)	-0.008 (0.005)	0.108 (0.169)	-0.003 (0.002)	-0.010* (0.005)	0.038 (0.184)
Call Down				-5.339e-6 (0.000)	9.080e-5*** (0.000)	0.001* (0.001)
Fund NAV				1.519e-5 (0.000)	4.134e-5** (0.000)	0.000 (0.001)
Constant	0.354*** (0.100)	2.394*** (0.363)	1.490 (11.498)	1.519e-5*** (0.000)	1.770*** (0.421)	-4.823 (14.061)
Observations	206	193	155	179	178	134
R-squared	0.096	0.093	0.052	0.162	(0.198)	0.081
Dependent Variable	Net IRR	Investment Multiple	Benchmark Outperformance	Net IRR	Investment Multiple	Benchmark Outperformance
Controls Set	Baseline	Baseline	Baseline	Extended	Extended	Extended
Sample	Total Sample	Total Sample	Total Sample	Total Sample	Total Sample	Total Sample

**Table 4**  
**Results of Regression Analyses II**

This table represents the regression results of analysis 1 for different fund size subsamples. The dependent variable is the net IRR. Model 7-9 use the baseline set of control variables whereas model 10-12 use an extended set of controls. Standard errors are in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% level, respectively.

Variable	(7) Model 7	(8) Model 8	(9) Model 9	(10) Model 10	(11) Model 11	(12) Model 12
ESG Footprint	-0.059* (0.032)	-0.108*** (0.035)	-0.007 (0.018)	-0.072** (0.028)	-0.109*** (0.036)	-0.010 (0.021)
PRI Signatory Dummy	0.001 (0.095)	0.042 (0.067)	-0.010 (0.046)	-0.093 (0.085)	0.109 (0.073)	0.018 (0.048)
Fund Size	-6.137e-6 (0.000)	7.047e-6 (0.000)	1.481e-5 (0.000)	-1.988e-5** (0.000)	2.968e-6 (0.000)	0.000* (0.000)
Dry Powder	2.789e-5*** (0.000)	9.957e-5*** (0.000)	0.000 (0.000)	1.782e-5 (0.000)	0.000*** (0.000)	0.000* (0.000)
# Portfolio Companies	-0.001 (0.002)	-0.002 (0.002)	-0.002 (0.003)	0.001 (0.001)	-0.001 (0.002)	-0.006 (0.004)
EPI Index	0.001 (0.004)	-0.004 (0.003)	0.000 (0.002)	0.003 (0.003)	-0.008** (0.003)	-0.001 (0.002)
Call Down				-3.831e-5** (0.000)	7.238e-6 (0.000)	1.901e-5* (0.000)
Fund NAV				1.457e-5*** (0.000)	1.110e-5 (0.000)	0.000*** (0.000)
Constant	0.337 (0.211)	0.626*** (0.196)	0.258 (0.167)	0.597*** (0.200)	0.738*** (0.242)	0.158 (0.206)
Observations	47	69	90	47	59	73
R-squared	0.272	0.297	0.016	0.501	0.407	0.279
Dependent Variable	Net IRR	Net IRR	Net IRR	Net IRR	Net IRR	Net IRR
Controls Set	Baseline	Baseline	Baseline	Extended	Extended	Extended
Sample	+€5bn Funds	€1bn-€5bn Funds	<€1bn Funds	+€5bn Funds	€1bn-€5bn Funds	<€1bn Funds

**Table 5**  
**Results of Regression Analyses III**

This table represents the regression results of analysis 1 for different geographic subsamples. The dependent variable are financial return metrics. Model 13-15 focus on European PE houses whereas model 16-118 look at US PE houses. Standard errors are in parentheses. \*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% level, respectively.

Variable	(13) Model 13	(14) Model 14	(15) Model 15	(16) Model 16	(17) Model 17	(18) Model 18
ESG Footprint	-0.040** (0.020)	-0.115* (0.061)	-1.865 (2.335)	-0.058** (0.026)	-0.202 (0.137)	-5.037* (2.772)
PRI Signatory Dummy	0.107** (0.053)	0.301* (0.160)	2.401 (5.231)	-0.057 (0.067)	-0.358 (0.357)	1.926 (8.599)
Fund Size	-2.982e-5*** (0.000)	-9.580e-5*** (0.000)	-0.003* (0.002)	-1.228e-5 (0.000)	-2.118e-5 (0.000)	0.000 (0.001)
Dry Powder	7.551e-5*** (0.000)	8.786e-5 (0.000)	0.007*** (0.003)	2.731e-5** (0.000)	2.723e-5 (0.000)	0.002 (0.001)
# Portfolio Companies	-0.002 (0.002)	0.010* (0.005)	-0.072 (0.220)	0.002 (0.002)	-0.001 (0.010)	0.231 (0.204)
EPI Index	-0.002 (0.002)	-0.007 (0.007)	0.192 (0.270)			
Call Down	-1.315e-6 (0.000)	8.280e-5*** (0.000)	0.002* (0.001)	-8.186e-7 (0.000)	0.000 (0.000)	0.002 (0.001)
Fund NAV	2.110e-5*** (0.000)	6.712e-5*** (0.000)	0.002 (0.001)	6.590e-6 (0.000)	3.782e-6 (0.000)	0.000 (0.001)
Constant	0.391** (0.182)	1.404** (0.563)	-22.488 (21.085)	0.363*** (0.130)	1.483** (0.694)	-5.099 (14.096)
Observations	133	132	91	46	46	43
R-squared	0.230	0.243	0.152	0.260	0.180	0.206
Dependent Variable	Net IRR	Investment Multiple	Benchmark Outperformance	Net IRR	Investment Multiple	Benchmark Outperformance
Controls Set	Extended	Extended	Extended	Extended	Extended	Extended
Sample	Europe	Europe	Europe	US	US	US

**Table 6**  
**Results of Regression Analyses IV**

This table represents the regression results of analysis 2 where the dependent variable is the fund-level ESG portfolio footprint. Model 19 uses the baseline set of control variables while model 20 uses the extended set (both excl. EPI index). Standard errors are in parentheses.

\*, \*\*, and \*\*\* indicate statistical significance at 10%, 5%, and 1% level, respectively.

Variable	(19) Model 19	(20) Model 20
PRI Signatory Dummy	-0.261** (0.130)	-0.242* (0.137)
ESG Responsibility	0.508*** (0.153)	0.539*** (0.151)
ESG Impact Controlling	-0.502 (0.367)	-0.531 (0.356)
ESG Value Enhancement Plans	-1.663** (0.670)	-1.693*** (0.645)
ESG Reporting Frequency	0.151 (0.093)	0.142 (0.097)
Fund Size	1.817e-5 (0.000)	2.708e-5 (0.000)
Dry Powder	4.029e-5 (0.000)	8.081e-6 (0.000)
# Portfolio Companies	-0.004 (0.006)	-0.001 (0.007)
Call Down		-4.387e-5 (0.000)
Fund NAV		-4.523e-7 (0.000)
Constant	2.105*** (0.132)	2.388*** (0.301)
Observations	206	179
R-squared	0.134	0.170
Dependent Variable	ESG Footprint	ESG Footprint
Controls Set	Baseline	Extended
Sample	Total Sample	Total Sample

## APPENDIX

**Table A1: Summary Statistics**

Variable	Description	Source
Net IRR	Net internal rate of return (after fees and carried interest)	PitchBook
Investment Multiple	Total value of a fund relative to the amount of capital paid into the fund to date ( Total Value to Paid-In Capital)	PitchBook
Benchmark Outperformance	Net IRR after deducting the PitchBook benchmark net IRR	PitchBook
ESG Footprint	RepRisk rating	RepRisk
PRI Signatory Dummy	UN PRI signatory status	UN PRI
Fund Size	Total amount of capital committed by investors	PitchBook
Dry Powder	Percentage of committed but unallocated capital	PitchBook
# Portfolio Companies	Number of portfolio companies (excl. add-on companies)	PitchBook
EPI Index	Measure for the environmental performance of countries' policies	Yale University
Call Down	Percentage of capital commitments which have been drawn	PitchBook
Fund NAV	Current value of the portfolio	PitchBook
ESG Responsibility	Extent whether the responsibility of ESG management is with the portfolio company management	UN PRI
ESG Impact Controlling	Extent of monitoring of ESG development	UN PRI
Value Enhancement Plans	Extent of implementation of ESG value enhancement plans for portfolio companies	UN PRI
ESG Reporting Frequency	The frequency of portfolio companies' ESG reports throughout the year	UN PRI