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ESG Integration in the European Private Equity Industry

Does ESG integration provide superior risk-adjusted returns?

Master Thesis

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by

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Abstract

Integration of sustainable investing in the financial sector has rapidly increased in recent decades. Private equity firms incorporate environmental, social, and governance (ESG) investment criteria as the metrics are gaining traction, influencing fund managers' investment strategies. Referring to the investment period from 2016 to 2021, we classified 86 European private equity buyout funds based on three distinct ESG variables into four diversified portfolios. The portfolios are comprised based on the funds' aggregate ESG score. Regarding geographic focus, we covered the Euro area to investigate whether risk-adjusted financial performance is affected by ESG integration in the private equity industry.

We found that ESG funds generate less volatile returns in quarterly net IRR standard deviation than non-ESG integrated funds. This evidence favors ESG funds as a suitable investment class in terms of risk-adjusted performance. The outperformance did not depend on absolute return, as non-ESG integrated funds generated the highest absolute return. On the other hand, evidence suggests that ESG integrated funds outperform non-ESG integrated funds in terms of standard deviation and possibly beta risk, indicating that systematic risk is considerably lower. Through an empirical model, we have found that ESG integration positively and significantly impacts funds' risk-adjusted performance in terms of the Sharpe ratio at the 10% significance level. Consequently, these results can be considered a general direction for long-term investors who are more interested in the capital allocation line than the security market line.

Keywords – European private equity, ESG, corporate financial performance (CFP), sustainable finance, risk-adjusted returns.

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1 Introduction

Integration of sustainable investing in the financial sector has rapidly increased over recent decades. Many large listed institutions, private equity firms, and investors incorporate sound environmental, social, and governance (ESG) investment criteria. ESG is a set of principles used by socially responsible investors to screen their investment strategies. ESG developments have their origin in socially responsible investing (SRI) with various considerations. However, the terminology has moved from a socially responsible philosophy to a more distinct investment strategy form (Boffo & Patalano., 2020).

ESG investing results from shifting demand across the financial ecosystem to achieve long-term financial performance and contribute to a more sustainable environment. Sustainability is a megatrend growing at all levels of society, and ESG requirements pose challenges to the financial industry. In lack of comparability with ESG ratings, metrics, and investment approaches, investors might have difficulty meeting managerial ESG risks with their investment mandates and incorporating outcomes of sustainable investments that could impose trade-offs in financial performance (Boffo & Patalano., 2020).

This thesis investigates whether ESG integration in the European private equity industry delivers superior risk-adjusted returns. The empirical analysis builds upon current research, implementing the latest methods to determine risk-adjusted returns in the Private Equity industry. The thesis differentiates itself by implementing three distinct ESG variables to understand ESG integration better, and the geographic focus is centered in Europe compared to a global focus. This investigation utilizes historical data comparing European private equity buyout funds' net internal rate of return (net IRR) to their respective risk, comprised of four diversified portfolios chronologically classified based on each fund's aggregate ESG score.

1.1 Motivation

The search for a relationship between environmental, social, and governance (ESG) criteria and corporate financial performance (CFP) can be traced back to the beginning of the 1970s (Freide et al., 2015). Research increasingly suggests that private equity capital that seeks to achieve ESG performance is not at odds with financial performance (Alfonso-Ercan, 2020). History has repeatedly demonstrated that private equity investors are well-positioned to demand swift and responsible corporate action to address critical problems. ESG tools, specific assessments, and metrics have emerged as critical instruments to differentiate sustainable private equity investments from traditional investments (Alfonso-Ercan, 2020). ESG tools enable more comprehensive diligence and analytical processes. Based on the growing global demand for sustainable investments, private equity participants have rushed to digest ESG-approaches to investing. Gaining market shares within this field has caused unfortunate practices and shortcomings that must be addressed to value the potential of ESG investing (Alfonso-Ercan, 2020).

The root cause of this challenge today stems from ESG's inconsistent definition. ESG is generally understood as a set of practices and guidelines that illustrate an investment's non-financial performance (Alfonso-Ercan, 2020). The other dimension relating to today's challenges within ESG investments in the private equity industry is disclosure. The landscape of private equity represents several characteristics. The alternative form of private financing emerges as a trade-off concerning different institutional investors, taking particular care of privacy and disclosure and the need to involve stakeholders in decision-making. In light of a growing interest in ESG investment, especially in Europe, this trade-off has become essential to assess whether sustainable investment strategies deliver alpha.

Previous research suggests that ESG has evolved beyond its initial concept phase and now appears to be a priority agenda item across the private equity landscape, moving into a period of comprehensive adoption (Alfonso-Ercan, 2020). The most comprehensive study on the relationship between ESG investment and corporate financial performance (CFP) was published in 2015 by Friede, Busch, and Bassen in the *Journal of Sustainable Finance and Investment*. The study extracted all previous studies aggregating the evidence from more than 2200 empirical studies. The result showed that the business case of

ESG investing was empirically well-founded. Roughly 90 percent of the studies found a nonnegative ESG-CFP relationship, and more importantly, most studies reported positive findings (Freide et al., 2015).

Furthermore, in the review of the "green" direction of the private equity industry, Teti, Dell'Acqua, and Zocchi published an article in 2012 about UN PRI and private equity returns. The paper assessed the economic impact of the United Nations Principles of Responsible Investment (UNPRI) on investment performance. Evidence suggests that investing responsibly pays in economic terms and reputational benefits. The rising tide of ESG interest is further demonstrated by the increase in ESG capital (Teti et al., 2012).

A vast research gap was found in the literature. Specifically, the existing research focuses on exploring private equity managers' main drivers and obstacles to adopting ESG considerations. Although ESG is a hot topic at all levels of financial markets and in the private equity market, it may seem odd that so few have investigated more deeply the correlation between ESG investing and corporate financial performance in recent times.

This thesis is built on recent evidence suggesting that ESG integration positively correlates with CFP in the private equity industry. We want to target the European region as ESG integration is the center of attention in investment strategies within this region. Many funds are specifically investing responsible, and ESG integration is built into their investment strategy. Many examples of private equity funds that entirely invest based on ESG risk and criteria are present in most larger European countries. We are specifically interested in the performance, but also how volatility differs across ESG compliant funds and non-ESG compliant fund that might affect their risk adjusted returns.

Therefore, this paper proposes the following research question:

Does ESG integration in the European private equity industry provide superior risk-adjusted returns?

The empirical analysis comprises a dataset of 86 European private equity funds, which we categorized into four subsamples. The first portfolio combines the most ESG compliant investment funds, and the fourth portfolio combines the low, or non-ESG compliant funds composed of comparable PE funds not having a declared explicit ESG factor nor are a UN PRI signatory. The dataset only includes buyout funds, and this thesis investigates whether historical financial performance is affected by ESG integration in the period from 31.12.2015 to 31.12.2020. All findings are based on quarterly data collected from Preqin's Pro platform.

The first step of the analysis is to evaluate the level of ESG integration for each private equity fund and assign an aggregate ESG integration score based on three distinct ESG variables. The ESG variables corresponds to a quantitative score based on the level of scoring in transparency KPI, risk magnitude, and the ESG-value of the company being a UN PRI signatory. The analysis forms a basis of several financial variables: net internal rate of return (net IRR), net pooled internal rate of return (net PIRR), total risk, Sharpe Ratio, and Treynor Ratio.

The empirical analysis showed that ESG integrated funds generate positive, and sometimes significant results on funds' risk-adjusted performance.

2 Background and Theory

This section encompasses relevant theories and background information for this thesis. It presents the emergence of the private equity industry and how it has evolved to its current state. The section introduces the European private equity industry and presents the critical drivers for private equity's direction toward sustainable investments. Finally, this section introduces the characteristics of ESG strategies and how to foster value-creation in PE.

2.1 Private equity

Following World War II, a form of private equity known as Venture Capital emerged as a way to ignite public interest in private sector investments (Alfonso-Ercan, 2020). During the 1970s, venture capital began bankrolling and was considered the initiator behind America's technological revolution. Private equity firms grew at the time with great interest among investors since PE companies had the opportunity to raise capital away from public markets to support struggling companies. The size of an average transaction in private equity increased with funds doubled in value (Bain&Company, 2022).

The 1980s became a golden age for the private equity industry. The firms thrived in markets dominated by Leverage Buyouts (LBOs) and junk bond financing. At the beginning of the 1990s, the junk bond market crashed, leaving many private equity-owned companies to default due to heavy debt used as a financing solution by the owning PE company. However, the industry survived the meltdown and was forced to rethink its concept. At the beginning of the new millennium, the activity resumed based on less leverage and focused on operational improvements (Malk-Sustainability-Partners, 2015).

The boom years for private equity occurred just before the financial crisis in 2008 and coincided with an increase in their debt levels. A study concluded that private equity groups raised USD 2 trillion between 2006 and 2008, where more than two dollars leveraged each dollar in debt. The evidence for the study concluded that private equity-backed companies performed better than their counterparts in public markets (Chen, 2022b).

Following the financial crisis, an improving macro economy led to growth in asset value

for private equity acquired companies during and after the recession. The improvement was reflected by 2013 and 2014 being the two most vital years on record, considering sales of private equity-owned companies (Malk-Sustainability-Partners, 2015). According to findings by *Pitchbook 1Q 2015 Private Equity Deal Multiples and Trends* the average EBITDA purchase multiples grew from 6x to 8x between 2012 and 2014 (Woodman, 2022). This context is relevant and explains today's private equity industry as it demonstrates the importance of private investors and private equity investments' role in driving innovation and affecting change since the public market is not well structured to achieve this. By having possibilities to affect changes, the private equity ecosystem is likely well-positioned to incorporate ESG as an essential driver for decision-making in the years to come.

2.2 European private equity industry

In Europe, the single currency has meant that the European debt and equity market has become closely linked to an integrated economy, creating a more competitive corporate environment which helped foster the European private equity market (ECB, 2005).

ECB Europa further elaborated that the growth of this market was driven by the boom in high-technology industries in the late 1990s and 2000, thereby financing a large number of European companies at an early stage. The private equity industry had an early start in Europe, whose roots can be traced back to the late 18th century in Great Britain. With its early start, the European private equity industry lacked a uniformly legal- and tax character and a wide dispersion of investment culture and traditions across Europe. This dispersion stifled growth in this specific sector compared to a more well-established market in the U.S. (Sergeeva, 2020).

The European private equity market has grown substantially in the past decade, and in 2022 there are 5,362 private equity companies registered in Europe. According to Preqin, 1,485 private equity companies have a buyout strategy with a geographic exposure to the European market. In 2017, 3,894 PE companies registered in Europe and 1,241 registered with a buyout strategy. This increase represents a significant source of finance and expertise for many European countries in the private equity sector. An article published by Invest Europe in 2019 stated that total fundraising in Europe during 2019 reached €109 billion with a growth of 6% from 2018 and the highest total in the last decade

(Invest-Europe, 2019). The report concluded that 578 funds raised capital during that year. The buyout fundraising increased by 15% in 2019 to €79 billion. The total equity invested in European portfolio companies increased by 10% year-on-year in 2019. From the perspective of a geographic breakdown, the most significant part of fundraising in Europe stemmed from France, with a total of 20.6%, whereas the Nordic countries represented 3.5% (Invest-Europe, 2019).

Private equity deals were flourishing in Europe during 2021. According to data collected from Pitchbook, the value of private equity transactions almost tripled during the last ten years, supported by a robust lending environment, a large portion of willing sellers, and numerous commitments by Limited Partners (LPs) (Woodman, 2022). Through the third quarter of 2021, around 5,492 deals worth €548.7 billion were closed. Regarding geographic breakdown, most of the deals in 2021 were concentrated in UK and Ireland, followed by France and DACH region (Capolaghi & Rech, 2021). Pitchbook also addresses that deal flow in 2022 is likely to surpass the record in 2021, totaling approximately 7,200 deals worth nearly €750 billion.

2.3 Characteristics of the European market

According to Preqin's database, 5,362 PE companies registered in Europe in 2022. 1,485 hold a buyout strategy. There are 1,741 PE funds with a buyout strategy targeting European portfolio companies in 2022. The current European economic climate remains one of the largest economic blocs in the world, accounting for approximately 30% of the global output (Höppner & Donaldson, n.d.). One of many reasons foreign investors want to invest in Europe is the relatively resilient markets that support growth and transformation. European markets are perceived to be stable due to robust infrastructures, skilled labor, political stability, and a large addressable market (Teigland et al., 2021).

A report issued by Tuck Parushev in April 2020 has found sound differences between the US and European private equity investment processes. The report is explicitly focusing on the lower middle markets (Parushev, 2020). The author came up with ten critical differences. Due diligence and distribution waterfalls are considered one of the most important differences. In Europe, PE firms encounter vendor due diligence reports during transactions, prepared and commissioned by the target company, in order for the PE fund

to familiarize the target quickly. Compared to the US, PE companies rarely use seller's counsel to provide such reports on target companies. Under European waterfall, the fund must return all drawn capital to its investors (LPs) before sharing profits between LPs and GPs. In the context of US waterfall, the fund can start sharing incremental profits between LPs and GPs on a "per realized" basis. This sharing of profits requires a quicker distribution, and the affected partners do not have to wait for invested capital to be realized (Parushev, 2020).

A senior manager in Summa Equity, a large Norwegian PE company, focusing on ESG investing, pleaded in an interview that especially the Nordic- and European markets are well established to consider ESG investing compared to the rest of the world. The senior manager strongly believed that regulatory-, technological- and consumer factors are the consequential drivers of ESG success. Most focus on ESG in the Nordic- and European countries today emanates from strong inducements from stakeholders and governments.

2.4 Private equity towards sustainable investments

The private equity sector plays a vital role in sustainable development. Environmental, social, and governance (ESG) factors shape the financial ecosystem for years to come. Research has proven growing evidence that investors now have embedded ESG considerations into their investment strategies to achieve positive valuation outcomes. A survey of Limited Partners (LPs) by Bain & company reports that 70% of their organization's investment policies include an ESG approach (Bain&Company, 2022). Nevertheless, many public organizations and private equity firms struggle to execute the ESG imperative. Private equity companies have a challenging time balance between a discordant goal of rendering returns for investors while fulfilling stakeholder requirements on ESG objectives (PwC, n.d.).

Picq and Fagerlund posted an article in November 2021 based on a pan-European survey consolidating the outcomes from 100 LPs and 150 GPs across geographies. The respondents represented the European market regarding geographical footprint, industry sectors, and investment strategies. The report concluded that European GPs and LPs are at the forefront of an ESG mindset. The private equity sector focuses more on ESG in daily operations and increasingly puts ESG considerations into their due diligence processes.

95.5% of all GP respondents expect more attention to ESG consideration in the subsequent years. More than 7 out of 10 GPs stated that they follow the ESG criteria outlined by the Sustainable Finance Disclosure Regulation (SFDR). 20% of the GPs are imposing a stricter form of sustainable investment strategy on their funds by targeting compaction in carbon emissions objectives (Fagerlund & Guillaume, 2021).

2.4.1 ESG characteristics and strategies

Today, there exist multiple frameworks for understanding and comparing ESG strategies. ESG is an acronym for Environmental, Social, and Governance. The environmental factors refer to carbon- and greenhouse gas emissions, electricity consumption, waste- and water management, and natural resource management. The governmental factors direct to management practices that underpin the E and S criteria of ESG. These factors may include corporate management structure, financial transparency, and anti-corruption practices. Lastly, social factors include the health and welfare of employees and employment practices that center on diversity, equity, and inclusion, which may incorporate equitable hiring conventions, pay scales, and training opportunities.

A recurring theme in most strategies is listed below:

- Best-in-class
- Exclusion criteria
- Thematic approach
- Impact investing
- Shareholder engagement
- ESG integration

Best-in-class is looking to take sustainability investing a step further. This approach is a systematic and holistic way to invest in companies that are at the forefront of managing their corporation with leading ESG practices (Northern-Trust-Asset-Management, 2017). Best-in-class sort companies within both sector diversification and geography. Investors seek to mitigate the risks associated with poor ESG performance using this investment approach and position themselves for possible reputational and long-term benefits. The best-in-class strategy impacts corporate behaviors, the environment, and communities. The strategy is used in positive screening to find the most sustainable companies in a sector without necessarily excluding more controversial industries but targeting companies that make the most effort to meet ESG criteria relevant to the respective industry. For example, a private equity fund could target a company investing in Oil & Gas with deemed

incentives to most negligible carbon emissions.

Thus, best-in-class refers to the most sustainable companies in a sector, often used as a benchmark to be equally or surpassed (Robeco, n.d.). The investment consideration lies in securities selection based predominantly on ESG scores and ratings. This approach rewards companies that have a higher ESG rating with capital.

Impact investing is an investment strategy that aims to generate specific beneficial, social, or environmental effects in addition to financial gains. The strategy uses numerous asset classes to the point of impact, where capital spending targets positive social results (Chen, 2022a). This approach targets companies and sectors with direct social and environmental impacts while preserving capital. Impact investing is usually a topic of private market investments aiming to deliver sustained alpha reaching market rates of return and positive screening of leading ESG practices. This strategy may seek to preserve capital but may sacrifice some financial return objectives to achieve an impact (Goldman-Sachs-Asset-Management, n.d.).

In a survey prepared by PwC in 2019 of PE firms, 48% of the respondents said they were taking on climate risk and reporting carbon footprint. 81% of respondents reported ESG matters to their Board of Directors at least once a year. 91% reported that their firm has adopted or currently developing ESG policies for responsible investments (Jackson-Moore et al., 2019).

Exclusion criteria are a strategy based on excluding funds or portfolios of certain sectors, companies, or practices based on specific ESG criteria. Exclusion criteria are also called negative screening and are the oldest and most popular approach to ESG investing. The exclusion occurs either by omitting, for example, fossil fuel sectors or excluding companies that fall outside the desired ESG rating. The negative screening would suit investors who want to take a moral stand by withdrawing funds using broad market benchmarks. Most investors within this strategy strongly desire to align with large-cap equity allocations (Evidence-Based-Investing, n.d.).

Shareholder engagement uses shareholder power to influence corporate behavior through direct corporate engagement, filing or co-filing shareholder proposals, and proxy voting guided by comprehensive ESG guidelines. Institutional investors have to act in

the best long-term interest of their beneficiaries. According to an article published by UN PRI in 2018, there is a straightforward way investors with companies on the issue of ESG can create shareholder value. The authors interviewed 36 representatives of large corporations to obtain a corporate perspective on engagement. The interviews highlighted three distinct types of shareholder value created by investor engagement: communicative dynamics, learning dynamics, and political dynamics. These three directions were seen in the highlight of value creation from the view of the company and the investors (U. PRI, 2018).

From the company's point of view, enhancing their communication with investors by closing the loop between internal ESG information systems and ESG reporting practices could lead to dedicated information systems managing investor relations. Corporations can use engagement proactively and strategically to test ESG policies and determine more efficient ESG targets and KPIs. The political benefits could enhance internal coordination between corporate investor relations divisions, sustainability departments, and the executive board (Gond et al., 2018).

For investors, enhancing the communicative value makes their engagement objectives, expectations, and desired form of success clear to companies. Investors' learning value can advance the feedback loop between new ESG information and knowledge gained through engagement. Political benefits can be achieved internally if ESG and financial analysts work closely on engagements (Gond et al., 2018).

Thematic approach is a sustainable investment strategy that invests in themes or assets related to sustainability, such as clean energy, green technology, or sustainable agriculture. Equities following a thematic ESG approach offer opportunities beyond a traditional index orientation. This approach can monitor well-suited portfolios. ESG thematic strategies can be implemented via active or passive strategies and diversifying across multiple themes. When investors use this investment strategy, the opportunity to reduce volatility relative to the conventional benchmark is present (Whittaker et al., 2018).

ESG integration is the systematic and explicit inclusion by investment managers of environmental, social, and governance factors into financial analysis. ESG integration is the strategy where investors incorporate sustainable information into investment decisions to enhance risk-adjusted returns, regardless of whether an investment strategy has a

sustainable mandate. ESG data is often categorized as "non-accounting" information because it captures items elementary for the valuation that are not traditionally reported, especially in non-listed companies (BlackRock, 2018).

2.4.2 ESG measurement to foster value-creation

Every year, there are increasing demands to report and comply with ESG guidelines. Non-financial data measurement is central to an ESG integration. Without it, financial data alone fails to give an exhaustive assessment of the actual performance of an asset (Alfonso-Ercan, 2020). Alfonso-Ercan also addresses that excluding pertinent ESG information in the decision-making process for private equity managers could negatively affect the firm's overall asset performance.

Ever more investors are emphasizing the importance of ESG, but limited partners and private equity firms frequently lack the tools to measure the impact of ESG on their portfolios. A report published by Bain & Company in January 2022 stated that only a fraction share of LPs ask for ESG key performance indicators (KPI) reporting from their GPs (Lino et al., 2022). Fewer than 20% asked for these indicators, the report concludes. There exists a glaring measurement gap as fewer than 35% of GPs responded to the survey and can provide data on all principal adverse indicators at all time (Lino et al., 2022).

Gunnar Friede et al. studied roughly 2200 corporations and reported a 63% share of positive findings between ESG and CFP. The report concluded only an 8% share with negative findings. This article laid the foundation for why ESG measurements are essential for the value creation process in PE today. McKinsey Quarterly posted an article in 2019 about five ways ESG is linked to value creation. 1) Top-line growth, 2) Cost reduction, 3) Minimizing regulatory and legal interventions, 4) Employee productivity uplift, and 5) Optimizing capital allocation to enhance investment returns (Henisz et al., 2019). For investors considering ESG integration, it is decisive to distinguish which of these guidelines adds the best value to the company. It is difficult to govern according to these principles in the private sector as there is little ESG data, particularly given the lack of reporting requirements.

Since industry-wide standards for ESG measurements and reporting still do not exist, several non-profit companies have grown to provide a framework for disclosure, such as

United Nations Principles for Responsible Investments (UN PRI) and ESG Disclosure Framework for Private Equity. Today, many PE companies adhere to UNPRI's guidelines for ESG. UNPRI offers six principles for responsible investments to incorporate ESG issues into investment practices. Furthermore, the EU has implemented directives for a green shift in the industry through the Sustainable Finance Disclosure Regulation (SFDR). (PRI, n.d.-a).

2.4.3 ESG challenges

Many factors drive the ESG integration momentum today, yet substantial obstacles hinder this development. Until recently, along with the history of ESG-related initiatives, the investment managers' challenges have delayed the implementation of ESG investing. Cuello (2021) points to four key challenges private equity today faces. Deborah La Franchi, founder, and CEO of SDS Capital Group, a national leader in impact investing with over \$1 billion in assets under management, said "*without financial performance, there is no impact*". The first challenge is that the misperception focusing on ESG investing is at odds with an investment manager's fiduciary duty to their investors (Cuello, 2021). As several studies point out, also supported by Cuello, the root cause of ESG challenges to private equity today is the lack of a clear definition of what qualifies as an ESG strategy and what is sustainable. The market has sound differences in which ESG initiatives are considered material. Every fund manager on the topic of ESG has a different priority regarding emphasizing socially responsible investing, diversity, equity, and inclusion, governance issues, or environmental issues.

Lastly, these varying approaches to ESG incorporation occur due to a lack of guidance. Market participants are experiencing inconsistency in how fund managers in private equity use ESG in their investment decision-making and diligence and create difficulty when evaluating the impact (Cuello, 2021).

For the time being, as private equity managers race to grab a seat at the sustainable investing table, it appears, in practice, acceptable to leave in favor of the table with financial performance-oriented investors, leaving ESG factors open to interpretation (Alfonso-Ercan, 2020). Searching through numerous private equity websites forms an image of sustainability being a long-term priority. However, according to Alfonso-Ercan,

ESG funds comprise only a single-digit percentage of overall assets under management. Furthermore, research suggests that ESG is gaining momentum and maturity increasingly over the private equity landscape, but it requires more regulatory support to maintain the integrity of ESG integration.

2.5 Buyout strategy

The leading strategies in private equity are buyout, venture, and growth. This thesis concentrates on buyout and will in the following describe the strategy. A buyout is the acquisition of a controlling interest in a company. A buyout occurs when a buyer acquires more than 50% of the company. Suppose the firm's management buys the stake. In that case, it is known as *management buyout*, or if high levels of debt acquire the company, it is called *leveraged buyout* (Barone, 2020). A leveraged buyout is considered a high-risk, high-reward strategy. Using this strategy in private equity, funds choose underperforming or undervalued companies and then "turn the company around" to become private. Years later, the company proceeds to operate in the public market and gets re-listed on a stock exchange.

Buyout strategies in private equity are fascinating to consider from an academic perspective, as buyout represents the industry's most mature and developed segment. This asset class has frequently outperformed the public markets, and of all private capital in 2019, 32% was invested into buyout funds (Moonfare, n.d.). The technology platform Moonfare published an article that buyout strategies create value through management effectiveness, operational support, access to finance, and multiple expansion (Moonfare, n.d.).

3 Literature Review

This section aims to provide an overview of relevant literature on the correlation between ESG investing and corporate financial performance in the private equity industry.

The work of this thesis relates to previous research on the relationship between ESG and CFP. This paper aims to identify the limitations of previous research and contribute to a deeper investigation of ESG investing in the private equity sector.

The growth of socially responsible and sustainable investment in financial markets has drawn considerable academic attention over the last decade. Several studies show that knowledge of the economic effects of ESG criteria remains fragmented. On the other hand, research over the last five years appears to be producing more conclusive results. However, it is worth acknowledging the challenges with inconsistent terminology, insufficient emphasis on "material" ESG issues, ESG data shortcomings, and confusion regarding different ESG investing strategies (Whelan et al., 2021).

In 2015, Gunnar Friede, Timo Busch & Alexander Bassen published a review study with more than 2200 global individual empirical papers in the *Journal of Sustainable Finance & Investment*. The authors extracted and combined their findings and showed that the business case for ESG investing is empirically very well-founded. Their evidence shows that roughly 90 percent of studies find a nonnegative ESG–Corporate Financial Performance (CFP) relation. Moreover, the large majority of studies examined report positive findings. Other notable findings include a remarkable USD 60 Trillion of assets managed by signatories of the UN Principles of responsible investments, indicating a commitment to factoring ESG performance into investment strategies (Freide et al., 2015).

Several studies have tried to explain the relationship between ESG factors and CFP. In the literature, evidence is not conclusive across all asset classes. This thesis wants to explore the relationship and build upon the evidence in the Private Equity industry. The industry presents evidence of rising demand for a sustainable approach to private investments and the need for further development of environmental, social, and governance (ESG) data analysis to enhance investment decision-making in the private equity world (Alfonso-Ercan, 2020). The literature argues an arising interest for investment managers to strategically position themselves towards investment standards to consider ESG impacts.

As ESG integration has been booming in the Private Equity industry for the past few years, few studies have specifically targeted Private Equity companies in their articles. As the Private Equity fund's primary goal is to provide investors with financial profits within 4-7 years (CFI), there must be incentives for both the fund and investors to invest responsibly. Moreover, the private industry has posed difficulties in measuring accurate fund performance in empirical analysis.

In 2020, the book "Value at Work" was published, and Alfonso-Ercan (2020) explored the current state of the Private Equity sector and how ESG factors can yield higher returns than traditional investment strategies. The author gathered the latest research in the literature and discussions within the sector, specifically focusing on ESG and Private Equity performance and how ESG integration is rising crucial for private equity firms (Alfonso-Ercan, 2020). In 2018, Limited Partner Association revised its current questionnaire to include a new section focusing on ESG data gathering. Consequently, it suggests that without ESG data inclusion, non-financial performance is restricted to a mere firm byproduct rather than a potential profit source (ILPA, 2018). Excluding this information in the decision-making process for private equity managers is irrational and can negatively influence overall asset performance.

The author included a quote from McKinsey quarterly that states, *"companies that pay attention to ESG concerns do not experience a drag on value creation—in fact, quite the opposite"*. Furthermore, McKinsey elaborated five ways that ESG creates value, and did find that ESG is linked to value creation by (1) facilitating top-line growth, (2) reducing costs, (3) minimizing regulatory and legal interventions, (4) increasing employee productivity, and (5) optimizing investment and capital expenditures (Henisz et al., 2019). Moreover, ESG characteristics seem to be a primary driver within the industry.

The annual report for Neuberger Berman in 2017 included the phrase, *"We have long believed that material ESG characteristics are an important driver of long-term investment returns, from both an opportunity and a risk-mitigation perspective"* (Neuberger-Berman, 2017). Moreover, the firm's report in 2019 revealed USD 339 billion in assets under management, whereas 60 percent were managed with *"consistent and demonstrable ESG integration"*. This statement reflects both arising interests in ESG integration and that Neuberger Berman truly believes ESG integration provides higher returns over a more

extended period (Neuberger-Berman, 2017).

In 2012, Dell'acqua and Teti aimed to assess the economic impact of the United Nations Principles for Responsible Investments (UN PRI) on investment performance. Notably, the authors analyzed whether adherence to the UN PRI program generates higher returns for the US private equity funds or not (Teti et al., 2012). The paper used a dataset of 135 US Private Equity funds from 2006 to 2011.

They ran a multivariate regression on the fund's returns, including compliance with UN PRI as their key explanatory variable. The other six explanatory variables include fund maturity, time intervening between vintage year and first investment, number of LPs, number of fundraising tranches, number of investments, and number of write-offs. Their findings indicate that responsible investing pays off in economic terms and the reputational benefits for companies in the United States. Their findings conclude that returns are linearly independent of the UN PRI compliance variable compared to the other six explanatory variables. Realized returns for every investment, a cash multiple was used as the dependent variable (Teti et al., 2012).

The evidence suggests that private equity funds included in the UN PRI program benefited from higher returns between 2006 and 2011. The findings suggest a positive impact of ESG screening in Private equity investment strategies.

The most prominent research conducted on the investigation between ESG and CFP in private equity was established by Zara (2019). The author investigated 126 PE investment vehicles, amongst them 70 ESG compliant funds and 56 non-compliant targeting European and North American PE funds. The research found that ESG funds generated more stable returns in terms of net IRR standard deviation compared to the non-ESG vehicles. The evidence proved that ESG funds are a more stable asset class in the medium-long period. The author concluded that their average Treynor Ratio was 50 percent higher than that for non-ESG funds. The better performance did not depend on absolute returns. In fact, the Sharpe Ratio was lower but on weaker connection with the systematic risk. Zara categorized the samples into alias portfolios, one with compliant ESG funds and the other without ESG compliance. The author used two criteria to determine whether the funds were compliant with ESG or not, by looking if the fund did declare ESG integration factors or was a UN PRI signatory (Zara, 2019).

Claudio Zara concluded that, on average, ESG integrated private equity funds did not perform better in terms of Sharpe Ratio compared to non-ESG funds. However, he introduced them into a fully diversified portfolio measured by the Treynor Ratio. The results did turn around in favor of ESG funds. The author concluded that the reason behind this was that the beta risk showing their systematic risk was considerably lower. Furthermore, the regression analysis did reflect that ESG integration generated a positive effect on funds' risk-adjusted performance (Zara, 2019).

Academic studies which investigate the relationship between ESG integration in PE funds and CFP has been increasing considerably since the early 1990s. However, when the focus is oriented to the private equity literature, a huge research gap was found (Zara, 2019).

Existing research primarily focuses on evaluating the main drivers and barriers to adopting ESG considerations by private equity managers. Based on the existing research gap, this paper contributes to new knowledge by conducting an empirical analysis to understand the specific impact of ESG integration on risk-adjusted financial performance for private equity funds (Zara, 2019).

Most of all research papers reviewed conclude that a key area for future research is a better understanding of the interaction of different ESG criteria in a portfolio to the relevance of specific corporate financial performance results. In the article by Teti et al. (2012) the authors conclude that the results are affected by a limited time period and that only 25 out of 135 funds are UN PRI compliant funds. This thesis aims to fill that gap by testing a new period more representative today, to gain more information about data reflecting today's situation in the private equity industry.

Furthermore, this thesis tries to critically and more precisely evaluate the ESG integration in PE funds by using multiple ESG variables to determine the effect of ESG integration. Earlier research uses CFP measures by evaluating the funds CFP based on Vintage year. In our analysis, we specifically compute the CFP for the selected period, not from Vintage. The results should therefore reflect more accurate CPF findings.

4 Testable Hypothesis

A critical theoretical principle for an efficient and great-performing fund in the private equity market is that the value of the funds' risk-adjusted returns to both GPs and LPs is as high as possible. This thesis explores whether a higher level of ESG integration in European private equity buyout funds delivers greater risk-adjusted returns than non-ESG integrated private equity buyout funds. The thesis will provide a more thorough breakdown of the ESG integration compared to earlier research in the PE asset class. Each portfolio will represent low, moderate, high, and very high ESG risk. Based on the existing research gap in the private equity literature, this thesis aims to dig deeper into the impact of ESG integration on the financial performance of European private equity funds. More in detail, the hypotheses we wish to demonstrate are:

H1: Can ESG integration in European private equity buyout funds generate higher risk-adjusted returns than average buyout funds in the Private Equity asset class?

H2: Can ESG integration in European private equity buyout funds generate higher risk-adjusted returns in a fully diversified portfolio than average buyout funds in the Private Equity asset class?

H3: Can ESG integration explain any result uniform with the two hypotheses?

In the following paragraphs, after clarifying the methodological drivers of the database construction and the variables used in the empirical analysis, the paper portrays the data and descriptive statistics of the first results. Moreover, the thesis explains the main findings of the impact of ESG integration on European private equity fund's risk-adjusted performance. Discussion of results and conclusions complete the paper.

5 Methodology

The empirical analysis comprises a dataset of 86 European private equity funds, which we categorized into four subsamples. Each portfolio is constructed based on each fund's respective weighted aggregate ESG score, where portfolio 1 is the foremost ESG compliant portfolio to portfolio 4 consists of the least ESG compliant or non-ESG compliant portfolio. The portfolios were constructed using an aggregate ESG z-score for each fund. Portfolio 4 contains the lowest ESG scoring funds, and the first portfolio contains the highest-scoring funds based on the sample ESG z-score distribution. The dataset only includes buyout funds, and this thesis investigates whether historical financial performance is affected by the choice of ESG investing from 2016 to 2021.

The first step of the analysis was to evaluate the level of ESG integration in each European private equity fund by calculating the aggregate ESG score for each fund based on three individual ESG variables. The variables include ESG Transparency KPI, ESG Risk Magnitude Score, and UN PRI signatories. The Transparency KPI and UN PRI capture the General Partner's ESG integration level, and the Risk Magnitude Score captures each fund's ESG risk. The scores are weighted into an aggregate ESG score that captures both GP's and fund's ESG integration level.

The second step of the analysis was measuring funds' corporate financial performance, namely risk-adjusted performance, by compromising two main measures. Sharpe Ratio affects H1, which refers to the absolute performance. Treynor Ratio affects H2, which considers performance inside the fully diversified portfolio. STOXX 600 was the comparable equity benchmark in our analysis. Preqin was the database for both the performance measures and ESG measures. The date of UN PRI signatories was collected through UN PRI's database.

We analyzed private equity as an industry based on the private equity industry benchmark dataset from Preqin. The dataset includes aggregate historical net IRRs for the whole industry. We also compared the private equity benchmark to all four subsamples in the selected period.

Finally, the last step of the analysis consisted of performing two linear regression models to verify if ESG integration, measured through the aggregate ESG score variable, can

explain differences in funds' risk-adjusted performance (H3).

5.1 ESG variables

This thesis's empirical analysis of ESG integration is conducted based on three ESG variables. The following three ESG variables are used in the analysis:

- *Transparency KPI*: This parameter shows a quantitative measure of the level of disclosure on ESG governance from three governance indicators: firm, portfolio, and asset transparency. The ESG Transparency metric indicates the percentage of ESG Core Data Disclosed divided by the total ESG Score of Data points collected (Preqin, 2021). The Transparency KPI score ranges from 0 - 100%. A high percentage indicates a high level of ESG disclosure for the GP. A 100% transparency KPI indicates that GP has measurable results on ESG and reports these publicly. For such PE companies, an ESG report will often be available in investor relation reports. A lower percentage indicates that the company only reports required ESG information to rating agencies giving lower transparency scores. Firms that do not report any ESG information receive a 0% score.
- *Risk Magnitude Scores*: ESG Risk Magnitude Score measures the fund's potential ESG risks based on sector and geography. The score gives a rating based on the private equity fund explained by the type of asset, size, and fundraising information. ESG Risk Magnitude score takes into account the value of the sector in which the fund operates and subtracts this from the sector to have an equal assessment of all funds regardless of what sector the fund invests in (Preqin, 2021). The ESG Risk Magnitude score ranges from 0 to 10, where 10 represents a very high ESG risk exposure estimate. Preqin's methodology creates "thresholds" rather than a "score," given possible data limitations, including missing assets, investment data, or other positional data points. The "thresholds" are simple score bands where 0.0 - 2.5 is assessed as "Low," 2.5 - 5.0 is assessed as "Moderate," 5.0 - 7.5 is assessed as "High," and 7.5 - 10.0 is assessed as "Very High." The Score bands are evenly distributed and rounded.

- *UN PRI Signatory*: Being a UN PRI signatory allows the private equity company (General Partner, GP) to publicly demonstrate its commitment to including ESG factors in investment decision-making and ownership (PRI, n.d.-b). The primary focus of this scoring methodology is on a signatory's responsible investment implication across their overall investment process, the sophistication of the practice of assets under management (AUM), and clarity on the timeframe of practices carried out (PRI, n.d.-b). UN PRI signatories must publicly report their responsible investment activities each year (PRI, n.d.-c). To become a UN PRI signatory, every PE company must assign to six principles. New signatories have one-year grace where the first reporting cycle is voluntary, meaning transparency reports can remain anonymous. The three most crucial requirements are investment policies that cover responsible investment approaches, implementing those policies both internally and externally, and commitments and accountability for responsible investments at the senior level in the company (PRI, n.d.-b).

Table 5.1: ESG integration score classification

ESG percentage score	ESG risk integration rating
0% < x > 30%	Very High
31% < x > 38%	High
39% < x > 72%	Moderate
73% < x > 100%	Low

Note: This table summarizes the ESG score classification, sorted from very high ESG risk, representing a z-score below 29% and low, representing a z-score higher than 73%. The classification is based on the aggregate ESG z-score sample across all 86 funds

The aggregate ESG score corresponds to a weighted quantitative score based on the level of scoring in transparency KPI, risk magnitude, and the ESG value of a firm being a UN PRI signatory. For private equity funds to be ESG compliant, the overall score z-score must be larger than 39% (0.39). We define the following ESG-score distribution between all funds and assign their respective ESG rating. The rating provides an overview of the level of ESG risk associated with each fund and its respective portfolio.

5.2 Corporate financial performance

This section encompasses our economic analysis' leading financial and descriptive variables. To carry out a financial interpretation of our dataset, we introduce financial variables related to the funds' performance. In addition, this thesis introduces variables associated with a category describing the fund's general features, such as risk and fund size.

5.2.1 Financial variables

To investigate whether historical financial performance is affected by the ESG integration, the analysis forms a basis of several financial variables that includes; net internal rate of return (net IRR), net pooled internal rate of return (net PIRR), total risk ratio, Sharpe Ratio, and Treynor Ratio.

Net IRR is calculated by:

$$IRR = NPV + \sum_{t=1}^T \frac{C_t}{(1 + IRR)^t} - C_0 \quad (5.1)$$

Where:

C_t = Net cash inflow during the period t

C_0 = Total initial investment cost

IRR = Initial rate of return

t = the number of time periods

The net IRR is the money-weighted return expressed as a percentage. Net IRR uses the present sum of cash contributed, the sum of distributions, and the current value of unrealized investments and applies a discount. This amount should be net of any carry/performance fees earned by the GP, (Lacaze, n.d.). For more details about the calculation, please see Appendix table A2.

Pooled IRR is calculated by:

$$PIRR = NPV + \sum_{t=1}^T \frac{C_t}{(1 + r)^t} - C_0 = 0 \quad (5.2)$$

Where:

IRR = Internal rate of return

NPV = Net present value

C_t = the pooled cash flows expected at time t

r = the risk-free rate of return

To compute portfolio performance more accurately, we compute the Net IRR for each fund individually which will be used in the Pooled IRR computation for each of the four portfolios. The weighted pooled net IRR contains all cash flows from all funds inside their respective portfolio, weighted for final closing size.

The applied formula for calculating the Sharpe Ratio is as follows:

$$SharpeRatio = \frac{R_p - R_f}{\sigma_p} \quad (5.3)$$

Where:

R_p = return of portfolio

R_f = risk-free rate

σ_p = standard deviation of the portfolio's excess return

The Sharpe Ratio (SR) expresses the average return earned in excess of the risk-free rate per unit of volatility (Zara, 2019). Subtracting the risk-free rate from the mean return allows us to isolate better the profits associated with risk-taking activities (Fernando, 2022). The SR depends on three inputs. The return of the portfolio (absolute return) corresponds to the last quarter's net IRR observation of the weighted average of the funds which form the portfolio. One of the descriptive variables gives the weights, AUM size. Using weights allows us to commiserate each fund's SR with its corresponding size (Zara, 2019). The risk-free rate corresponds to a theoretical return where the investment gives zero risk. The rate represents an investor's expectations from a risk-free investment over a specific period. In this analysis, the risk-free rate is the average 10-year maturity risk-free rate issued by the European Central Bank (ECB) from 2016 to 2021, as all funds

¹(Fernando, 2022)

are within the European sphere of influence. The portfolio's standard deviation is the weighted sum of standard deviations of the quarter net internal rate of returns allocated to each fund within the respective portfolios.

The Treynor Ratio (TR) formula is calculated as:

$$TreynorRatio = \frac{R_p - R_f}{\beta_p} \quad (5.4)$$

Where:

R_p = return of portfolio (in absolute terms)

R_f = risk-free rate

β_p = portfolio beta risk

The Treynor Ratio is known as the reward-to-volatility ratio. It is a performance metric corresponding to the return required for how much excess return is generated for each unit of risk issued by the portfolio. The Treynor Ratio only differs from Sharpe Ratio regarding the assumed risk measure. However, adjusting for systematic risk instead of total risk is essential for estimating the variance between fund returns (Zara, 2019). The factor of systematic risk, beta, is calculated by:

$$\beta_p = \frac{Cov(R_p, R_m)}{Var(R_m)} = Correlation(R_p, R_m) * \frac{\sigma_p}{\sigma_m} \quad (5.5)$$

Where:

β_p = Portfolio beta risk

(R_p, R_m) = Correlation factor

$\frac{\sigma_p}{\sigma_m}$ = Total risk ratio

Market portfolio: The market portfolio is given by the index for the European market, STOXX 600. Quarterly data for the period 31.12.2015 - 31.12.2020 are considered.

²(Kenton, 2020)

5.2.2 Descriptive variables

The descriptive variables used in our multiple linear regression is as follows:

- *Size Dummy*: Represents the final closing size of each fund (AUM), which is classified in table 5.2. The AUM is based only on the equity committed to the fund, excluding any leverage or debt used to finance investments. The final closing size is reported in USD. For funds denominated in non-USD currencies, conversions to USD are made using the exchange rate at the date of the final close or latest interim close of the fund (Preqin, 2021). The variable is treated as a dummy variable in the multiple regression analysis.

Table 5.2: Funds' AUM size class

Fund class size	AUM size in millions USD
Small	< \$ 500
High	> \$ 501

- *Geographical Area*: The geographical area corresponds to the fund's geographic focus, either Nordic or the remainder of Europe. The variable is treated as a dummy variable. The dummy assumes 1 for the Nordic region and 0 as the remaining European region, the UK included.

6 Data

This chapter explains the data collection process and how we constructed the empirical analysis. Moreover, the first set of preliminary results from the data analysis is presented.

Table 6.1: Summary of data

Summary of variables	
Number of funds	86
Geographic area	Europe
Strategy	Buyout
Time period	31.12.2015 - 31.12.2020
ESG variables	3 (included in 1 aggregate ESG score)
Financial variables	5
Descriptive variables	2

Note: This table shows a complete summary and classification of the data used in the empirical analysis.

We collected data through Preqin’s Private Equity database, “Preqin Pro.” Preqin is the foremost provider of analytics, data, and insights to the alternative asset community. Since 2003, Preqin has built valuable relationships with fund managers, institutional investors, and other industry professionals who provide data on their activities. Preqin’s data collection includes web data extraction, direct conversations with fund managers, on and offshore web research, FOIA requests, and manager-initiated data contributions (Preqin, 2021).

During Preqin’s data validation, they cross-check data to ensure accuracy and clarify data points directly with whomever it might concern. In the following, we present the screening and data processing. Then we describe the ESG score, performance metrics, and transactions used in this empirical analysis. Finally, we explain the portfolio construction and introduce the dependent variable and the risk factors used in the analysis.

6.1 Screening and data processing

The total extracted dataset consists of 814 European geo-focused buyout PE investment funds from 31.12.2015 to 31.12.2020. We use Buyout as the PE Investment fund strategy to narrow the empirical analysis. A buyout strategy invests in more mature companies

and generates returns through an active investment and management approach. Focusing solely on buyout funds makes each fund's analysis easily comparable, and the limitations are reduced compared to early-stage companies' uncertainties and volatility. All funds must have a vintage year earlier than 31.12.2015 to be included in the analysis, aggregating the most accurate results. The sample used in the empirical analysis relies on a dataset composed of 86 European geo-focused PE investment funds. All financial data in the period, ESG data in the period, and transactions data for each quarter must be reported to be included in the sample.

We specifically included 2020 in the measurement period as some analyses and surveys suggest that ESG integrated funds, regardless of asset class, outperformed non-ESG integrated funds during the COVID-19 era (Whieldon & Clark, 2021). We were consequently interested in determining if the risk-adjusted performance was more significant in the PE asset class. The analysis might help us understand if volatility reflects medium-term risk-adjusted returns and how absolute performance might also be affected in the measurement period.

6.2 ESG validation of data

Preqin has played a role in developing the nascent growth of ESG across private equity classes by introducing ESG policy and impact investing policy status as well as information on third-party ESG affiliations (Preqin, 2021). Preqin's Sustainability Solutions are conducted to identify the best-use ESG indicators collected from accepted ESG databases and engagement frameworks most applicable to the private market ecosystem. ESG data existing on the Preqin platform are collected mainly from, The Sustainability Accounting Standards Board (SASB), The United Nations Principles for Responsible Investing (UNPRI), Institutional Limited Partnership Association (ILPA), and public market ESG rating providers.

In cooperation with the Nordea Sustainable Finance Advisory department in Norway, this section explores an overview of public and private market ESG rating providers and their validity. A consolidation trend has occurred with ESG providers coalescing around three groups: Stock Exchanges, Credit Rating Agencies, and Research and Data providers. There has been a significant interest among traditional investment research firms and

ESG specialty shops in integrating ESG into their processes. This thesis has mainly used ESG information from main- and subgroups from Research and Data providers, especially Morningstar, Sustainalytics, and MSCI, giving an ESG consolidation on Preqin's platform. ESG ratings pose challenges to stakeholders as they lack transparency. The way data is collected also poses a challenge to trust in the ESG rating environment. Nordea Sustainable Finance Advisory department conducted a report stating the strong consensus on the quality of ESG rating. The report concludes that 95% and 92% of their respondents consider the importance of the credibility of data sources and quality of methodology, respectively.

Most public market rating agencies have exposure and management scores as their assessment approaches. However, the data analysis approach differs across agencies. This thesis collects information from several agencies to get the most credible ratings. The rating agencies used in this empirical analysis use comprehensive data models to collect, aggregate, and analyze the ESG rating data. However, the data collection type can vary, and the focus can be on different data types. In example, MSCI uses computer-driven models and analysis-based approaches, whereas Sustainalytics uses only analysis-based evaluations.

6.3 ESG score

The first significant act of disclosure of the integration of ESG factors in the private equity industry was given by the launch of the Private Equity United Nations Principles for Responsible Investing (UN PRI). Many major private equity firms have become UN PRI signatories following the launch. This indicates that they acknowledge ESG issues as a critical factor affecting the performance of private equity portfolios (PRI, n.d.-a). Other studies have only used UN PRI for the ESG integration criteria to measure the funds for ESG integration. In the empirical analysis, we create one aggregate ESG score composed of three distinct weighted ESG variables: ESG Transparency, Risk Magnitude Score, and Signatories of UN PRI, which should strengthen our analysis compared to current research. All three ESG variables are weighted based on the ESG impact significance based on Preqin methodology and our assumptions. ESG Transparency, Risk Magnitude, and Signatories of UN PRI are weighted 16,67%, 33,33%, and 50%, respectively, of the

total score of 100%.

The maximum weighted score for a UN PRI signatory is 50%. As PE firms can be UN PRI signatories in the period, each signatory was weighted differently based on when they became signatories. Therefore, each year accounts for a 10% score reduction after 31.12.2015. A firm signatory in 31.12.2015 or earlier would obtain the total 50% score. Each signatory after 31.12.2020 receives a score based on which year they became signatories. Firms that signed in 2016 would receive 40%, 2017 would receive 30%, 2018 would receive 20%, and 2019 would receive 10%, see table 6.2 below.

Table 6.2: UN PRI Weighted ESG Score

UN PRI Signature Date	Total ESG Variable Score
Before 31.12.2015	50%
01.01.2016 - 31.12.2016	40%
01.01.2017 - 31.12.2017	30%
01.01.2018 - 31.12.2018	20%
01.01.2019 - 31.12.2019	10%
01.01.2020 - 31.12.2020	0%

Note: The table displays the weights given for the date each GP signed up as an UN PRI signatory. The objective of the weighting is to demonstrate the importance of having been an UN PRI signatory for a more extended period, and differentiate GPs that have not been ESG compliant over the measurement period.

The transparency score is based on the firm's ESG disclosure. The maximum weighted score for transparency score is 16,67%. A reduced transparency weight of 16,67% is given based on the uncertainty regarding each fund disclosure, specifically green-washing, that might affect the results.

The maximum weighted Risk Magnitude score is 33,33%. The weight represents the ESG risk's importance based on all portfolio companies within the fund.

Adding up all variables, each fund receives an aggregate ESG score for the period. All funds are given the ESG z-score, where portfolio 1 contains the funds with the highest ESG z-score and portfolio 4 with the lowest ESG z-score.

Table 6.3 summarizes the first results for the aggregate ESG scores for the entire sample. In the data, the average ESG score was 0.28 out of 1, and the standard deviation of the sample was 11%.

Table 6.3: Fund ESG Score - Descriptive statistics

Aggregate ESG Score - Descriptive Statistics	
Average ESG Score	0.28516376
Standard Deviation	0.10709345
Skewness	0.3946773
Kurtosis	0.052852461
Average ESG Z-Score	0.48447716

Note: This table summarizes the descriptive statistics for the aggregate ESG score for all 86 PE funds.

We observe that the average ESG score is generally low. The preliminary results might be explained that funds in portfolio 3 and 4 does not contain any GP UN PRI signatories, resulting in a lower aggregate ESG score. We also observe a standard deviation of 10% in the data. We observe a positive skewness, indicating a central dispersed tendency in the scoring. On the other hand, the tendency is relatively low, indicating fairly normal distributed data.

We compute the z-score to classify each fund's ESG risk and assign them in their respective portfolio. The z-score percentiles are shown below.

Table 6.4: ESG Z-Score Percentiles

Data percentiles	
25th Percentile	0.294406064
Median	0.389101382
75th Percentile	0.735500406

Note: The table shows what ESG z-score a fund must have in order to be selected in its respective portfolio.

After constructing all four portfolios based on each fund's aggregate ESG score, we compute the portfolio average ESG score for each of the four portfolios. Results are shown in table 6.5 "Portfolio ESG Score".

Table 6.5: Portfolio ESG Score

Portfolio	1	2	3	4
Average ESG Score	0.44	0.30	0.24	0.16
Average ESG Z-Score	0.89	0.54	0.35	0.15
Standard Deviation	0.06	0.02	0.01	0.05

Note: This table display the respective ESG scores assigned to each portfolio.

The average aggregate ESG score is 44% in portfolio 1, 30% in portfolio 2, 24% in portfolio 3, and 0,16% in portfolio 4. Resulting in a z-score average distribution of 89% in portfolio 1, 54% in portfolio 2, 35% in portfolio 3, and 15% in portfolio 1, completing the low, moderate, high, and very high ESG risk profiles for each portfolio. We observe the standard deviation for each portfolio. The preliminary results show a higher standard deviation in portfolios 1 and 4, indicating a more dispersed ESG rating across funds in the most compliant and the least compliant portfolios. This might indicate that most funds have ESG integrated measures, and some outliers reflect the higher standard deviation in both ESG score directions.

6.4 Transactions and financial performance

Preqin’s Cash Flow data is the industry’s largest source of reliable cash flow data, allowing users to undertake extensive financial modeling and understand how private capital fund returns evolve over time. The transactions data consists of 280,000 historical data points for over 5,000 private capital funds, including over 140,000 cash flow transactions and over 150,000 historical NAVs (Preqin, 2021).

This dataset from Preqin is made up of fund-level cash flow transactions – capital calls, distributions, and unrealized valuations.

- Capital Calls: Capital called up by the GP from LPs for investment.
- Valuations: The estimated NAV of the fund portfolio.
- Distribution: Capital returned to investors from the GP.

Cash flow data is collected from aggregated data. Typically, reliable FOIA sources are used, but occasionally, data is included directly from consistent reporting GPs. For

most funds, data tends to derive from a single source, reporting quarterly metrics for the fund from inception. Quarterly cash flow amounts can then be calculated using the mid-point of the quarter and normalizing each fund to a commitment of 10mn in the fund's denominated currency (Preqin, 2021).

In order to specifically target the net IRR for the period, we extracted quarterly transaction data for all funds. In the analysis, the absolute portfolio return corresponds to the net IRR for each portfolio in the period. We extracted the unrealized fund value at the start of the period (31.12.2015) and the end of the period (31.12.2020) and all quarterly cash flows accordingly to the time frame. The cash flows in the period corresponding to distributions and capital calls. The net IRR is then calculated for each fund. The size of each fund is used to compute the weighted net Pooled IRR in each portfolio. The standard deviation is the weighted sum of standard deviations of the quarter net IRRs for each fund included in the specific portfolio. Where quarterly net IRRs are based on quarterly net IRRs since vintage. Weights for net IRRs in all funds included in each portfolio are given by the final closing asset size of the funds. Sharpe Ratio and Treynor's Ratio are computed for each fund in the portfolio.

6.5 Portfolio construction

To test our hypothesis, we create four portfolios based on the fund's ESG score chronologically. Portfolio 1 contains 21 funds. Portfolio 2 contains 22 funds, portfolio 3 contains 22 funds, and portfolio 4 contains 21. Funds with the highest ESG score (lowest ESG risk) are assigned to portfolio 1, the following highest portfolio 2, the third-highest portfolio 3, and worst scoring funds are assigned to portfolio 4. To make the analysis more precise, each portfolio's subsample size must be sufficient. We, therefore, assign the selected subsamples. The weighted net IRR and standard deviation are computed for each portfolio in the period to compute the Sharpe and Treynor's ratios. The results are shown below in Table 6.6, "Data results."

Table 6.6: Data results

Portfolio	1	2	3	4
ESG Risk	Low	Moderate	High	Very High
Number of funds	21	22	22	21
Portfolio Size (in USD millions)	76,828	74,339	77,774	23,436
Weighted Net PIRR	10.86%	9.06%	15.91%	12.46%
Weighted Standard Deviation	2.17%	2.73%	3.69%	6.28%

Note: The table summarizes each portfolio results of the empirical data computation.

We observe that the weighted net PIRR is lower in portfolio 1 and 2 compared to portfolio 3 and 4. The results might indicate a higher absolute return in non-compliant ESG portfolios than ESG compliant portfolios. On the other hand, the more pressing detail is that the standard deviation is significantly lower in portfolio 1 than in portfolio 4. The weighted standard deviation results show a monotonic tendency in the volatility of the net IRR for funds within each portfolio. The preliminary results might indicate that the volatility will make a more significant impact than absolute return when we compute the risk-adjusted returns in the next chapter.

6.6 Private equity industry benchmark

In order to strengthen the understanding of the results, we compare all sub-samples to the PE class by introducing Preqin's private equity industry benchmark. Preqin Benchmarks are calculated using performance information for over 10,000 private capital funds – the largest pool of fund returns data available globally, (Lacaze, n.d.).

The private equity industry benchmark is based on private equity funds' vintage, investment strategy, and geographic focus. The following factors calculate net IRR:

- Median: the middle value from the ordered industry benchmark
- Average: the mean net IRR is taken from the industry benchmark grouping to calculate the average fund net IRR
- Pooled: accounts for the timings of calls/distributions; aggregates cash flows of constituent funds and calculates resultant net IRRs.

- Weighted: takes the performance ratios of each fund and calculates a weighted average using the size of each fund.

Prequin has used the following methodology: For a fund to be included in the sample for a given time horizon, it must be active at the start and the end of the period, i.e., have an unrealized value reported at both start and end dates. The IRRs are calculated using:

- The fund's net asset value (NAV) at the start of the period as a negative outflow.
- LP contributions as a negative outflow (treated as the initial investment).
- Distributions as a positive inflow.
- The fund's NAV at the end of the period as a positive number.

The horizon IRRs are capital weighted, i.e., larger funds have more of an impact on the overall calculation (Prequin, 2021).

The Prequin methodology matches with our analysis for the four subsamples and the results should be more comparable. The following descriptive statistics are calculated based on the private equity industry benchmark ³:

Table 6.7: Private Equity Industry Benchmark

PE Industry Benchmark: 31.12.2015 - 31.12.2020	
Net IRR	16.33%
Standard Deviation	4.97%
Sharpe Ratio	3.26

Note: This table summarizes the benchmark results for the private equity industry within the period 31.12.15 to 31.12.20.

We observe a higher average net IRR in the benchmark compared to the portfolio results. The standard deviation is more significant than portfolios 1, 2, and 3. The tendency might indicate that the overall benchmark funds' are comparable and consistent with our comparison and results in our sample.

³(Lacaze, n.d.)

7 Results and Analysis

This section encompasses the results and analysis found in this thesis. The results are conducted using data analysis and two multiple linear regression models on Sharpe Ratio and Treynor Ratio as dependent variables.

7.1 Sharpe Ratio results and multiple regression model results

The empirical data analysis shows that portfolio 1 performs best with weighted average Sharpe Ratio of 4,95, which is 15% higher than that found for portfolio 3 at 4,29. The Sharpe ratio for portfolios 2 and 4 is 3,29 and 1,97, respectively, which is still very strong compared to STOXX 600. Strong stock and private market returns, low-interest rate climate, and below-average volatility produced solid risk-adjusted returns for the private equity class in the period (Ploutos, 2020).

In comparison, the average Sharpe Ratio for the private equity industry benchmark was 3.26 in the period. The private equity industry benchmark generated an average 5-year absolute annual return of 16,33% in the selected period between 2016 and 2021. The standard deviation of the Private equity benchmark portfolio averaged 4,97%, and we used the comparable risk-free rate at 0,10% to calculate the Sharpe Ratio for the industry benchmark. The 298 bp spread between the most ESG compliant portfolio and the least ESG compliant portfolio can be referred to as both the size of absolute return and the standard deviation observed in the data. We specifically see that the Sharpe Ratio results reflect the low volatility in the most ESG-compliant portfolio.

When comparing absolute return, portfolio 4 shows a significantly higher financial performance in terms of weighted net Pooled IRR with a 1,60% positive difference (11,40% vs. 12,46%). The best performing portfolio is portfolio 3 with an absolute return of 15,91%, and portfolio 2 is the least performing portfolio at 9,06%. At the same time, the individual level of risk is significantly lower for portfolio 1 compared to portfolio 4 (2,17% vs. 6,28%). Portfolio 1 lower level of risk, mitigates its absolute underperformance compared to the comparable portfolios. Results are summarized below:

Table 7.1: Sharpe Ratio performance results

Portfolio	1	2	3	4
Net PIRR	0.11	0.09	0.10	0.12
Weighted Average Standard Deviation	0.02	0.03	0.04	0.06
Sharpe Ratio	4.95	3.29	4.29	1.97

Note: This table shows the data result of the empirical computations within each portfolio in regard to Sharpe Ratio.

As for multiple linear regression models in the analysis, the first regression model is performed on all subsamples to assess whether the percentage ESG score positively and significantly impacts the Sharpe Ratio of the 86 private equity funds. In this regard, table 7.2, Sharpe Ratio regression results show that a 1% increase in the level of the ESG score generates a significant 2,41% growth of the Sharpe Ratio at a 10% significance level. The results are supported by the significance of the multiple linear regression model with an F statistic of 2,06 and a p-value of 0,094.

It is possible to argue that H1 is confirmed as a general statement, being ESG funds overperform in line with the Sharpe Ratio. At the same time, the ESG score positively affects the risk-adjusted performance, offering a positive confirmation for H3.

$$SR_i = \beta_0 + \beta_1 ESGScore_i + \beta_2 Geo_i + \beta_3 Risk_i + \beta_4 D_1 + \mu_i \quad (7.1)$$

Table 7.2: Multiple regression results with Sharpe Ratio as the dependent variable

	Estimate	SE	tStat	pValue
(Intercept)	-0.047892	0.48877	-0.097985	0.92219
ESG Score	2.4082	1.4203	1.6955	0.093818
Geo	-0.078995	0.40519	-0.19496	0.84591
Risk	-0.20577	0.21194	-0.97091	0.33448
SizeDummy	-0.4411	0.32124	-1.3731	0.1735

Number of observations: 86, Error degrees of freedom: 81 Root Mean Squared Error: 1.34
R-squared: 0.0923, Adjusted R-squared: 0.0474 F-statistic vs. constant model: 2.06, p-value:
0.094

7.2 Treynor Ratio results and multiple regression model results

We compare and compute the Treynor ratio on the four subsamples. The findings indicate that European ESG private equity funds, portfolio 1, perform better in weighted average Treynor Ratio (1.38), which is 126% higher than the next highest subsample, portfolio 2 (0.61). Moreover, the results for portfolios 3 and 4 are 0.50 and 0.32, respectively. We observe a monotonically decreasing pattern from portfolio 1 to portfolio 4.

The result can be mainly explained by the weighted average beta risk between all four subsamples. The weighted beta risk monotonically increases from portfolio 1 to portfolio 4. The observed weighted beta risk value for portfolio 1 is 0.08, and the weighted beta risk value for portfolio 4 is 0.39, which is approximately five times greater than portfolio 1. The weighted beta risk for portfolios 2 and 3 are 0.15 and 0.20, respectively. We observe a lower weighted average beta risk for the most ESG compliant portfolios than non-ESG compliant portfolios. Our result is even more relevant if we introduce a beta risk component analysis.

The other explanatory factor for the Treynor Ratio difference is the correlation. The findings show that portfolio 2 correlates more with STOXX 600 than portfolios 1 and 3, with a weighted average correlation factor of 0.79. The respective weighted average correlation factor for portfolios 1 and 3 are 0.68 and 0.69. For portfolio 4, the factor is 0.78, which is a little lower than portfolio 2. The findings show that the most ESG integrated portfolio, portfolio 1, presents a lower level of weighted average correlation factor than portfolio 4. Moreover, the weighted total risk for all portfolios is also monotonically increasing from 0.11 in portfolio 1 to 0.50 in portfolio 4. Table 7.3 shows these findings.

Table 7.3: Treynor Ratio performance results

Portfolio	1	2	3	4
Weighted Average Beta Risk	0.08	0.15	0.20	0.39
Weighted Average Correlation	0.68	0.79	0.69	0.78
Weighted Average Total Risk Ratio	0.11	0.19	0.29	0.50
Treynor Ratio	1.38	0.61	0.50	0.32

Note: This table shows the data result of the empirical computations within each portfolio in regard to Treynor Ratio.

The multiple linear regressions models are secondly performed on all four subsamples to assess whether the percentage ESG score positively and significantly impacts the Treynor Ratio of the 86 private equity funds. In this regard, Table 7.4 shows that a 1% increase in the ESG score level generates a positive but insignificant 0,21% growth of the Treynor. Moreover, the control variables do not significantly impact Treynor Ratio levels. As a general statement, H2 is not confirmed with ESG compliant portfolio that shows a better risk-return combination in the fully diversified portfolio with a positive coefficient. Regarding H3, the econometric analysis could not confirm a significant relationship between Treynor Ratio and ESG score, even if the coefficients in the regression models were consistently positive.

$$TR_i = \beta_0 + \beta_1 ESGScore_i + \beta_2 Geo_i + \beta_3 Risk_i + \beta_4 D_1 + \mu_i \quad (7.2)$$

Table 7.4: Multiple regression results with Treynor Ratio as the dependent variable

	Estimate	SE	tStat	pValue
(Intercept)	0.34444	0.2661	1.2944	0.1992
ESG Score	0.20895	0.77327	0.27022	0.78768
Geo	-0.17611	0.2206	-0.79834	0.42701
Risk	-0.16922	0.11538	-1.4665	0.14637
SizeDummy	-0.25474	0.17489	-1.4566	0.1491

Number of observations: 86, Error degrees of freedom: 81 Root Mean Squared Error: 0.731
R-squared: 0.0702, Adjusted R-squared: 0.0243 F-statistic vs. constant model: 1.53, p-value:
0.202

7.3 Discussion of results

The first step of the analysis aims to comprehend if different levels of ESG integration in European private equity buyout funds generate significantly higher Sharpe Ratios. The evidence suggests that H1 is confirmed. Moreover, the first multiple linear regression model determines that an increasing level in ESG score generates a significantly higher Sharpe Ratio on average. The findings offer a positive finding in favor of H3. No other independent variable in the regression analysis shows significance. Hence, all independent variables show an insignificant negative impact. We observe the following insignificant impact:

- The geographical location dummy shows a negative impact on the Sharpe Ratio. This result might indicate that Nordic Geo-focused PE funds are less developed than European funds.
- The size dummy variable negatively impacts the Sharpe Ratio. The result might indicate that smaller private equity funds have higher performance than medium-large PE funds on average.
- The risk dummy shows a negative impact and might indicate that funds with less risk generate a higher Sharpe Ratio.

The results are insignificant and need to be investigated in more depth.

Moreover, the second step of the analysis focused on understanding the impact of the level of ESG integration on the Treynor Ratio. The regression analysis indicates that the ESG score in European private equity buyout funds shows that a 1% increase in ESG score generates a positive 0,21% growth of the Treynor ratio. The results are insignificant, and non of the independent variables are significant. The matter must be investigated further to draw any conclusion. On the other hand, the results might indicate that ESG integrated PE funds present a lower risk by the average beta risk values. We can not argue that H2 is confirmed, with superior relative performance for the ESG compliant funds compared to non-ESG compliant funds. The regression models showed that the ESG score had a positive but insignificant beta coefficient with the Treynor Ratio. Therefore, H3 nevertheless needs to be investigated more in-depth.

8 Limitations and further research

In this section, we comment on the limitations of our thesis and bring recommendations to further research on the topic of ESG integration in the private equity industry. We introduce the limitations of the ESG and the corporate performance aspect.

8.1 Limitations

The main challenge of ESG implementation in the private equity ecosystem is the lack of a clear definition of what qualifies as an ESG strategy and sustainable investing. Measuring ESG integration brings difficulties when measuring the level of ESG empirically, especially over a period. A notable limitation of this thesis is the extraction and validity of ESG data. Research on private equity is scarce, and the research conducted combining ESG and CFP is virtually absent in empirical research. Researching the private equity ecosystem is challenging, especially considering the tradition of nondisclosure and transparency. However, with more reporting requirements in the industry, we firmly believe that this research field is developing moving forward. This thesis mainly uses ESG information provided by Preqin, and the scarcity of other sources/databases might question the validity of ESG information provided.

ESG data from Preqin are collected from The Sustainability Accounting Standards Board (SASB), The United Nations Principles for Responsible Investing (UNPRI), Institutional Limited Partnership Association (ILPA), and public market ESG rating. The data analysis approach differs across ESG rating agencies. This thesis has collected information from several agencies to get the most credible ratings. The data collection type can vary, and the focus can be on different data types. MSCI uses computer-driven models and analysis-based approaches, whereas Sustainalytics uses only analysis-based evaluations. This means that ESG data on different funds in the portfolio in this thesis has received an ESG score from different rating companies. Comparing the funds with their respective ESG scores might deliver incomparable results when reviewing the ESG component.

Implementing ESG initiatives as an investment strategy has sound benefits affecting a company's financial performance. Many European countries offer tax incentives for environmentally-friendly investments and activities, such as accelerated depreciation

or tax credits, R&D credits, or specific investment allowances (FDI-Intelligence, 2009). Such incentive schemes allow target companies to receive such subsidies and outperform companies without such a scheme. Especially with green bonds, the development of subsidies has resulted in lower interest rates. This thesis does not account for such benefits and is considered a limitation in assessing ESG's effect on CFP.

The positive trend in ESG integration in the European financial market has led to the discussion about green-washing. Exploring numerous private equity sources forms an image of sustainability being a long-term priority. However, according to Alfonso-Ercan, ESG funds make up only a single-digit percentage of overall assets under management (Alfonso-Ercan, 2020). We consider that green-washing may constitute a limitation in our thesis, as investment managers report ESG data to ESG rating agencies. Prequin retrieves this information and gives a score based on the information. In the wake of this, the European Union introduced its Sustainable Finance Disclosure Regulation, which required that asset management companies report information on investment and ESG risks (Morningstar, n.d.). In 2021 Bloomberg Green published an article about asset managements dropping ubiquitous ESG labels from their company filings due to the latest EU anti-greenwash rulebook of SFDR (Arons & Schwartzkopff, 2021). These new regulations will make research on ESG in the Private Equity industry more reliable in the future.

Reliable ESG data and score within the period is challenging to measure. A firm might change its strategy or its level of ESG integration. In the thesis, we countered the limitation by implementing weighted scores for when GPs signed UN PRI to capture a correct ESG score better.

Measuring private equity performance poses difficulties as there is no market price. Fund managers, GPs, and investment mandates can massively influence the fund's performance. Moreover, how skilled management sells businesses, finds buyers willing to pay reasonable prices, exits prospects or launches successful IPOs influences performance measures. When we assess each fund's quarterly performance, the assessment does not assess whether the management has the right qualities to operate the company in a position for increased growth. The performance assessment does not directly evaluate how good GPs are at transforming the target company in a buyout strategy. The funds' performance is based

on portfolio companies. Therefore, it may not accurately reflect actual performance as financial statements might be unavailable or exclusively reported by the fund.

The exit of target companies in a fund during the period may give misleading net IRRs. If a fund sells three to four companies in the period, one can observe very high IRR values in that period. This is why it is challenging to assess quarterly IRR for PE companies since investments are realized in the period in which the sale occurs, compared to stock market data that reflects the company's price at any time. Results might influence the standard deviation of net IRRs or absolute overall performance. The IRR assumes that cash flows are reinvested at the same rate of return. This can lead to the over- or understatement of the performance of a given investment where the returns on reinvestment do not match those produced by the investment and should be accounted for when comparing IRRs (BVCA, 2015).

The IRR is not an effective way of assessing mutually exclusive projects, as it does not consider the projects' scale – this can be difficult when two projects require a significantly different amount of capital (BVCA, 2015). In the thesis, we try to counter the limitation by using weighted returns based on fund size. In order to compare the IRR to a time-weighted return, historically IRRs over a given time horizon are often used. Caution should be used, however, as when a given point in time (and therefore an attendant valuation) is taken as a start date, this can give a misleading perspective on a fund's performance (BVCA, 2015). Historically net IRRs used in computing the standard deviation over the period are measured from the vintage year and might not accurately reflect the firm's actual standard deviation and return.

Multiple of invested capital (MOIC) and public market equivalent (PME) are other performance measures that can be used to measure performance more accurately. In the thesis, we primarily base performance calculations on net IRR.

Another limitation of this thesis is related to various investment strategies. Although all funds evaluated are buyout funds, each fund can have different investment and ESG integration strategies. This affects the data set because all funds assessed do not have the same basis for comparing ESG's impact on CFP. Furthermore, Unrealized Value in 31.12.2015 and 31.12.2020 can be misleading as the funds report values themselves. As companies report it, it is challenging to validate accurate unrealized values. Unrealized

values could be higher or lower compared to actual values. Since there are no market-based data and market prices, the actual value is challenging to measure.

8.2 Further research

The aspect of ESG is becoming an increasingly important part of the financial ecosystem. Especially after the SFDR launch, more players are becoming more aware of ESG guidelines and reporting obligations. This master's thesis helps strengthen the theory that sustainable investing positively affects financial performance. Further research on financial performance in the private equity industry can also focus on which strategy provides the best returns. Today 6 ESG strategies exist, and we recommend new research on this topic. This is justified by the fact that today, there is an evident lack of definition of what qualifies as an ESG strategy and the definition of what is sustainable. The SFDR regulation, which was implemented in March 2021, may significantly impact actual ESG reporting in the future. This reporting excludes the fact that there may be companies that underpin green-washing, affecting the research data set.

Furthermore, future research should use a similar rating approach used by one agency to reflect ESG values and integration more accurately. Using ESG data from Prequin, one must assess the validity of the rating given by the specific rating company. When working with a dataset that contains ESG values given by different companies, one can not specifically assess each company's ESG rating against the other. We would therefore recommend using only one ESG rating provider in future research if it eventually becomes possible to find ESG data for a large enough sample from rating companies.

We further recommend that future research investigates net IRR values, not containing target companies' exits in the chosen period of analysis which will reflect more volatile IRR values. In order to be able to compare IRRs to different funds within a given period, funds that have sold to many target companies during the period must be excluded.

9 Conclusion

Academic studies investigating the relationship between ESG integration and financial performance have increased extensively since the early 1990s. However, a vast research gap was found in the literature. Specifically, the existing research focuses on exploring private equity managers' main drivers and obstacles to adopting ESG considerations (Zara, 2019). Based on the current research gap, this paper contributes new knowledge by conducting an empirical analysis to understand the impact of ESG integration methods on European private equity buyout funds' risk-adjusted performance. Specifically, we use a new method for classifying ESG-compliant funds vs. non-ESG-compliant funds using an aggregate ESG score based on three distinct ESG variables.

When introducing four diversified portfolios based on ESG integration, the data analysis indicates that ESG integrated funds generate a higher Sharpe Ratio than non-ESG integrated portfolios. The results can be explained by the lower standard deviation of the quarterly net PIRR. The overall absolute return is lower in the compliant portfolios compared to the non-compliant ones and might indicate that non-ESG integrated funds generate higher absolute returns.

In the regression analysis, it is possible to argue that ESG integrated private equity funds perform better in Sharpe Ratio than non-ESG funds (H1). Moreover, the Treynor Ratio data analysis shows higher risk-adjusted performance in ESG integrated portfolios (H2), whereas the results are insignificant. We might argue that ESG-compliant funds have a lower beta risk, which shows that their systematic risk is considerably lower.

Regression analysis showed that ESG integration generates positive but insignificant results on funds' risk-adjusted performance (H3). Consequently, these results can be considered a general direction for long-term investors who are more interested in the capital allocation line than the security market line.

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Appendix

A1 Risk-free rate

Figure A1.1: Risk free rate - 10-year ECB Treasury Yield



Note: The risk-free rate used in the empirical analysis is extracted from the Bloomberg's terminal.

The risk free rate is 0,10%.

A2 Net IRR Computations

Table A2.1: Example of a funds net IRR calculation

Transaction type	Date	Cash flow
Unrealized Fair Value	31.12.2015	-6,139,308.80
Distribution	14.02.2015	2,449,40.66
Capital Call	15.05.2016	-54,998.44
Distribution	15.05.2016	7,991,95.73
Capital Call	15.11.2016	-148,965.62
Distribution	15.11.2016	1,131,599.36
Distribution	14.02.2017	165,845.84
Distribution	15.05.2017	192,113.72
Capital Call	15.11.2018	-82,432.94
Distribution	15.11.2018	564,813.37
Capital Call	31.03.2019	-22,953.86
Distribution	31.03.2019	1,944,042.00
Distribution	15.08.2019	40,740.84
Distribution	15.11.2019	995,901.66
Capital Call	15.05.2020	-166,109.89
Distribution	15.05.2020	0.04
Unrealized Fair Value	31.12.2020	1,829,391.46
	Net IRR	7.01%

Note: The net IRR uses the present sum of cash contributed, the sum of distributions, and the current value of unrealized investment, and applies discount. The value is the net of any carry/performance fees earned by the GP.