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A Comparative Analysis of Financial Returns in Impact Funds and Traditional Funds

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Abstract

This study investigates the effect of impact investing on the financial performance of VC & PE funds. A comprehensive analysis is conducted on a global sample comprising 5,439 VC & PE funds spanning the period from 1990 to 2019. The results indicate that the underperformance of impact funds compared to traditional funds cannot be found for the full sample, but is contingent upon two factors: the vintage year of the funds (post-crisis) and their size (less than or equal to $250 million). Additionally, the study explores the influence of critical factors, namely fund strategy, sector focus, and geographic focus, on the financial performance of impact funds. Notably, impact funds employing VC strategies exhibit significant outperformance, as do those with a specific sector focus and a focus on developing economies. These findings contribute valuable insights to understanding the financial outcomes of impact investing and provide practical implications for impact investors, fund managers, and policymakers seeking to optimize their investment strategies.

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1 Introduction

The field of impact investing has experienced remarkable growth in recent years, with the total assets under management (AUM) surpassing $1.16 trillion in 2022, compared to $502 billion and $715 billion in 2019 and 2020, respectively (Hand et al., 2022). Impact investing has emerged as a powerful approach to aligning financial objectives with societal and environmental goals, attracting a diverse range of investors seeking both financial and impact outcomes. Private equity has emerged as the most prevalent asset class within the impact investing market, with approximately 76% of market-rate-seeking investors allocating a significant portion of their investments to PE, accounting for 28% of the total impact AUM.

BNP Paribas has identified PE as an optimal domain for implementing impact investing strategies, driven by compelling justifications (Haumesser et al., 2022). Firstly, PE investors wield significant influence over their target companies' strategic direction and operational aspects, surpassing shareholders' capabilities in publicly traded firms. This enhanced leverage empowers investors to shape and guide company activities with greater efficacy and purpose. Secondly, PE investors possess essential resources, including essential information, managerial tools, and data, which equip them to steer companies toward specific trajectories. This knowledge and toolkit bolster their capacity to establish meaningful change aligned with impact objectives. Lastly, the investment horizon inherent in PE, typically spanning from 4 to 6 years, provides a reasonable time frame for investors to catalyze substantial and enduring transformation within target companies. This extended timeline allows for the cultivation of sustainable impact practices and the realization of long-term strategic goals. The alignment of impact investing strategies with the inherent characteristics of PE highlights the immense potential for driving purposeful and transformative outcomes in the investment landscape.

The financial performance of impact funds has been a subject of ongoing debate and scholarly inquiry, revealing a lack of consensus among existing research studies. On one hand, certain investigations suggest that these funds fall short in comparison to traditional funds (Barber et al., 2021), highlighting concerns over the ability to deliver competitive returns. Conversely, alternative viewpoints argue that impact funds have reached a stage where their performance is on par with, or even surpasses, that of traditional funds (Hagenmuller et al., 2022). The contrasting findings and perspectives present an intriguing landscape for researchers and investors alike, increasing the need for further exploration into the financial outcomes of impact investing. Given the increasing prominence of impact investing and its strong alignment with PE, it is imperative to delve deeper into the financial performance of impact funds compared to traditional funds. This investigation aims to address the lingering question:

"Does being an impact fund negatively influence the financial performance compared to traditional funds?"

In this research, a comprehensive analysis is conducted on a sample of 5,439 funds spanning vintage years from 1990 to 2019, providing valuable insights into the ever-evolving landscape of investment. The dataset, retrieved from Preqin, encompasses various fund characteristics, shedding light on the fund's status, type, and size. Moreover, crucial information regarding fund strategy, geographic focus, and sector focus is carefully included, providing a holistic understanding of the diverse investment approaches

adopted by PE and VC funds. Within this dataset, performance metrics such as the Net IRR and Net Multiple are captured, offering an in-depth evaluation of fund performance. Additionally, average benchmarks for these metrics serve as a valuable point of reference. To identify impact funds amidst the multitude of funds in the Preqin database, thorough impact identification procedures are employed, leveraging globally available resources on impact funds and their managers.

The research methodology employed in this study utilizes multiple linear regression to investigate the impact of being an impact fund on financial performance while controlling for various factors. Additionally, the regression model incorporates control variables related to fund characteristics, fixed effects of fund strategy, sector focus, and geographic focus, as well as fixed effects of vintage year to account for time-specific factors. To also test the effectiveness of each influencing factor on the financial performance of impact funds specifically, interaction terms are introduced to isolate the effects of sector focus and geographic focus. The study also includes separate terms and interaction terms between the impact variable and variables related to fund strategy, specific sector focus, and focus on developing economies.

After the assessment of the full set of funds, I do not find conclusive evidence to support the notion that impact funds underperform traditional funds. Initially, the regression analysis which only controlled for fund characteristics such as fund type, status, and size showed a significant underperformance of impact funds in terms of Net IRR compared to traditional funds. However, when vintage-year fixed effects and fund-specific effects were incorporated into the regression models to control for the overall market environment, the significance of this underperformance disappeared. Similarly, for the Net Multiple analysis, none of the regression models exhibited a statistically significant effect of being an impact fund on financial performance.

The findings of this study also demonstrate the significance of various factors in influencing the financial performance of impact funds. Specifically, the results consistently reveal a positive and significant effect of the interaction term between being an impact fund and employing venture capital (VC) strategies. This combined effect indicates that impact funds utilizing VC strategies exhibit higher financial performance compared to funds employing private equity (PE) strategies. Similarly, the interaction term between being an impact fund and having a specific sector focus consistently displays a positive and significant effect. Furthermore, the overall effect suggests that impact funds with a specific sector focus outperform those with a diversified sector focus. Additionally, the combination of a consistently positive and significant effect of the interaction term between being an impact fund and having a geographic focus on developing economies, alongside the consistently positive overall effect on financial performance, indicates that impact funds with a geographic focus on developing economies outperform those with a focus on emerging markets.

Robustness tests were conducted to assess the validity and stability of the main findings for the hypotheses. The first test involved splitting the sample based on the vintage year of the funds, specifically between 1990-2007 and 2008-2019, to account for the influence of the global financial crisis. The second test involved splitting the sample based on the size of the funds, distinguishing between funds smaller or equal to \$250 million and funds larger than \$250 million. The results indicated a significant underperformance of impact funds compared to traditional funds after the financial crisis, particularly for funds

smaller than or equal to $250 million. This finding contradicted the previous results for the main research question and suggests that the crisis and subsequent economic downturn may have negatively affected impact funds' performance during that period. However, for the findings of the influence of factors influencing the financial performance of impact funds, the results remained consistent, demonstrating a positive outperformance of impact funds for each influencing factor. Notably, the outperformance for funds with a geographic focus on developing economies was more pronounced for impact funds with a vintage year before the financial crisis and funds smaller than or equal to $250 million. This could potentially be due to the higher turbulence and instability leading up to the crisis impacting emerging markets more than developing economies.

This study makes significant contributions to the existing literature on the impact investing market. While important papers, such as the one by Barber et al. (2021), have examined the performance of impact funds compared to traditional funds and found an underperformance of impact funds, their findings have not been subjected to robustness tests based on critical factors such as vintage year and fund size. In this research, I extend the existing literature by conducting additional analyses to investigate the consistency of the findings while controlling for economic downturns and different fund sizes as these could be critical in driving the results. This study enhances the reliability and validity of the comparisons of financial performance between impact funds and traditional funds, addressing potential confounding factors and providing a more comprehensive understanding of the impact investing landscape.

Furthermore, numerous scholars have made concerted efforts to evaluate the efficacy of influencing factors on financial performance. However, the majority of prior research has primarily concentrated on optimizing strategies for traditional funds. For instance, I synthesize the findings from studies conducted on traditional funds, such as the discovery by Lossen (2007) that funds employing specialized sector strategies tend to achieve superior financial performance. Expanding this inquiry to impact investing, I facilitate the exploration of the most effective strategies, sector focal points, and geographic focuses for impact investors. In doing so, my contribution to the existing literature sheds light on how impact funds can enhance their financial performance by drawing upon the insights garnered from the analysis of traditional funds.

Chapter two delves into a comprehensive exploration of impact investing within the VC and PE landscape, clarifying the essential dynamics that shape the impact investing ecosystem and examining impact measurement methods. In chapter three, attention is given to the data selection process, including explaining sample selection criteria and methods employed for impact identification, variable construction, and descriptive statistics. Chapter four explains the methodology employed for analyzing the financial performance of impact funds compared to traditional funds. In chapter five, the results derived from the analysis are presented, analyzed, and critically evaluated to assess and validate previously formulated hypotheses. Chapter six discusses limitations inherent in the research methodology, provides insights into potential biases and constraints, and proposes avenues for further research to contribute to knowledge advancement in impact investing. Finally, chapter seven consists of a comprehensive conclusion summarizing key findings and their implications for the impact investing market.

2 Literature Review

2.1 Impact Investing

Impact investing is a fast-growing field that has gained significant attention among investors in the past few years. This attention gathering began in 2010, after the release of a report by J.P. Morgan, in which the immense growth potential was highlighted. This research positioned impact investing as an emerging asset class and projected global capital inflows ranging from $400 billion to nearly $ 1 trillion in the next ten years. Additionally, the impact investing market could generate potential profits ranging from $ 183 billion to$ 667 billion over the subsequent decade (Wheelan, 2010). Although impact investing rose to prominence during this period, it is important to acknowledge that investments that combine social objectives with financial returns had been present in earlier decades. The roots of what is now known as "impact investing" can be traced back to the 1980s and 1990s, during which the precursors to today's impact investors began to emerge significantly. Noteworthy examples are the Triodos Bank, which started with a focus on sustainable investments supporting initiatives in sectors such as renewable energy and cultural projects in 1980. Additionally, the Calvert Foundation began with the use of community investment notes to finance community development projects in 1988. To give a more thorough understanding of impact investing, the definition and evolution, key features, and decision-making dynamics will be discussed.

2.1.1 Definition and Evolution

In response to the realization that government aid and charitable donations alone were insufficient to address global social problems, innovative approaches were explored by social entrepreneurs. Key innovations such as microfinance, community development finance, rural development, and patient capital, paved the way for social investments as a viable and scalable alternative to traditional philanthropy. The concept of impact investing could be perceived as the evolution of a previously fragmented landscape of investments, converging into a more unified class characterized by an increased emphasis on impact assessment (Reeder & Colantonio, 2013). This convergence results from the independent development of innovative approaches across diverse sectors and regions, eventually forming a new global industry. Within this evolving landscape, the term "Impact Investing" emerged to encompass a diverse range of investment activities that shared a common focus on generating positive social and environmental outcomes. This introduction of this term can be traced back to the Rockefeller Foundation's Impact Investing Initiative in 2007 (Höchstädter & Scheck, 2015).

With the introduction of the term "Impact Investing", industry experts adopted a broad perspective, often referred to as the "big tent approach". This approach aimed to create a shared language and attract capital from various investors, including, foundations, pension funds, and family offices, all driven by the belief that financial returns and positive social and environmental impact can coexist (Goldman & Booker, 2015). The success of this approach is evident in the remarkable growth of the sector. Between 1995 and 2014, the AUM in socially responsible investing (SRI) exhibited a robust compound annual growth rate (CAGR) of 13.1% (Burton et al., 2020).

Impact investing is generally described as an investment approach that combines financial and non-financial returns, with the latter often referred to as social and/or environmental. The overarching goal of impact investing is to achieve both financial and social/environmental returns, which is commonly referred to as dual or bottom line mandate (Tekula & Andersen, 2019). This mandate appeals to individuals and institutions seeking market-based solutions to address societal and environmental challenges (Burton et al., 2020). Furthermore, impact investing can be seen not only as an investment approach but also as an industry (Bouri, Amit and Mudaliar, Abhilash and Schiff, Hannah and Bass, Rachel and Dithrich, Hannah, 2018). It envisions a world where social and environmental considerations are integrated into investment decisions and act as a catalyst for directing capital towards solutions for critical social and environmental issues (Cambridge Associates, 2013).

In addition to the dual bottom line mandate, which emphasized the integration of financial and non-financial returns, impact investing distinguished itself through its focus on *intentionality* and *measurability* (Bass, Dithrich, Sunderji, Nova, & Network, 2020). Intentionality ensures that the generation of positive and social impact in impact investing is not accidental but deliberate, while measurability underscores the importance of quantifying both the financial returns and social impact achieved. Important to note is that the measurement of impact is a new field without widely accepted standards. Therefore a detailed explanation will be given in section 2.2. By incorporating these aspects, impact investing aligns with the overarching goal of achieving financial and social/environmental returns. Its core lies in the pursuit of enhancing local communities through economically viable ventures that deliver social and environmental benefits, distinguishing it from traditional philanthropy. Impact investing embodies the principles of "Blended Value Proposition", an emerging framework coined by Jed Emerson. This proposition recognizes that organizations, regardless of their profit orientation, create value encompassing economic, social, and environmental components. It further emphasizes that investors, regardless of their priorities, have the potential to generate all three forms of value by providing capital to these organizations. Understanding blended value is essential for comprehending the implications of impact investing for capital providers and recipients (Emerson, 2010).

2.1.2 Sustainable Investing Umbrella

In academic discourse, when exploring sustainable investment strategies, it is common to encounter the interchangeable use of the terms socially responsible investing (SRI), environmental, social, and governance (ESG) investing, and impact investing. Although these terms can be categorized broadly as sustainable investment approaches, each term possesses a distinct definition and employs a distinctive methodology to address intricate investment complexities.

ESG investing integrates an environmental, social, and governance component into investment practices while pursuing competitive financial returns. ESG integration refers to the explicit inclusion of ESG opportunities and risks into traditional financial analysis and investment decisions (Eurosif, 2014). It involves a systematic process and utilizes appropriate research sources. ESG investing endeavors to identify and exclude companies that exhibit irresponsible behavior, typically employing a system of scoring or rating. Investments may undergo a "traffic-light" assessment or be assigned a comprehensive aggregate

score that must surpass a specified threshold for inclusion in the investment fund. While impact investing is a subset of ESG investing, ESG investing involves the allocation of funds to companies that adhere to environmental, social, and governance standards based on ethical considerations. On the contrary, impact investing pertains to the allocation of funds towards businesses that proactively drive social or environmental change to generate measurable impact (Grim & Berkowitz, 2020).

The remaining practice, Socially Responsible Investing (SRI), considers environmental, social, and governance criteria. While SRI is related to impact investing, it is distinct and considered an umbrella term (Höchstädter & Scheck, 2014). SRI integrates ethical, social, environmental, and governance concerns into the investment process and engages in local communities and shareholder activism (Sandberg et al., 2009). It has grown from a niche to a mainstream market, influencing corporate social responsibility practices (Revelli, 2015). In contrast, impact investing is active in creating social or environmental impact and measures its outcomes. It entails a range of financial returns and targets small enterprises through direct investments (Höchstädter & Scheck, 2014). SRI, on the contrary, focuses on screens for asset selection and operates as a "do not harm" strategy, without the same emphasis on impact measurement (Revelli, 2015). The distinction between impact investing and SRI extends to the nature and size of investments, with SRI predominantly involving publicly traded securities and impact investing often involving direct investments (Saltuk et al., 2013). SRI has experienced a shift towards a primary focus on financial impact, prompting calls to reintegrate ethics into its core (Revelli, 2015). Considering the development of the SRI market can therefore provide valuable insights into the growth and direction of the impact investing market.

2.1.3 Investment Features and Market Landscape

The impact investing market is undergoing a shift from a niche sector to a mainstream investment approach, as evidenced by the involvement of established financial institutions in this emerging asset class such as Morgan Stanley, Deutsche Bank, Citi, BNP Paribas, BlackRock, and Goldman Sachs (Godsall & Sanghvi, 2022). For instance, Deutsche Bank, a prominent global financial institution, has established an impact investment platform called "DB Impact", which aims to provide clients with access to impact investment opportunities across different regions and sectors. Similarly, Morgan Stanley, a renowned financial services firm, offers a range of impact investing options through their initiative 'Investing with Impact'. This involves sustainable investing portfolios, social impact funds, and customized solutions for clients interested in aligning their investments with their values.

Despite the novel efforts, the ecosystem is still in its early stage, fragmented and largely comprised of niche players (Drexler & Noble, 2013). While a comprehensive understanding of the impact investment ecosystem is typically achieved by examining it at the country and sector levels, the Mainstreaming Impact Investing initiative conducted a global analysis of the ecosystem to identify common gaps and challenges. Figure 2, in line with the impact investing ecosystem provided by the World Economic Forum, depicts an overview of the key participants in the impact investing industry, including capital providers, financial vehicles such as Community Development Financial Institutions (CDFIs) and funds, as well as investment targets.

Figure (2)   The Impact Investing Ecosystem.
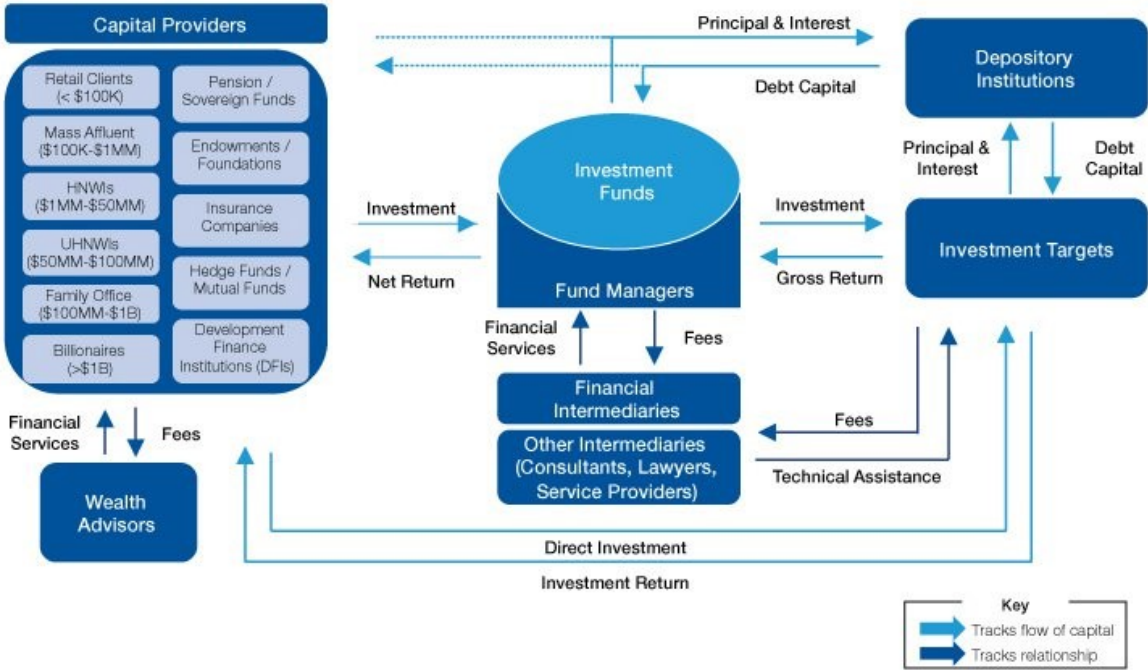
Capital providers - The driving force behind the impact investment sector lies in the activities of fund providers. Impact investments can be made directly into impact enterprises or channeled through impact investing funds. Among the most active capital providers in impact investment are family offices, insurers, pension funds, and high-net-worth individuals (HNWIs). An illustrative example is the Omidyar Network, established by the founder of eBay, Pierre Omidyar. This network is a philanthropic investment firm that actively engages in impact investing. The network has already committed over $ 1.5 billion to nonprofit organizations and for-profit companies across multiple investment areas, according to their website.[1]

Investment funds - Impact investing funds serve as the primary avenue for mainstream investors to engage in impact business. These funds can vary in terms of geographic scope, sector focus, investment type (debt or equity), return expectations, and institutional affiliations, such as development institutions. For instance, Bamboo Capital Partners (BCP) is an impact investment firm specializing in small-cap growth equity investments in the energy, finance, and healthcare sectors without being affiliated with larger institutions.

Investment targets - Impact enterprises operate across various sectors and pursue diverse objectives. The organizations contributing to GIIN's IRIS initiative represent various sectors and cater to economically disadvantaged individuals, such as those at the base of the economic pyramid, as well as individuals aspiring to reach the middle class. These impact enterprises may adopt different business models, either for-profit or not-for-profit, and align themselves with social enterprises or traditional businesses with a social mission. They all share a common focus on pursuing social or environmental objectives and pri-

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[1]https://omidyar.com/

oritize thorough measurement and reporting of their progress towards these objectives. In some cases, the social or environmental mission is integral to the business model, while in others, it is intentionally integrated into the operations of the enterprise. Regardless of the approach, these enterprises are driven by the desire to generate both economic and social or environmental impact (Drexler & Noble, 2013).

Intermediaries - Effective intermediaries play a vital role in the ecosystem by facilitating various aspects of the investment process. They contribute to creating liquidity, minimizing transaction and information costs, reducing risk, and enabling efficient payment mechanisms. In mainstream finance, financial intermediaries, such as advisors, investment banks, brokers, and exchanges, traditionally act as intermediaries in transactions. Similarly, in the impact investment market, intermediaries are instrumental in developing products, vehicles, and investment structures that align with the requirements of mainstream investors (Drexler & Noble, 2013). However, the current landscape of intermediaries in the market is predominantly composed of small and specialized entities. While some investment banks, like Morgan Stanley's Global Sustainable Finance Group, and Goldman Sachs' Urban Investment Group, entered the impact investing space, only a few banks incorporate impact investment transactions within their existing commercial banking operations(Drexler & Noble, 2013).

Wealth advisors - Wealth advisors play a crucial role in providing high-net-worth individuals and family offices with valuable information regarding investment strategies, products, and portfolio structures. They leverage investment platforms to offer comprehensive guidance to their clients (Drexler & Noble, 2013). For instance, Morgan Stanley introduced its investing with Impact platform in 2012, granting access to a range of investment vehicles that have been thoroughly evaluated in terms of their financial return potential and social impact.[2]

Depository institutions - Depository institutions are important in providing debt capital to impact enterprises. While they operate similarly to other banks by accepting retail deposits and administering loans, their focus is primarily on lending to impact enterprises, and the loan sizes are typically smaller compared to traditional commercial loans (Drexler & Noble, 2013). To illustrate, the Beneficial State Bank, a US-based community development bank, committed $ 789 million in mission loans in December 2021. These mission loans support diverse and distributed ownership and provide mission-driven core products and services. The mission's focus areas include among others affordable housing and environmental sustainability (Taylor et al., 2022).

2.1.4   Market size and Features

The Global Impact Investing Network (GIIN) estimates that the global impact investing market, with over 3,349 organizations, has reached a notable milestone with assets under management (AUM) totaling $ 1.164 trillion (Hand et al., 2022). This achievement is particularly significant considering the industry's ongoing development and increasing complexity. Despite the challenges posed by the COVID-19 pandemic, impact investing strategies continue to obtain momentum, as evidenced by the growth of AUM among impact investors and the entry of new participants in the sector.

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[2]https://www.morganstanley.com/content/dam/msdotcom/articles/investing-with-impact/our-holistic-approach-to-investing-with-impact.pdf

As the world approaches the 2030 target for achieving the Sustainable Development Goals (SDGs), there has been a remarkable commitment from asset managers and owners to bridge the $ 4.2 trillion funding gap required for SDG attainment. Understanding the capital allocated to impact investing strategies is crucial in this phase of action. Accurate market sizing provides valuable insights for impact investors, traditional investors, researchers, and other stakeholders to assess the evolving impact investing market. Recent attention to the climate crisis and sustainability reporting standards has underscored the importance of integrating impact investing strategies into the investment process. Recently, the GIIN published a market sizing report for 2022 in which they analyzed data across a subset of 1,289 organizations. The average impact assets under management (AUM) in investment portfolios was $ 485 million, with a median of $ 62.5 million. However, 34 outlier organizations, managing a total of $ 343 billion in impact AUM, significantly influenced these figures. Excluding these outliers, the average AUM decreased to USD 224.7 million, indicating that the average organization's allocation to impact investing remains relatively small. This may be attributed to the presence of new entrants with smaller funds and the practice of "carve out" tactics by some institutional asset owners. The majority of organizations reporting their headquarters location are based in developed markets, predominantly the U.S. and Canada (50%) and Western, Northern, and Southern Europe (31%), as indicated in the provided data. On the other hand, organizations in emerging markets are primarily located in sub-Saharan Africa (6%), Latin America and the Caribbean (3%), and Southeast Asia (2%). Although there is representation from both developed and emerging markets, the concentration of impact assets under management (AUM) is significantly higher in developed markets, accounting for 92% of the total, while emerging markets contribute only 8% of the impact AUM.

2.2 Impact Measurement and Reporting

2.2.1 Impact Measurement

With the increasing popularity of impact investing, an expanding number of companies and funds are labeling themselves as "impact-driven" without genuinely addressing societal challenges or providing substantial evidence of the additional value of their investments through rigorous risk-return-impact evaluations (Yee et al., 2021). The practice of using the term "impact-washing" to gain public recognition without meaningful impact is prevalent. While some investors may consider impact-washing a necessary compromise, it is suggested that the current impact measurement and management (IMM) systems are inadequate for fostering effective and accountable impact investing practices (Yee et al., 2021).

IMM has experienced significant advancements in recent years due to the increasing popularity of impact investing and the need for more rigorous sustainability reporting. As impact investing moves towards mainstream adoption, even large asset managers and pension funds are expanding their teams to incorporate specialists to navigate the complexities of IMM (Lewis, 2023). Measuring impact is relatively straightforward when focused on goals with quantifiable outcomes, such as carbon emissions reductions. However, challenges arise when dealing with multiple variables or difficult-to-quantify social impacts like well-being or biodiversity improvements. Moreover, measuring impact across the entire value chain,

such as tracking carbon emissions in a global supply chain, adds further complexity, Additionally, the use of different metrics by companies to measure similar impact hampers comparability for investors. Impact measurement is a fundamental aspect of impact investing, distinguishing it from previous socially responsible investment approaches that aimed to do good without quantifying or measuring the impact achieved (Hervieux & Voltan, 2019). There are two primary reasons for emphasizing impact measurement in impact investing.

Improved performance - Constant monitoring of impact allows organizations to identify areas for intervention and improve their performance over time. By understanding where and how to intervene, organizations can enhance their impact and strive for greater outcomes.

Ensuring accountability - It established accountability by measuring the impact achieved per dollar invested, holding social enterprises responsible for their performance. This trend is driven by funders who want to assess whether their financial resources are truly making a meaningful impact or if they should be allocated elsewhere.

Due to the rapid development of impact investing as an investment class, there is a growing disparity between existing impact measurement methodologies and the evaluation needs expressed by impact investors (Hand et al., 2021). This gap, acknowledged by the market, poses a significant challenge that must be addressed to ensure the continued expansion of impact investing into mainstream markets. It is important to note that the progress in impact measurement is not attributed to the impact investing sector itself, but rather to the prevailing incentive structure that was dominant before the emergence of impact investing (Höglund & Mellblom, 2019). Non-financial impact measurement has a long-standing history in the public sector, where routine monitoring and evaluation have been carried out to secure funding from governmental and non-governmental entities. Similarly, NGOs and philanthropies have integrated monitoring and evaluation processes into their operational frameworks to fulfill their social objectives (Reisman & Olazabel, 2016). However, until recently, impact measurement, including outcome assessment, was not widely emphasized in the social sector, including non-profit organizations. Funding schemes predominantly focused on inputs, activities, and outputs rather than outcomes, creating a lack of economic incentives for social organizations to assess their impact and strive for improvement.

The incentive structure that existed before the paradigm shift brought about by impact investing hindered the establishment of a comprehensive framework centered around the fundamental concept of impact measurement. Consequently, the fragmented state of impact measurement can be attributed to the recent shift in focus from outputs to outcomes (Hervieux & Voltan, 2019). Therefore, the challenge of measuring social impact extends beyond the realm of impact investing and encompasses various social issues at large.

2.2.2 Reporting Standards and Disclosure

International bodies are collaborating with the impact investment market to develop IMM platforms that establish principles and standards for companies to follow. One significant initiative is the Operating Principles for Impact Management (OPIM), launched in 2019 under the International Finance

Corporation (IFC) and later transferred to the Global Impact Investing Network (GIIN) in 2022 (Corporation, 2019). Additionally, another collaborative effort is the Impact Management Platform (IMP), which involves various organizations such as the IFC, UN, Principles for Responsible Investment (PRI), B lab, and the GIIN. This platform provides standards, frameworks, tools, and guidance for effectively managing sustainability impacts. The GIIN's IRIS+ impact measurement accounting system has emerged as a prominent resource, attracting more than 30,000 users from financial institutions, companies, and consultants. Additionally, initiatives like BLab's BCorp program play a role by certifying companies that demonstrate strong social and environmental performance. Despite the existence of these initiatives, much reporting on impact measurement is primarily voluntary and lacks standardized methodologies. This leads to challenges in comparing impact across the impact investing market. The issue is even further complicated when fund managers disclose information about impact measurement, particularly regarding subjective criteria like social impact (Lewis, 2023). Descriptions such as "improving thousands of lives" fail to provide a comprehensive understanding of the actual impact on individuals or local economies.

2.3 Financial Performance of Impact Investing

2.3.1 Overview of Financial Performance

The primary objective of impact investing is to generate societal or environmental impact, even at the cost of sub-optimal market-rate returns, and in some cases, capital preservation or even loss. However, as the sector evolves, an increasing number of sources advocate that impact investing has the potential to achieve risk-adjusted financial returns on par with, or in some cases even superior to, market returns.

To illustrate, the Impact Investing Benchmark, a joint analysis by Cambridge Associates and GIIN, reveals that aggregate impact investment funds launched between 1998 and 2004, which have now reached full maturity, have significantly outperformed funds in a comparable universe of conventional funds (Matthews et al., 2015). A comparable outcome is supported by TONIIC, a global impact investing network, through its T100 report, a comprehensive analysis of the financial performance of its network members over several years. In the survey conducted for the report, 83% of the respondents expressed expectations of market-rate returns on their investments, and precisely 83% of the survey participants reported that these expectations were either met or exceeded. Numerous media outlets have embraced a prevailing narrative that promotes the notion of achieving both social impact and market-rate financial returns as the norm rather than the exception. This perspective challenges the long-held belief in a fundamental trade-off between impact and financial outcomes. However, this perspective has not been without its critics.

Oxfam, a prominent consortium of charities, has expressed concern about the tendency to label a wide range of investments in emerging markets as impact investing. They argue that this inclination, especially among institutional investors, dilutes the focus on intentional social impact in favor of prioritizing financial returns. This shift in focus could divert funds away from organizations that place a higher emphasis on social impacts (Bolis et al., 2017). Similarly, established organizations in the industry have

faced challenges in meeting mainstream investors' expectations. The Acumen Fund, a non-profit global venture fund dedicated to poverty alleviation, reported an average after-tax profit of 20% in its investment portfolio, despite adopting a highly selective approach and providing extensive support to investees (Koh et al., 2012). On the other hand, Root Capital, a non-profit social investment fund operating in impoverished rural areas, experienced instances where concessionary loans resulted in negative financial returns or yielded positive returns blow market standards (McCreless, 2017). A more recent study by Barber et al. (2021) found that impact funds generate lower financial returns compared to traditional VC funds. They did find that investors in impact funds are willing to accept these lower returns in exchange for non-financial benefits associated with impact investing (Barber et al., 2021).

I expect that, in line with Barber et al. (2021), the presence of social and environmental purposes in return-seeking funds deteriorates financial performance in three dimensions. Firstly, impact funds are predicted to source deals from a restrained set of opportunities. Secondly, intentionality is expected to translate into higher due diligence costs during the pre-investment phase. Lastly, impact evaluation is anticipated to result in higher expenses during the investment phase. These activities drain both monetary and non-monetary resources, including time and energy, from impact funds. Therefore, based on these factors, the following hypothesis regarding the overall performance of impact funds is constructed:

Hypothesis 1: Being an impact fund deteriorates financial performance compared to traditional funds.

2.3.2 Factors Influencing Financial Performance

Several factors may influence the financial performance of a fund. The most obvious factors that have been mentioned in several papers are fund strategy, sector focus, and geographic focus. A recent study executed by Cambridge Associates has shown that over almost all periods, ranging from 6 months to 25 years, the US Venture Capital Index has outperformed the US Private Equity Index (Slotsky, 2023). Over 25 years, Venture Capital had index returns of 28.1%, while Private Equity had index returns of 13.8%. Additionally, VC strategies focus on companies at an early or growth stage. This stage allows for greater potential to shape and influence a high-growth company's operations and impact, which could lead to substantial value-creation opportunities. These companies are often in sectors at the forefront of innovation, such as clean energy and biotechnology, with substantial growth prospects. Investing in such companies provides exposure to high-potential ventures, which could drive financial returns (Holtslag et al., 2021). Therefore the following hypothesis is constructed:

Hypothesis 2: Impact funds with VC strategies will be associated with a higher financial performance than impact funds with PE strategies.

Research has found a consistent positive relationship between the risk level and the financial returns (Fiegenbaum & Thomas, 1988). Specialization within funds is believed to be associated with a higher risk but provides several advantages to PE firms. It allows for advantages such as deeper knowledge, better selection of investments, and effective monitoring and advice. The specialization is associated with expertise in targeted sectors, enabling funds to select superior investments (Lossen, 2007). It is therefore expected that funds with specialized sector strategies can generate a higher financial performance than

funds with a diversified focus which may have lower risks. Based on these considerations, the following hypothesis is constructed:

Hypothesis 3: Impact funds with a specific sector focus will be associated with a higher financial performance than impact funds with a diversified sector focus.

A recent study conducted by Cambridge Associates has provided insights into the performance of impact funds across different market segments. According to their findings, impact funds investing in developed markets achieved higher returns than those investing in emerging markets from 1999 to 2020. Specifically, the study reported a return of 14.5% for impact funds in developed markets, whereas the return for funds in emerging markets was 5.8% (Associates, 2022). Additionally, another research focused on the long-run market returns to impact investing in emerging markets and developing economies has found that investments in larger economies yield higher returns. Next to that, returns decline as banking systems deepen and countries soften capital controls (Cole et al., 2020). Based on the evidence from these studies, the following hypothesis is formulated:

Hypothesis 4: Impact funds with a geographic focus on developing economies will be associated with better financial performance than impact funds with a focus on emerging markets.

Through these hypotheses, the variations in financial performance among different impact fund strategies, sector focuses, and geographic focuses will be examined. This examination will help assess the effectiveness of each influencing factor in generating positive financial outcomes within the context of impact funds. If an underperformance of impact funds compared to traditional funds is found, assessing these influencing factors may help mitigate the deterioration in financial performance.

3   Data

3.1   Data Selection

This research aims to understand the effect of impact funds and various fund characteristics on the financial performance of the funds. To achieve this, an expansion of the research methodology introduced by Barber et al. (2021) has been adopted. Specifically, data has been collected on the financial return differentials[3] between impact assets and traditional assets to better understand the factors driving the financial performance among different investor types. First, the sample selection criteria and data sources will be described, followed by a detailed explanation of the variables and data-cleaning procedures.

While the dataset of this research shares similarities with the paper by Barber, this research includes more information about specific fund characteristics and the differentials of financial performance metrics, Net IRR, and Net Multiple, which have been corrected for the average market benchmarks. Unlike the study of Barber which focused on venture or growth-oriented funds, this research recognizes the need to broaden the scope to gain sights into a wider landscape of investment opportunities and strategies within the PE and VC industries. By including a diverse set of fund classifications in this research, which encompasses classifications such as buyout funds, funds of funds, and balanced funds, a more nuanced examination of the overall investment ecosystem is ensured. This approach recognizes the distinctive characteristics and investment dynamics associated with different stages and types of funds. It allows for a more holistic evaluation of the performance, impact, and effectiveness of various investment strategies employed by fund managers across the PE and VC industries. To provide a comprehensive understanding of fund performance over time and address potential biases, 30 years spanning from 1990 to 2019 have been chosen for this analysis. However, it is important to acknowledge that including funds that are still active within this period may introduce survivorship bias, which could impact the findings. This bias arises when since this period might include funds that are still active, each year will be separately included when funds with poor performance exit the market or are excluded from the dataset, potentially skewing the results towards funds with better performance (Kaplan & Lerner, 2016).

To mitigate this potential bias, fixed effects are included in the regression model. Specifically, each year will be separately included as a fixed effect, allowing for the control of year-specific factors that could influence fund performance. By incorporating fixed effects for each vintage year, this approach aims to account for any potential bias arising from including still-active funds, particularly in the last 2-3 years of the observation period. This approach can provide more granularity in capturing the relationship between the vintage years and the financial performance. It enables the analysis to better account for the potential impact of active funds, thus enhancing the robustness and accuracy of the findings. It is worth noting that the chosen 30-year period captures the typical investment horizon for PE and VC funds, which is 4 to 5 years for a full investment of committed capital (Wiek et al., 2022). The extension of the time frame compared to Barber et al. (2021) may seem like a minor improvement, but overall this will lead to a better understanding of the long-term performance of impact funds compared to traditional

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[3]This is the difference between the financial returns of a particular investment or fund and the average benchmark or reference point to assess its performance.

funds.

The data on PE and VC funds are collected from Preqin, which is the most comprehensive database containing performance data. This database encompasses 53,805 funds belonging to different alternative asset classes, including both active and non-active funds, among others PE, real estate, and hedge funds. It should be noted that not all funds included in the database include performance metrics. The Preqin database provides two performance metrics, the Net Multiple and the Net Internal Rate of Return (IRR), in addition to the average market benchmarks of financial performance. The absence of data on the financial performance metrics from certain funds could be due to confidentiality or competitive reasons. Additionally, this could be due to reporting requirements or limitations imposed by authorities or industry associations. To ensure that the dataset includes funds with the required performance metrics, funds that did not provide data on the financial performance metrics, have been filtered out. Filtering out these funds help to maintain the integrity and reliability of the dataset. This ensures that the analysis is based on a consistent and comparable set of funds with available performance data. However, it is crucial to recognize that the exclusion of those funds could introduce biases. Specifically, when the excluded funds exhibit a systematic difference in performance compared to the included funds, estimates may be affected. This is also known as the selection bias (Tucker, 2010). Although efforts have been made to minimize this bias through robust filtering procedures, it is important to acknowledge that it may still exist to some extent.

Additionally, funds that have invested after 2020 will be omitted due to the unreliability of their data, eventually leading to 5,439 funds remaining. The unreliability primarily comes from the fact that the performance of these funds is not yet fully realized or observable within the given timeframe. While it should be acknowledged that this filtering process may not be entirely random, as some types of funds or fund characteristics may be more likely to report these metrics, it is important to note that the inclusion of these metrics is widely expected in the PE and VC industry. Reporting performance metrics is considered standard practice and requirement, driven by transparency obligations, industry standards, and the need for comparability (D. Cumming & Walz, 2010). That is why it is not expected that the inclusion of these metrics is significantly influenced by factors such as performance, size, or period, as they are fundamental and widely reported measures in the industry.

3.2 Impact Identification

Next, it is essential to identify and categorize funds that can be classified as impact funds. These funds should compromise investments made into companies with the primary objective of generating a positive impact, in addition to yielding a financial return (Barber et al., 2021). The fund should intend to create positive externalities, as demonstrated by its intentionality, to be considered an impact fund. However, Preqin does not provide a distinction between impact and non-impact funds. Thus, a manual approach will be adopted to classify funds based on the availability of data. This approach will rely on a combination of resources providing lists of impact funds and managers. The following lists have been included in this research:

AVPN (Asia Venture Philanthropy Network) - The AVPN is a network of social investors that

focuses on building a high-impact social investment ecosystem across Asia. The aim is to stimulate the flow of capital towards social investment opportunities and facilitate the development of a pipeline of investable social purpose organizations. The AVPN currently includes more than 600 members, which are active in more than 33 markets in Asia.

B-Corporation - The B-Corporation list of B-Lab includes a directory of companies that have been certified as B-Corps. These are businesses that level high standards of both environmental and social performance, transparency, and accountability. The directory currently includes information about the company's certification status, impact areas, and mission statement of 6,299 B-Corps.

CDVCA (Community Development Venture Capital Alliance) - The CVDCA provides information on the community development VC in the United States. The included funds seek to support businesses in low-income communities by providing both financial and technical assistance. The database currently includes information about among others the location and investment focus of more than 120 funds.

EVPA (European Venture Philanthropy Association) - The EVPA is Europe's impact finance network, which includes a list of fund managers who are investing in social impact projects across Europe. The association particularly focuses on supporting social enterprises and organizations that are aiming to address social and environmental challenges. The network currently includes more than 300 impact capital providers, such as funds, foundations, and public funders.

GIIN (Global Impact Investing Network) - The GIIN is a non-profit organization focused on increasing the scale and effectiveness of impact investing. The network currently includes over 400 organizations from around the world consisting of both asset owners and assets managers.

IA (Impact Asset) 50 - The IA 50 is an annually updated list consisting of 50 private debt and equity impact investment fund managers, which have demonstrated their commitment to creating positive social and environmental impact besides financial returns.

Impactspace - This is a global database of companies that are creating positive social and environmental impacts through their operations. It is a directory of impact-focused financial organizations including, accelerators, foundations, impact investors, and venture capitalists. The database currently consists of more than 3,350 impact investors.

Impact Yield - ImpactYield is a database consisting of private funds that are aiming to generate financial returns while creating positive social and environmental impact. The database currently includes information about more than 850 impact funds and impact fund managers.

Preqin Ethos Funds - The database of Preqin includes a limited list of investment funds that invest across five responsible themes, including Environmentally Responsible, Microfinance, Socially Responsible, Economic Development, and Sharia Compliant. These ethos funds are designed to align with these responsible themes, with each of them representing a particular area of impact focus.

To identify which of the funds in the Preqin database match the funds that are listed in the impact investing databases, Instant Data Scraper is used. This is a web scraping tool that is designed to extract data from websites quickly and subsequently convert this data into a spreadsheet or Excel file. After this

process, the funds in the Preqin database are matched with the web scraping database to identify which funds are impact funds. The funds are identified as an impact fund if they are present on at least one list. In addition to these databases, the Preqin database also includes the geographic focus of the funds. Funds that invest in companies that are in the poorest countries of the world can additionally be considered to not only look for financial returns but also for positive externalities. The poorest countries in the world are Somalia, South Sudan, Sierra Leone, Malawi, and Central African Republic, all located in Sub-Saharan Africa (FocusEconomics, 2021). Funds that invest in this region are generally considered impact funds, given the significant development challenges they face. However, to establish their classification as impact funds, a manual assessment of the 30 funds was conducted based on information available on their company websites. To recognize the additional risk factors prevalent in these countries, such as political instability and weak institutional frameworks, the (fixed) effect of the separate categories within the geography variable was included as means to control for these risks. By incorporating these fixed effects, this research aims to account for the specific country or regional factors that may impact the financial performance and risk profiles of the funds operating in Sub-Saharan Africa. Nevertheless, it is important to note that despite the inclusion of fixed effects helps to control for some risks associated with specific geographies, it may not capture all dimensions of risk entirely. The limitations of observable variables and potential unobserved factors, as well as the heterogeneity within countries, should be taken into account when interpreting the results.

After the matching process [4] the sample of impact funds consists of 641 funds. To ensure that the identified sample is in line with the criteria for the classification as an impact fund, each fund's profile has been manually assessed and the ones that did not explicitly state a dual objective on their website were excluded.[5] This resulted in a decrease in the sample size to 208 funds. Although this methodology may have missed identifying all impact funds, resulting in false negatives, its implementation has facilitated significant time savings, while upholding the integrity of the data sample by minimizing the incidence of false positives. This presents an opportunity for refinement rather than a bias, as the employed method holds the potential to misclassify certain funds as non-impact funds (false negatives), inadvertently excluding them from the analysis. Considering this misclassification as a random occurrence, it is important to acknowledge that it introduces a certain level of noise into the analysis. This noise has the potential to bias the estimation of the financial performance differential between the two fund types. More specifically, if impact funds are misclassified as traditional funds, it could lower the perceived performance of the traditional funds, thereby influencing the estimated performance differential towards zero.

Given the diverse range of goals and investment strategies utilized by impact funds, it is beneficial to examine specific examples of such funds within the sample of this research. A well-known impact fund manager that is included in this sample of impact funds is TPG Capital, a globally active PE firm. This firm has 14 billion dollars of assets under management across The Rise Funds and the Evercare Health Fund. Both funds seek to generate positive social and environmental impact alongside financial

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[4]This entails that the funds in the Preqin database are included in at least one of the impact fund databases or invested into Sub-Saharan Africa

[5]See figure 7 in the appendix for an example of the Capricorn Investment Group.

returns. While the Evercare Health Fund focuses on healthcare investments in emerging markets, the Rise Funds invest in projects and companies that address critical societal challenges, such as climate change, inequality, and poverty. This fund has several investors mainly consisting of public pension funds. One notable investor is the New York State Common Retirement Fund, which has committed up to nearly $150 million to the Rise fund. An increasing amount of pension funds have mandates to invest in "good" investments to align their investments with their stakeholders' values (Caddick, 2021). Another well-known impact fund manager is Elevar Equity, which invests in companies that serve low-income communities in emerging markets. Elevar Equity manages the Unitus Equity Fund which invests in early-stage businesses that provide financial services to underserved communities in emerging markets, such as payments service providers and microfinance institutions. The investors in this fund consist mainly consists of foundations, such as the Omidyar Network, which is a social change venture which invests to build more inclusive and equitable societies.

3.3   Variable Construction

As discussed in the previous section, the dependent variables used in this research will be the **Net IRR** and the **Net Multiple**. The **Net Internal Rate of Return (IRR)** is a time-weighted return expressed as a percentage. It uses the present sum of cash contributed by investors, the present value of liquidated distributions to investors, and the current value of unrealized investments, while applying a discount rate (Lacaze, 2021). This amount is calculated after any carry or performance fees and incorporates a provision of carry for unrealized investments. This metric is widely used due to its ability to account for the time value of money and provide a measure of investment profitability. It considers the timing and magnitude of cash flows, allowing investors to assess the returns in a standardized way across different funds and investment opportunities. However, limitations include its sensitivity to the timing of cash flows, which can lead to varying results for the same investment based on the sequence of cash inflows and outflows. Additionally, the metric assumes that cash flows are reinvested at the same rate, which may not accurately reflect the real-world investment practices (Miletic & Latinac, 2020). The **Net Multiple** shows how many times investors have received, or are likely to receive, their money back and make a profit from their investments (Lacaze, 2021). This is calculated as the sum of the Capital distribution (DPI) plus the Remaining value to paid-in (RVPI).

$$\text{Multiple } (\mathbf{X}) = \frac{\{ \text{ DPI } (\%) + \text{ RVPI } (\%)\}}{100} = \frac{\text{Dist } (\$) + \text{ Value } (\$)}{\text{Called Capital } (\$)} \tag{1}$$

This metric provides a straightforward interpretation by quantifying the multiple of capital returned to investors, reflecting the overall profitability of an investment. Additionally, it is less sensitive to timing, compared to the Net IRR. However, weaknesses include the lack of accounting for the time value of money, potentially overlooking the impact of cash flow timing on investment returns. Next to that, the multiple may be influenced by outliers or large cash flows, which could lead to distorted interpretations of investment performance (Nouvellon & Pirotte, 2019). The main difference between the two metrics is thus that the Net Multiple is not adjusted for the time factor. For instance, consider two funds, fund I

and fund II. Fund I achieves a Net Multiple of 2.5, while Fund II achieves a Net Multiple of 3.0. However, the time frames in which these returns were generated differ significantly. Fund I achieves its Net Multiple of 2.5 over 3 years, while Fund II achieves its Net Multiple over 7 years.

The Preqin database also provides a benchmark for both variables, namely the average Net IRR and Net Multiple of the same cohort of funds based on fund type, investment focus, and vintage year. This benchmark is calculated using performance information for more than 10,000 private capital funds. It calculates various performance metrics such as the multiples and the Net IRR, based on the fund's vintage, investment strategy, and geographic focus. This involves calculating the metrics such as the median and average performance within specific benchmark groupings (Lacaze, 2021). By subtracting the benchmarks from the Net IRR and Net Multiple, adjustments of the Net IRR and Net Multiple for fluctuations in mean returns during the period 1990-2019 are possible. The adjusted variables are referred to as the **Net IRR Differential** and the **Net Multiple Differential**. Important to note is that, unlike the Net IRR, the Net IRR Differential is not expressed as a percentage, but as a difference in percentage points (ppts). For instance, if a fund has a Net IRR of 8% and a benchmark Net IRR of 10%, then its Net IRR Differential would be -2.0 ppts. By conducting the differential variable instead of the unadjusted Net IRR and Net Multiple, the impact of the variations in average returns over the analyzed period can be eliminated (Patrick & French, 2016).

The main independent variable that is used in this research is the binary variable **IMPACT**. This variable serves the purpose of identifying whether a fund can be classified as an impact fund or a traditional fund. The fundamental characteristic that sets impact funds apart from traditional funds is their investment approach. Impact funds focus on projects that generate social or environmental benefits, whereas traditional funds primarily aim to maximize financial returns (Hand et al., 2021).

One of the other independent variables used in this research is the binary variable **VC**. The variable distinguishes between venture capital and private equity funds. VC funds generally invest in startups and early-stage companies with high growth potential, whereas PE funds generally invest in mature companies with established business models. The distinction between these two types of funds is of great importance since their investment strategies, risk profiles, and expected returns can differ significantly (D. J. Cumming & Johan, 2013).

The third binary variable, **CLOSED**, indicates whether the fund has been closed or liquidated. A closed fund has completed its investments phase and is in the process of selling the portfolio companies, whereas a liquidated fund has sold all of its assets and returned the capital to investors. This binary variable is important because it captures the impact length of the investment horizon on fund performance (Jagannathan et al., 2010). Generally speaking, longer investment horizons are associated with higher returns, as funds have more time to nurture their portfolio companies and benefit from market cycles (Barrot, 2012).

In addition to the binary independent variables, several control variables are included in the analysis. The variable **YEAR**, indicating the vintage year of a fund, is an important control variable since it captures the impact of market cycles on fund performance. Funds that have been launched in different years may have faced different market conditions and macroeconomic factors which might have affected

their returns. **SIZE** also is an important control variable since larger funds may have different risk profiles and expected returns than smaller ones (Humphery-Jenner, 2012). To account for the extreme outliers in fund size, the natural logarithm of fund size is utilized, resulting in the variable **LOG(SIZE)**. This will be shown in section 3.4 in the Fund Descriptive Statistics.

Lastly, control variables for the investment focus **STRATEGY** (fund strategy), **SECTOR** (sector focus), and **GEOGRAPHY** (geographic focus) are added. Fund strategy captures the type of investment that a fund makes. Note that this variable is interrelated to the binary variable VC. The strategy variables include strategies such as buyouts, fund of funds, or growth. Sector focus captures the industry sector in which the funds invest, such as Energy Utilities, Healthcare, and Industrials. Geographic focus captures the geographic region in which the funds invest, such as East Asia, Sub-Saharan Africa, or the US & Canada. These control variables are important since they capture the impact of investment specialization on fund performance. Funds that focus on a specific strategy, region, or sector might have specific investment opportunities and risks that can affect their returns. An overview of the description for all the variables used in this research including sources is given in Tables 7 and 8 in the Appendix.

3.4 Fund Descriptive Statistics

Table 1 includes the descriptive statistics of both the impact and traditional funds, including the fund characteristics and financial performance measures. Regarding size, it can be observed that the mean size of impact funds (1225.43) is significantly larger than the mean size of traditional funds (705.19) at a 1% significance level, however, the standard deviation for the impact funds (3346.15) is also higher than for the traditional funds (1519.78), which indicate a higher degree of variability. One explanation is that the impact fund industry is relatively young and diverse with a wide range of fund strategies, which leads to a higher degree of variability in fund sizes and performance metrics. Additionally, the sample size of impact funds is substantially smaller compared to traditional funds, which brings greater potential for outliers or extreme values. This highlights the importance of considering the unique characteristics of impact funds when evaluating their financial performance and risk. To address the issue of high variability in fund sizes, a new variable has been created by taking the natural logarithm of the size variable, LOG(SIZE). When looking at the natural logarithm of size there is not a substantial difference in the fund size between the two funds types. This indicates that the differences in the mean size between impact and traditional funds can be driven by a few larger funds, rather than representing a fundamental difference in the size distribution of the two fund types.

The financial performance metrics of impact and traditional funds present an interesting pattern. Impact funds have a mean Net IRR (NIRR) of 14.79% (median 14%), which is significantly lower than the mean of 18.86% (median 15.5%) of traditional funds at a significance level of 5%. After correcting for the benchmark Net IRR (BNIRR) for both fund types, traditional funds still outperform the impact funds with a mean of 4.88% compared to a mean of 1.68% however, this is not significant. This indicates that the performance difference is not merely driven by market conditions. An opposing pattern is observed when looking at the Net Multiples (NM) since in this case the impact funds with a mean of 2.09 slightly outperform the traditional funds with a mean of 2.05, however, this is also not statistically significant.

Especially after correcting for the benchmark Net Multiple (BNM), the outperformance of impact funds with a mean of 0.03 compared to traditional funds with a mean of -0.02 is observable. This suggests that impact funds are generating more value relative to the amount of capital invested. This might be attributed to the fact that impact funds invest in companies with environmental or social goals, which may generate higher environmental and social value per dollar invested compared to traditional funds. Therefore, based on both the Net IRR and Net Multiple, the outperformance remains debatable. While traditional funds generate higher returns relative to their benchmark, impact funds may generate more value per dollar invested.

To initially compare the means of the financial performance, in this case the Net IRR, an independent two-sample t-test is utilized. This test assumes independence between the groups, and in this research, the impact funds were manually examined and selected to ensure independence. Furthermore, the test requires the dependent variable to follow a normal distribution and assumes equal variances between the two groups. To assess the distribution of the Net IRR and Net Multiple, a detailed examination was performed using the box plots shown in the appendix (figures 8a & 8c). The analyses revealed the presence of outliers, primarily associated with the Kimmeridge Energy Fund, Matrix Partners V fund, and the Crescendo I fund, which had values of 981, 500, and 392, respectively. To mitigate potential bias stemming from these outliers, they were excluded from the study. Despite the exclusion, some outliers remained, however less extreme, necessitating the winsorization of both the Net IRR and Net Multiple differential. In this study, the financial performance metrics were winsorized using the 10th and 90th percentile resulting in the new variable winsorized Net IRR and Net Multiple Differential (NIRRD_W & NMD_W). The box plots in the appendix (figures 8b & 8d) demonstrate that the winsorized variables do not contain any outliers. In addition to the normal distribution, equal variances between the two groups are also necessary. To assess this assumption, Levene's Test of Equality of Variances was employed. The results showed a non-significant p-value for both the NIRRD_W & NMD_W. This suggests that variances are homogeneous in both dependent variables.

After satisfying all the requirements for the independent two-sample t-test, the null hypothesis is tested which states that the means between the two fund types are the same. As anticipated, for the winsorized Net IRR Differential, the observed sample difference of +1.40 ppts. along with along with large sample size resulted in a notably high t-ratio of 1.72. It can be concluded that the difference in the mean winsorized Net IRR Differential of the two fund types is significantly larger than 0 at a significance level of 10%. Thus, we can reject the null hypothesis and accept the alternative hypothesis with a confidence interval of 0.90. Thus, this t-test provides evidence that impact funds exhibit inferior financial performance compared to traditional funds. Regarding the winsorized Net Multiple Differential, no significance of the difference of +0.04 ppts. can be found. These findings acknowledge the possibility that, in specific sectors or geographical areas, impact funds may achieve similar or even better returns than traditional funds. However, on average, impact funds underperform traditional funds based on the winsorized Net IRR Differential. The reason for this performance gap cannot be precisely determined by this analysis, whether it be due to higher costs associated with stricter due diligence requirements, limited investment opportunities, or the expenses related to impact assessment processes during the investments.

The return differential favoring traditional funds demonstrates that there is a trade-off between impact and financial return beyond a certain level of desired impact. To identify the relationship between the financial performance and the impact variables, several multiple linear regressions will be executed which will be elaborated on in the Methodology in the next section.

Table (1)   Fund descriptive statistics for both impact funds and traditional funds.

Fund descriptive statistics

	Impact funds				Traditional funds				t-statistic
	N	Mean	Median	Std. Dev.	N	Mean	Median	Std. Dev.	
CLOSED	208	0.70	1	0.46	5,231	0.62	1	0.49	-2.401**
VC	208	0.34	0	0.47	5,231	0.26	0	0.44	-2.514**
SIZE	208	1225.43	221.58	3346.15	5,231	705.19	254.52	1519.78	-4.519***
LOG(SIZE)	208	5.51	5.40	1.73	5,231	5.49	5.54	1.51	-0.177
NIRR	208	14.79	14	15.31	5,231	18.86	15.5	28.54	2.273**
BNIRR	208	13.11	16.56	25.99	5,231	13.98	17.13	25.34	0.479
NIRRD	208	1.68	-2.38	27.59	5,231	4.88	-0.55	36.51	1.234
NIRRD_W	208	-0.93	-2.38	11.43	5,231	0.46	-0.56	11.51	1.720*
NM	208	2.09	1.70	2.12	5,231	2.05	1.74	1.61	-0.412
BNM	208	2.06	1.86	0.72	5,231	2.06	1.93	0.71	0.186
NMD	208	0.03	-0.21	1.90	5,231	-0.02	-0.15	-0.15	-0.539
NMD_W	208	-0.16	-0.21	0.60	5,231	-0.12	-0.15	0.62	0.861

Notes: This table presents the fund summary statistics for impact funds (left columns) and traditional funds (right columns). Several fund characteristic variables have been included in addition to the different financial performance metrics regarding the Net IRR and the Net Multiple. The fund types in this sample include 208 and 5,231, respectively. Note that ***p<0.010, **p<0.050, *p<0.100.

Figure 3 compares fund strategies of impact funds and traditional funds. Four strategies - ' Buyout', 'Early stage', 'Growth', and 'Venture' - are the most represented among the impact funds, accounting for 76% of the total impact sample. Impact funds also have a notable share in the 'Fund of funds' strategy at 13%. Conversely, 'Balanced', 'Co-investment', 'Expansion', 'Secondaries', and 'Turnaround' fund strategies are less represented. For traditional funds, 'Buyouts', 'Fund of funds', 'Ventures', and 'Growth' are the four most significant strategies, representing 75% of the total traditional funds' sample. The overrepresentation of 'Early stage' and 'Growth' in the impact sample may be due to impact funds focusing more on investing in startups and SMEs, which are more likely to address environmental or social issues, and in growth-stage companies that have proven their viability and potential scale up with significant impact. Additionally, impact funds may prefer to invest in companies with a long-term perspective, which aligns better with early-stage and growth strategies, as these companies require 'patient capital' and do not focus solely on short-term financial returns (Gentzoglanis, 2022).

Figure (3)   The fund strategy (STRATEGY) of the impact funds and traditional funds.
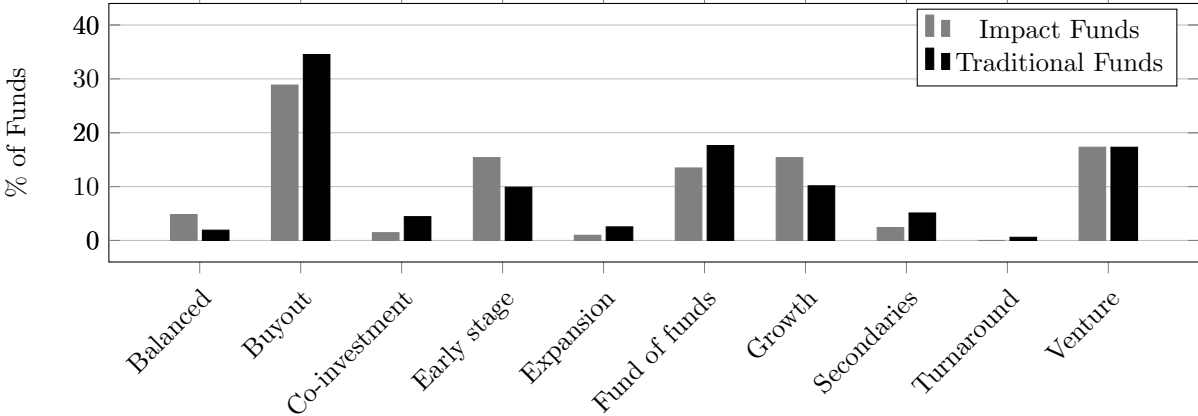

Figure 4 illustrates the sector focus of both fund types and shows that the largest share for both fund types is in the 'Diversified' sector, which accounts for around 62% of both types of funds. It is important to note that funds that focus on multiple sectors are classified as diversified. The distribution pattern of both fund types based on their sector focus is quite similar, with only minor differences. Impact funds seem to prioritize IT, Energy utilities, Natural resources, and F&I services, which together account for approximately 17%, 4%, 3%, and 1%, respectively. Traditional funds, on the other hand, show a greater focus on Healthcare, Industrials, Telecom % media, and Business services, accounting for around 10%, 3%, 3%, and 1%, respectively. The results indicate that there are sectors that are particularly attractive for impact investment and could be opportunities for growth and innovation, such as energy and IT.

Figure (4)   The sector focus (SECTOR) of the impact funds and traditional funds. Note that the shares are relative to their sample sizes.
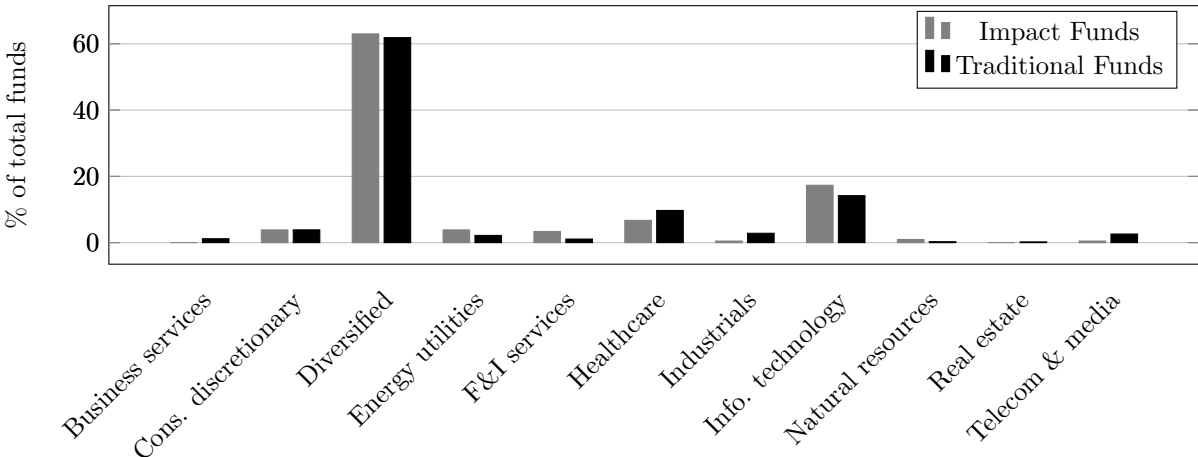

Figure 5 illustrates the distribution of the impact funds and traditional funds based on their geographic focus. The US & Canada represent 40% of all impact funds, followed by Western, Northern, and Southern

Europe (18%), Sub-Saharan Africa (14%), and East Asia (13%). The absence of impact funds in Oceania and Southeast Asia suggests that impact investments in these regions may not be as attractive to impact investors, although this does not imply that these regions lack environmental and societal challenges that could benefit from impact investments. In contrast, traditional funds exhibit a more uneven distribution across regions, with 60% focused on the US & Canada, and a lower share for other regions compared to impact funds. The higher distribution of impact funds across different geographic regions implies that funds with a regional focus on one of the remaining regions are more likely to generate positive externalities beyond financial returns. Impact investors prioritize environmental and societal impact alongside financial returns, and therefore, may be willing to invest in regions that face such challenges.

Figure (5)   The geographic focus (GEOGRAPHY) of the impact funds and traditional funds.
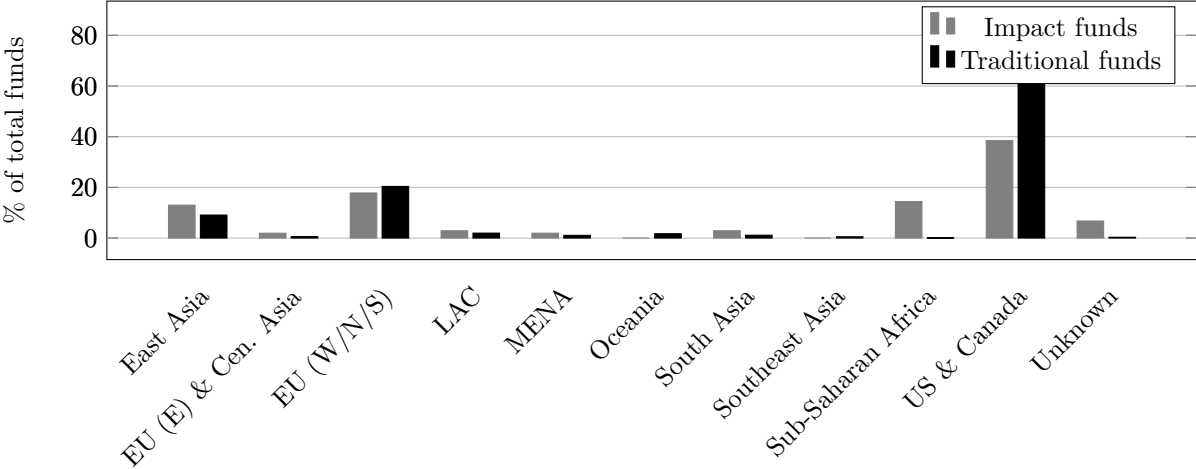

The vintage year refers to the year in which the fund first utilizes the capital that has been committed by investors. Knowledge of the fund's commencement dates can provide insight into the activities and current state of the PE and VC industry over the year. Although the industry predates 1990, the chosen timeframe of 30 years is deemed representative since the standard time for PE and VC funds to fully invest their committed capital is 4 to 5 years, as discussed before. A cyclical trend is evident in figure 6, with a peak and subsequent declines around the years 2000, 2007, and 2017. This trend may reflect changes in the economy, such as the dot-com boom and bust in the early 2000s and the global financial crisis in 2008, that affected the flow of investments in the industry (Obstfeld & Rogoff, 2009). Furthermore, the figure shows that the industry seems to be declining in the last two years of the sample, which may reflect a more challenging investment environment or a shift in investor preferences towards other asset classes.

When comparing the distribution of vintage years for impact and traditional funds, the figure indicates that, except for some spikes, the distributions are quite similar, especially starting from 2004. This suggests that impact investing has become more integrated into the broader PE and VC industry over time. The skewness of the impact funds towards the right tail of the distribution can be attributed to the popularity of impact investing which start in the early 2000s, despite its origins dating back to earlier decades. As a result, the increasing number of impact funds in recent vintage years may reflect a growing

interest and awareness of impact investing among investors and fund managers.

Figure (6)   The distribution of both impact funds and traditional funds based on vintage years (YEAR).
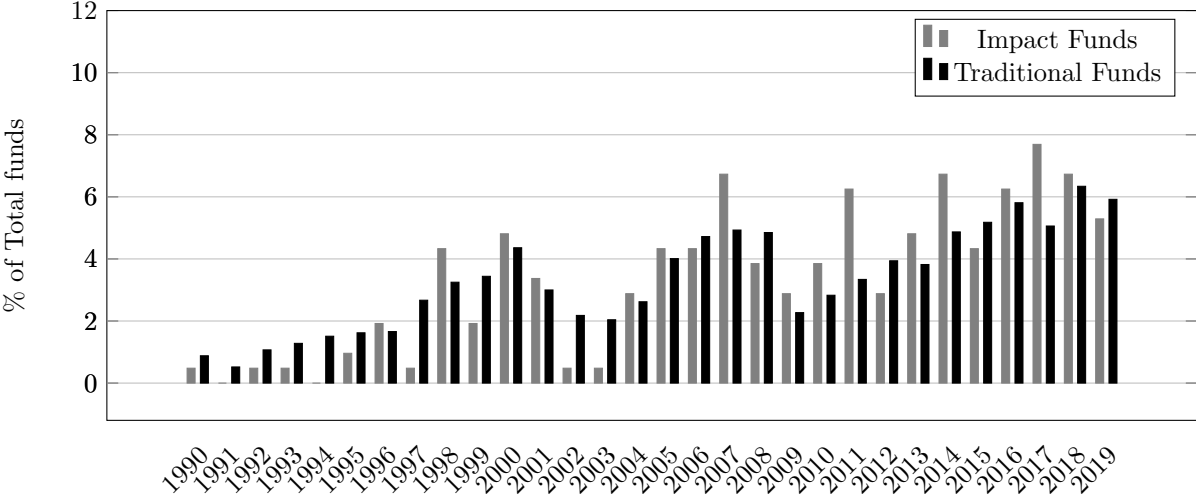
4 Methodology

4.1 Multiple Linear Regression

The Multiple linear regression is a form of supervised learning that is straightforward to interpret and typically exhibits strong performance when applied to practical data-driven challenges (James et al., 2013). To test the first hypothesis about the effect of being an impact fund on financial performance, several control variables for fund characteristics are added to the regression model. These variables include characteristics such as fund status and fund size. To also control and account for the unobserved heterogeneity at a strategic, sector, and geographic level, the fixed effects of the fund strategy, sector focus, and geographic focus are added to the regression. In addition, to also address potential confounding factors that remain constant over time and may affect both the Net IRR and the independent variables, fixed effects of the vintage year are added to the regression. This serves to capture any systematic variations in the dependent variable across different vintage years, effectively isolating the effects of other independent variables. By doing so, we can discern the specific impacts of these variables, while accounting for any time-specific factors that could potentially influence the outcome (Mummolo & Peterson, 2018). Lastly, to control for time-invariant differences across the investment focus categories that may affect the financial performance, I include interaction terms between the fixed effects of vintage year, sector focus, and geographic focus in the regression model[6]. This enables me to isolate the specific yearly effects of a fund's sector focus, and geographic focus, while accounting for any unobserved factors associated with these categories. Important to note here that to establish the interaction term, the categories within the sector focus and geographic focus variables have been clustered into two groups. For the sector, the categories have been clustered into funds with a specific focus and funds with a diversified focus. For geography, the categories have been clustered into funds with a focus on emerging markets and funds with a focus on developing economies[7]. This results in the main regression as shown in equation (3).

$$PERFORMANCE_i = \beta_0 + \beta_1 IMPACT_i + \beta_2 CHARACTERISTICS_i +$$
$$\beta_3 STRATEGY\_FE + \beta_4 YEAR\_FE * SECTOR\_FE * GEOGRAPHY\_FE + \beta_6 + \epsilon \tag{2}$$

where $IMPACT_i$ indicates whether a fund is an impact fund. $CHARACTERISTICS_i$[8] represent the fund characteristics including fund status and fund size. STRATEGY_FE represents the fixed effects of the strategy variable. YEAR_FE * SECTOR_FE * GEOGRAPHY_FE represents the interaction term between the fixed effects of a fund's vintage year, sector focus, and geographic focus.

To test the second hypothesis, which states that impact funds with VC strategies will be associated with a higher financial performance than funds with PE strategies, a comparable regression as the previous regression will be utilized. The main difference is the inclusion of both the separate terms and

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[6]To my knowledge, no recent research has indicated a yearly fluctuation in PE and VC strategies, therefore the strategy variable is not included in the interaction term.

[7]Emerging economies include: Eastern Europe, Central Asia, Latin America (LAC), Middle East & North Africa (MENA), South (east) Asia, and Sub-Saharan Africa. Developing economies include East Asia, Oceania, the US & Canada, and W/N/S Europe (Bass, Dithrich, Sunderji, & Nova, 2020).

[8]Fund strategy is not included since the fixed effects of strategy are already included.

the interaction term between the impact variable and the fund strategy variable. This interaction term consequently shows the effect of impact funds utilizing certain strategies on financial performance. Additionally, the fixed effect of fund strategy cannot be included since this would cause collinearity issues with the VC variable. This results in the following regression:

$$PERFORMANCE_i = \beta_0 + \beta_1 IMPACT_i + \beta_2 VC_i + \beta_3 IMPACT_i * VC_i +$$
$$\beta_4 CHARACTERISTICS_i + \beta_5 YEAR\_FE * SECTOR\_FE * GEOGRAPHY\_FE + \epsilon$$

(3)

where VC_i indicates whether a fund is a VC fund. VC strategies include venture, early-stage, and late-stage/expansion strategies. $IMPACT_i * VC_i$ represents the interaction term between being an impact fund and applying VC strategies.

A similar process is utilized to test the third hypothesis, which states that impact funds with a specific sector focus will be associated with a higher financial performance than funds with a diversified sector focus, and the fourth hypothesis, which states that impact funds with a geographic focus on developing economies will be associated with better financial performance than funds with a focus on emerging markets. The third hypothesis includes both the separate terms and an interaction term between the impact variable and the clustered sector focus variable created[9]. The fourth hypothesis, which also includes both the separate terms and an interaction term between the impact variable and the clustered geographic focus variable is created[10]. Since the fund strategy is not included in the interaction term for these hypotheses, the fixed effects of the fund strategy are added back to the regression. This leads to the following regressions:

$$PERFORMANCE_i = \beta_0 + \beta_1 IMPACT_i + \beta_2 SPECIFIC_i +$$
$$\beta_3 IMPACT_i * SPECIFIC_i + \beta_4 CHARACTERISTICS_i + \beta_5 STRATEGY\_FE +$$
$$\beta_6 YEAR\_FE * SECTOR\_FE * GEOGRAPHY\_FE + \epsilon$$

(4)

$$PERFORMANCE_i = \beta_0 + \beta_1 IMPACT_i + \beta_2 EMERGING_i +$$
$$\beta_3 IMPACT_i * DEVELOPING_i + \beta_4 CHARACTERISTICS_i + \beta_5 STRATEGY\_FE +$$
$$\beta_6 YEAR\_FE * SECTOR\_FE * GEOGRAPHY\_FE + \epsilon$$

(5)

where $DEVELOPING_i$ indicates whether a fund has a focus on countries in developing economies. $SPECIFIC_i$ indicates whether a fund has a specific sector focus. $IMPACT_i * SPECIFIC_i$ and $IMPACT_i * DEVELOPING_i$ represent the interaction term between being an impact fund, having a specific sector focus and focusing on developing economies.

To assure the accuracy and reliability of the results, extensive testing has been conducted to assess the fulfillment of the assumptions for multiple linear regression. These tests include examining linearity, homoscedasticity, normality, and multicollinearity, ensuring the validity of the regression analysis.

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[9]This clustered version includes the groups: specific focus and diversified focus.
[10]This clustered version includes the groups: emerging markets and developing economies.

5   Results

5.1   Hypothesis 1

To test the first hypothesis which states that being an impact fund deteriorates the financial performance of a fund several regressions have been performed for both financial metrics. As presented in table 2, the effect of being an impact fund on financial performance is examined through four regression models. Regression (1) included controls for fund characteristics, regression (2) added fixed effects for fund strategy and geography, and an interaction term between vintage year and sector. Regression (3) included an interaction term between vintage year and geography, and regression (4) included an interaction term among vintage year, sector, and geography. In the analysis for the Net IRR, regression (1) the coefficient of the variable impact indicates a significant underperformance of impact funds compared to traditional funds by 1.54 ppts (p<0.050). This is in line with the recent findings by Barber et al. (2021) however, when additional controls and fixed effects are included in regressions (2), (3), and (4), the significance disappears. For the Net Multiple analysis, none of the regression models show a statistically significant effect of IMPACT on financial performance. Therefore, based on these results, it is not conclusive to claim that being an impact fund deteriorates financial performance compared to traditional funds.

5.2   Hypothesis 2

To examine the second hypothesis, which posits that impact funds employing venture capital (VC) strategies will exhibit superior financial performance compared to funds employing private equity (PE) strategies, multiple regression models have been employed for both performance metrics. The results in table 3 show that the separate effects of the impact variable are consistently negative and significant in all four models for both financial performance metrics. However, the coefficient for the variable VC is not consistently significant across the models. For the Net IRR, in regression (1) and (2), the coefficient is not statistically significant, however in the last regressions the effect becomes significantly negative. For the Net Multiple, the effect of applying VC strategies is consistently negative at a 1% significance level, suggesting that the separate effect of funds applying PE strategies may outperform funds applying VC strategies. When looking at the interaction term between the impact and VC variable, a consistently positive and statistically significant effect (p<0.010) is observed in all four models. This indicates that the combination of being an impact fund and applying VC strategies is associated with higher financial performance. Taking the total effect into account for regression (4), an outperformance of impact funds applying VC strategies over impact funds applying PE strategies of 4.52 ppts (5.01-0.49) based on the Net IRR. Based on the Net Multiple, the outperformance is 0.15 ppts in regression (4). Comparing these findings to the findings by Holtslag et al. (2021), a similarity can be found. Based on the obtained results, it can be concluded that impact funds applying VC strategies indeed outperform traditional funds, therefore the hypothesis cannot be rejected.

Table (2)   The effect of being an impact fund on the financial performance.

Variable	Net IRR				Net Multiple			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
IMPACT	-1.542**	-0.753	-1.169	-1.184	-0.028	0.031	-0.013	-0.005
	(0.810)	(0.778)	(0.752)	(0.121)	(0.043)	(0.044)	(0.040)	(0.042)
Observations	5,439	5,439	5,408	5,408	5,439	5,439	5,408	5,408
R-squared	0.004	0.153	0.156	0.158	0.011	0.068	0.071	0.070
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strategy FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sector FE	No	No	Yes	No	No	No	Yes	No
Geography FE	No	Yes	No	No	No	Yes	No	No
Year FE * Sector	No	Yes	No	No	No	Yes	No	No
Year FE * Geography	No	No	Yes	No	No	No	Yes	No
Year FE * Sector * Geography	No	No	No	Yes	No	No	No	Yes

Notes: This table shows the multiple linear regression results of the impact of being an impact fund on the dependent variables, the winsorized Net IRR, and Net Multiple differentials. The sample consists of 5,439 funds with vintage years between 1990 and 2019. The main independent variable is IMPACT indicating is an impact fund. For regression (1) controls for fund type, fund status, and fund size are added. For regression (2), fixed effects for fund strategy and geography are added, next to the interaction term between the fixed effects of vintage year and sector (consisting of the clustered categories specific and diversified). For regression (3) an interaction term of the fixed effects between vintage year and geography (consisting of the clustered categories emerging market and developing economies) is added to the regression. For regression (4), an interaction term between the fixed effects of the vintage year, sector, and geography is added. The observations in regressions (3) and (4) are lower than (1) and (2) due to the exclusion of the category 'Unknown' when clustering the geography variable which included 31 funds. Robust standard errors are in parentheses and ***$p<0.010$, **$p<0.050$, *$p<0.100$.

5.3   Hypothesis 3

To empirically assess the validity of the third hypothesis, positing that impact funds concentrating on a specific sector demonstrate enhanced financial performance relative to funds with a diversified sector focus, this research employs multiple regression models to scrutinize the performance metrics. When looking at the results in table 4, the separate effect of the impact variable on performance is negative and statistically significant across all four regressions, in line with the previous results. This suggests that being an impact fund (compared to a non-impact fund) is associated with a lower financial performance, based on both financial performance metrics. For the separate effect of funds having a specific sector focus on financial performance, no statistically significant effects can be found. Regarding the interaction term between the impact and specific variable, a positive and statistically significant effect ($p<0.010$) can be observed in all four regressions for both performance metrics. Looking at the total effect of being

an impact fund with a specific sector focus compared to impact funds with a diversified sector focus, an outperformance can be observed of 4.76 ppts[11] in terms of the higher Net IRR. For the Net Multiple, an outperformance of 0.29 ppts is observed. These findings are also in line with the findings by Fiegenbaum & Thomas (1988) and Lossen (2007). Taking the results into consideration, the third hypothesis cannot be rejected.

Table (3)   The effect of impact funds applying VC strategies on the financial performance.

Variable	Net IRR				Net Multiple			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
IMPACT	-3.218***	-2.478***	-2.987***	-3.968***	-0.152***	-0.084**	-0.127***	-0.124***
	(0.927)	(0.887)	(0.863)	(0.880)	(0.044)	(0.044)	(0.041)	(0.043)
VC	0.122	-0.430	-1.297**	-0.488*	-0.160***	-0.192***	-0.244***	-0.197***
	(0.413)	(0.439)	(0.475)	(0.441)	(0.023)	(0.026)	(0.028)	(0.026)
IMPACT * VC	5.027***	4.935***	5.094***	5.008***	0.372***	0.342***	0.335***	0.348***
	(1.761)	(1.630)	(1.648)	(1.676)	(0.099)	(0.092)	(0.092)	(0.095)
Observations	5,439	5,439	5,408	5,408	5,439	5,439	5,408	5,408
R-squared	0.006	0.153	0.156	0.157	0.014	0.066	0.069	0.069
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sector FE	No	No	Yes	No	No	No	Yes	No
Geography FE	No	Yes	No	No	No	Yes	No	No
Year FE * Sector	No	Yes	No	No	No	Yes	No	No
Year FE * Geography	No	No	Yes	No	No	No	Yes	No
Year FE * Geography * Sector	No	No	No	Yes	No	No	No	Yes

Notes: This table shows the multiple linear regression results of the impact of impact funds applying VC strategies on the dependent variables, the winsorized Net IRR, and Net Multiple differentials. The sample consists of 5,439 funds with vintage years between 1990 and 2019. The main independent variable is IMPACT indicating is an impact fund. For regression (1) controls for fund status and fund size are added. Fund type is excluded to prevent collinearity issues. For regression (2), fixed effects for fund strategy and geography are added, next to the interaction term between the fixed effects of vintage year and sector (consisting of the clustered categories specific and diversified). For regression (3) an interaction term of the fixed effects between vintage year and geography (consisting of the clustered categories emerging market and developing economies) is added to the regression. For regression (4), an interaction term between the fixed effects of vintage year, sector, and geography is added. The observations in regressions (3) and (4) are lower than (1) and (2) due to the exclusion of the category 'Unknown' when clustering the Geography variable which included 31 funds. Robust standard errors are in parentheses and ***p<0.010, **p<0.050, *p<0.100.

5.4   Hypothesis 4

To examine the fourth hypothesis, positing that impact funds with a geographic focus on developing economies exhibit superior financial performance compared to funds with a focus on emerging markets, again multiple linear regression models have been employed. Looking at the results in table 5, it can be

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[11]The effect of the variable SPECIFIC is not taken into account since the coefficient is insignificant.

observed that in this case, the estimates for the variable IMPACT are all significant based on the Net IRR, except for regression (4), where an interaction term between the fixed effects of vintage year, geography, and sector are added. The opposite is true for the variable DEVELOPING since no significant effect can be observed in the regressions except for regression (4). Nevertheless, the effect of the interaction term

Table (4)   The effect of impact funds with a specific sector focus on the financial performance.

	Net IRR				Net Multiple			
Variable	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
IMPACT	-3.045***	-2.927***	-2.078**	-2.900***	-0.099**	-0.098**	-0.036***	-0.109**
	(0.958)	(0.906)	(0.937)	(0.910)	(0.049)	(0.046)	(0.049)	(0.047)
SPECIFIC	0.638	0.495	-0.110	1.947	0.010	0.012	0.063	0.119
	(0.388)	(0.387)	(3.768)	(4.100)	(0.021)	(0.022)	(0.225)	(0.256)
IMPACT * SPECIFIC	4.167**	4.706***	3.544**	4.761***	0.195**	0.239***	0.178**	0.287***
	(1.696)	(1.605)	(1.554)	(1.589)	(0.094)	(0.091)	(0.087)	(0.089)
Observations	5,439	5,408	5,439	5,408	5,439	5,408	5,439	5,408
R-squared	0.006	0.149	0.154	0.159	0.012	0.060	0.069	0.072
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strategy FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Geography FE	No	No	Yes	No	No	No	Yes	No
Year FE * Geography	No	Yes	No	No	No	Yes	No	No
Year FE * Sector	No	No	Yes	No	No	No	Yes	No
Year FE * Geography * Sector	No	No	No	Yes	No	No	No	Yes

Notes: This table shows the multiple linear regression results of the impact of impact funds with a specific sector focus on the dependent variables, the winsorized Net IRR, and Net Multiple differentials. The sample consists of 5,439 funds with vintage years between 1990 and 2019. The main independent variable is IMPACT indicating is an impact fund. For regression (1) controls for fund type, fund status, and fund size are added. For regression (2), fixed effects for fund strategy are added, next to the interaction term between the fixed effects of vintage year and geography (consisting of the clustered categories emerging market and developing economies). For regression (3) an interaction term of the fixed effects between vintage year and sector (consisting of the clustered categories specific and diversified) is added to the regression. For regression (4), an interaction term between the fixed effects of the vintage year, sector, and geography is added. The observations in regressions (2) and (4) are lower than (1) and (3) due to the exclusion of the category 'Unknown' when clustering the Geography variable which included 31 funds. Robust standard errors are in parentheses and ***$p<0.010$, **$p<0.050$, *$p<0.100$.

between the variables IMPACT and EMERGING is negative and statistically significant in all regression models. Therefore, the conclusion can be drawn that impact funds with a focus on developing economies outperform impact funds with a focus on emerging markets by 18.04 ppts based on the Net IRR. For the Net Multiple, the outperformance is 0.14 ppts. These findings are in line with the findings of Cambridge Associates (2022) and Cole et al. (2020). This suggests that the combination of being an impact fund with a geographic focus on developing economies is associated with higher financial performance. Taking all of the results into consideration, the hypothesis can therefore not be rejected.

Table (5)   The effect of impact funds with a focus on developing economies on the financial performance.

Variable	Net IRR				Net Multiple			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
IMPACT	-3.433***	-2.832**	-2.714**	-2.950	-0.112	-0.085	-0.086	-0.085
	(1.261)	(1.176)	(1.132)	(1.149)	(0.068)	(0.062)	(0.060)	(0.060)
DEVELOPING	0.429	0.374	5.101	15.005***	-0.028	-0.017	0.027	0.159
	(0.362)	(0.348)	(4.390)	(3.934)	(0.019)	(0.019)	(0.241)	(0.465)
IMPACT * DEVELOPING	3.501**	2.953**	2.733**	3.095**	0.170**	0.140*	0.130*	0.140*
	(1.654)	(1.543)	(1.506)	(1.531)	(0.090)	(0.084)	(0.081)	(0.083)
Observations	5,408	5,408	5,408	5,408	5,408	5,408	5,408	5,408
R-squared	0.006	0.148	0.157	0.158	0.013	0.060	0.071	0.071
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Strategy FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Sector FE	No	No	Yes	No	No	No	Yes	No
Year FE * Sector	No	Yes	No	No	No	Yes	No	No
Year FE * Geography	No	No	Yes	No	No	No	Yes	No
Year FE * Sector * Geography	No	No	No	Yes	No	No	No	Yes

Notes: This table shows the multiple linear regression results of the impact of impact funds with a focus on developing economies on the dependent variables, the winsorized Net IRR, and Net Multiple differentials. The sample consists of 5,439 funds with vintage years between 1990 and 2019. The main independent variable is IMPACT indicating is an impact fund. For regression (1) controls for fund type (PE/VC), fund status (closed/liquidated), and fund size are added. For regression (2), fixed effects for fund strategy are added, next to the interaction term between the fixed effects of vintage year and sector (consisting of the clustered categories specific and diversified). For regression (3) an interaction term of the fixed effects between vintage year and geography (consisting of the clustered categories emerging market and developing economies) is added to the regression. For regression (4), an interaction term between the fixed effects of the vintage year, geography, and sector is added. The observation in all regressions is lower than the total sample size due to the exclusion of the category 'Unknown' when clustering the Geography variable which included 31 funds. Robust standard errors are in parentheses and ***p<0.010, **p<0.050, *p<0.100.

5.5   Robustness tests

Robustness checks are essential in empirical research within the field of economics and finance. Therefore, to explore additional channels and control for potential confounding factors that could explain the main results, additional analyses have been conducted based on sample splits. These checks aim to establish the robustness of the findings across various sub-samples by, in this case, excluding specific years or funds based on size. The robustness checks have been performed on regression (4)[12] for all the hypotheses.

The first robustness check is a sample split based on the vintage year of the funds. The PE and VC industry has experienced significant economic downturns, including the global financial crisis in 2007-

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[12]Taking the interaction term between the fixed effects of the vintage year, geography, and sector into account.

2008. The pre-crisis period, before 2007, was characterized by a relatively stable economic environment and robust markets. In contrast, the post-crisis period, after 2008, witnessed the aftermath of the crisis and its long-lasting effects. This triggered, among others, a global recession, financial market volatility, and increased regulation (Johnston-Ross et al., 2021). These factors influenced the investment dynamics for PE and VC funds creating a more challenging fundraising environment. Therefore the sample has been split between funds with a vintage year between 1990-2007 and between 2008-2019. The second robustness check is the sample split based on the size of the funds. Previous research found that a fund's financial performance decreases with the size of the fund (Chen et al., 2002). In the field of impact investing, the process of identifying suitable investment opportunities is widely recognized as a common challenge faced by practitioners. Therefore larger impact funds are expected to encounter even more formidable obstacles in their pursuit of identifying investments that are in line with the fund's specific investment criteria. To assure the robustness of the results the sample has been split into funds smaller or equal to $250 million and funds larger than $250 million[13].

Looking at the results in table 6, for hypothesis 1, a significant underperformance of impact funds compared to traditional funds (p<0.050) is observed based on the IRR, contradicting the previous findings for regression (4) since no significant effect was found. The conclusion could be drawn that a significant underperformance of impact funds can be found when looking at the funds after the financial crisis (2008-2019). It is possible that the crisis and subsequent economic downturn affected impact funds[14], leading to an underperformance during the period. Additionally, the underperformance is only significant for funds smaller than $250 million. Although not in line with the theory of Chen et al. (2002), this might be the result of resource constraints which might have hindered the ability of smaller impact funds to conduct comprehensive due diligence (compared to traditional funds). Due to this significance, the answer to hypothesis 1 needs to be revised. It remains true that for the full sample between 1990-2019 including all fund sizes no significant underperformance can be observed. However, for funds with a vintage year after the crisis and a size smaller than or equal to $250 million a significant underperformance can be observed. For hypotheses 2, 3, and 4 the results in all of the subsamples are in line with the previously stated results. The combined effect of the interaction variables and the separate variables are always positive, which confirms the outperformance. For hypothesis 4, it should be noted that the outperformance is far more pronounced for impact funds with a vintage year before the financial crisis and funds smaller than or equal to $250 million. A potential explanation could be that the years leading up to the financial crisis may have created a higher degree of turbulence and instability which affected financial performance more in emerging markets than in developing economies. Additionally, the more pronounced outperformance among smaller funds compared to larger funds is in line with the theory by Chen et al. (2002).

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[13]This exact split has been based on the median fund size in the whole sample.

[14]The market volatility has shifted investor sentiment and heightened risk aversion which could have had a more pronounced impact on the performance of impact funds.

Table (6) Robustness tests for both financial performance metrics with sample splits based on a fund's vintage year and size.

	Net IRR				Net Multiple			
	Vintageyear		Size		Vintageyear		Size	
Variable	1990-2007	2008-2019	<=250M	>250M	1990-2007	2008-2019	<=250M	>250M
Hypothesis 1								
IMPACT	0.450	-2.057**	-2.048**	0.065	0.083	-0.059	-0.028	0.029
	(1.294)	(0.894)	(1.124)	(1.010)	(0.073)	(0.049)	(0.063)	(0.053)
R-squared	0.054	0.247	0.172	0.208	0.076	0.069	0.098	0.094
Hypothesis 2								
IMPACT	-0.531	-4.051***	-5.254***	-0.977	-0.086	-0.140***	-0.229***	-0.031
	(1.662)	(0.971)	(1.186)	(1.205)	(0.087)	(0.047)	(0.063)	(0.052)
VC	-1.036	0.138	-0.967	0.453	-0.170***	-0.119***	-0.213***	-0.164***
	(0.655)	(0.587)	(0.591)	(0.682)	(0.037)	(0.036)	(0.035)	(0.040)
IMPACT * VC	1.801*	6.909***	7.371***	4.119**	0.401***	0.285**	0.458***	0.271**
	(2.726)	(2.027)	(2.331)	(2.038)	(0.141)	(0.132)	(0.129)	(0.147)
R-squared	0.050	0.247	0.172	0.208	0.073	0.066	0.086	0.087
Hypothesis 3								
IMPACT	-2.014	-3.251**	-3.845***	-1.834	-0.092	-0.115**	-0.121	-0.095*
	(1.554)	(1.071)	(1.296)	(1.239)	(0.080)	(0.057)	(0.074)	(0.055)
SPECIFIC	2.273	-0.324	2.800	-4.487	0.105	-0.037	0.173	-0.666**
	(4.132)	(1.637)	(4.681)	(3.798)	(0.256)	(0.102)	(0.282)	(0.275)
IMPACT * SPECIFIC	6.313**	3.502**	4.771**	5.680***	0.448***	0.166*	0.247**	0.370***
	(2.608)	(1.887)	(2.366)	(1.983)	(0.144)	(0.108)	(0.131)	(0.117)
R-squared	0.056	0.248	0.173	0.210	0.079	0.070	0.099	0.097
Hypothesis 4								
IMPACT	-1.658	-3.688***	-3.156**	-1.737	0.045	-0.175**	-0.056	-0.100
	(2.071)	(1.237)	(1.482)	(1.229)	(0.104)	(0.070)	(0.079)	(0.083)
DEVELOPING	14.837***	0.446	16.538***	7.993***	0.149	-0.004	0.217	-0.587***
	(4.037)	(4.071)	(4.663)	(0.004)	(0.477)	(0.259)	(0.668)	(0.000)
IMPACT * EMERGING	-3.801*	3.805*	2.280*	-2.676**	0.068*	0.200**	0.058*	0.691**
	(2.611)	(1.758)	(2.235)	(2.113)	(0.144)	(0.098)	(0.126)	(0.106)
R-squared	0.055	0.247	0.172	0.209	0.076	0.070	0.098	0.095

Notes: This table shows the robustness analysis for all the hypotheses. For each hypothesis regression (4) has been tested on its robustness. The sample of 5,439 funds has been split based on the vintage year and fund size. For the vintage year, the sample from 1990-2007 consisted of 2,466 funds, and the sample from 2008-2019 of 2,942. Regarding size, the sample with funds smaller or equal to $250 million consisted of 2,683, and the sample with funds larger than $250 million of 2,725 funds. Note that for each financial performance metric, all of the hypotheses have been tested. Robust standard errors are in parentheses and ***p<0.010, **p<0.050, *p<0.100.

6   Limitations and further research

This research provides several new insights into the dynamics in the impact investing markets, however, similar to any other research, some limitations need to be recognized. These limitations are mainly pertaining both to the data used and the research method. Regarding the data, the first limitation is data incompleteness. As information from established providers is based on voluntary disclosures, this could lead to biased data. Particularly, underperforming funds may have a stronger incentive to withhold their performance, which could affect the accuracy of reported data. Another limitation is the survivorship bias, where retrospectively adding historical performance favors funds with successful exits, potentially resulting in an overestimation of positive returns. Lastly, there is a risk of distortions due to the lack of third-party verification for investment valuations, specifically in early-stage companies, where valuations could potentially be manipulated. These data limitations introduce challenges for an accurate assessment of financial performance and understanding the true dynamics in the VC and PE industries. The research methodology aimed to address limitations in previous studies, such as sample size restrictions, selection biases, and robustness checks. However, challenges remained, including the possibility of false positives in the dataset and the need for a larger sample size to perform more detailed sub-analyses. Verification of data accuracy and the subjective nature of fund classification also posed limitations.

Further research with greater sample sizes and rigorous verification processes is necessary to enhance the robustness of the findings further. Additionally, I would recommend exploring the quantification of social impact methodologies such as the Impact Multiple of Money (IMM) framework, which has been developed by The Rise Fund and The Bridgespan Group[15]. Unlike traditional impact assessment methods, the IMM employs social science research to estimate a company's potential for impact before investments. This is an evidence-based approach that aims to determine how many dollars of benefit a company can generate for society or the planet for each dollar invested. Further research in this area could contribute to a deeper understanding of impact investing and enhance the effectiveness of investment decisions in generating positive social and environmental outcomes.

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[15]https://hbr.org/2019/01/calculating-the-value-of-impact-investing

7 Conclusion

This paper investigates whether impact funds have a negative influence on financial performance compared to traditional funds. To answer this research question, four hypotheses have been tested. A global sample of 5,439 funds has been used between 1990 and 2019. The hypotheses are tested using several multiple linear regressions including several controls and fixed effects. Additionally, several robustness checks have been performed based on a fund's vintage year and size. To answer the main research question of whether being an impact fund deteriorates financial performance compared to traditional funds, the first hypothesis has been tested. The results indicate a significant underperformance of impact funds when adding several fund characteristics as controls however, when additional controls for fixed effects are included, the significance disappears. Therefore, based on the full sample, it is not conclusive to claim that being an impact fund deteriorates financial performance compared to traditional funds. However, when running a robustness test a significant underperformance has been found for funds with a vintage year post-crisis and with a size smaller than $250 million dollars. This underperformance is in line with papers by researchers such as Barber et al. (2021).

To assess the effectiveness of each influencing factor, such as fund strategy, sector focus, and geographic focus, on the financial outcomes of impact funds, hypotheses 2-4 have been constructed. The second hypothesis investigated the impact of different strategies (VC vs. PE) on financial performance. The consistent positive and significant effect of the interaction term between impact and VC combined with the total consistent positive effect[16] on the financial performance indicated that the combination of being an impact fund and applying VC strategies is associated with higher financial performance compared to PE strategies. This remains true after conducting the robustness tests. For the third hypothesis, the influence of an impact fund's sector focus on the financial performance has been investigated. A consistently positive and significant effect of the interaction term between impact and a specific sector focus has been found. Additionally, the total effect on the financial performance was consistently positive, indicating that impact funds with a specific sector focus outperform impact funds with a diversified sector focus, even when performing robustness tests. For the fourth hypothesis, the impact of the geographic focus on financial performance has been analyzed. A combination of the consistent positive and significant effect of the interaction term between impact and a focus on developing economies, and the consistent positive total effect on the financial performance indicates that impact funds with a geographic focus on developing economies outperform impact funds with a focus on emerging markets. These findings remain robust after conducting robustness tests, however, the outperformance is more pronounced for funds with a vintage year pre-crisis and funds smaller than or equal to $250 million. All of these findings for hypotheses 2-4 are consistent with previously mentioned research.

The results of this study contribute to the existing literature by offering nuanced findings on the financial performance of impact funds and examining the effects of various influencing factors. The results challenge existing perspectives and emphasize the need for further exploration and understanding of the financial outcomes of impact investing.

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[16]When taking into account the significant effect of the separate variables.

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A   Appendix

Figure 7 displays the impact page of the company website of the Capricorn Investment Group, a B-Corporation-certified investment platform. In line with the definition "investments made to generate positive, measurable social and environmental impact alongside a financial return", Capricorn aims to deliver enhanced risk-adjusted returns while pressing environmental and social issues. Therefore the activities of Capricorn are recognized as impact investing activities.

Figure (7)   Description of the impact investing activities of the Technology Impact Funds of the Capricorn Investment Group on the company website.
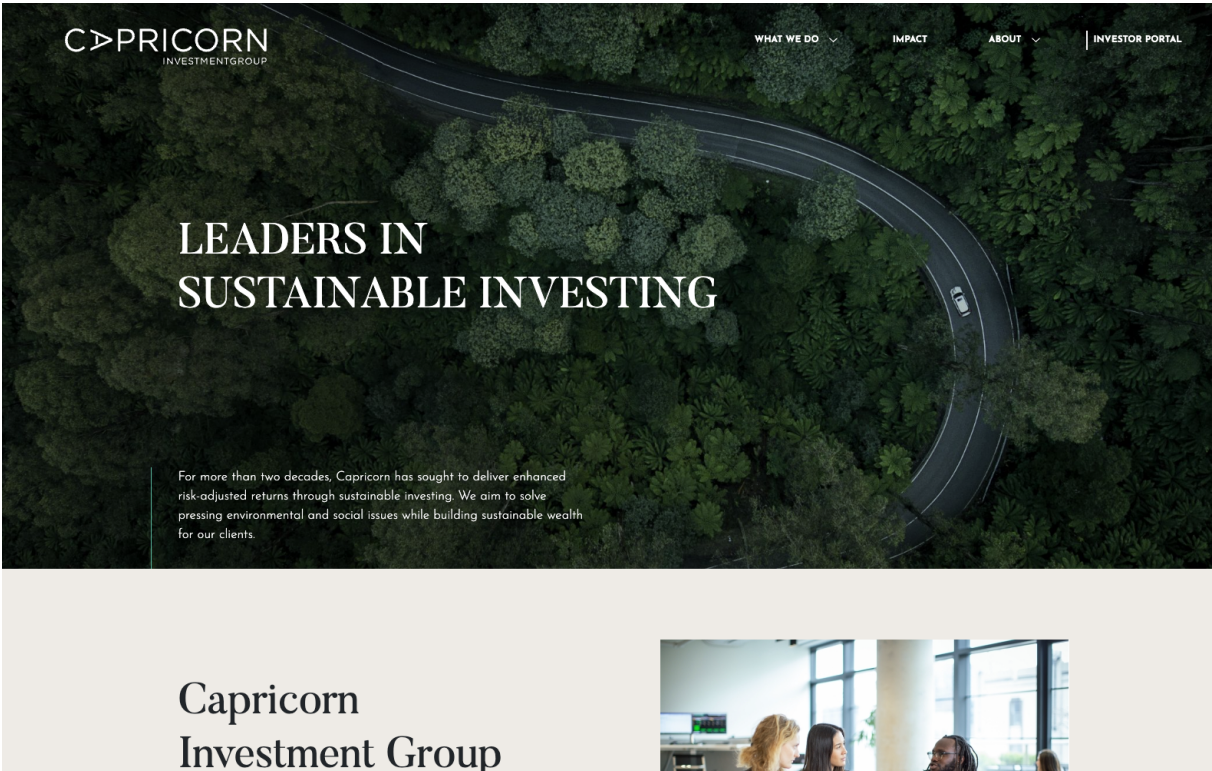
Table (7)   Description of all the financial performance variables discussed in this research, including the sources.

| Variable	Definition	Source
Dependent variables		
NIRR	Expected annualized rate of return that an investor would receive, net of all fees and expenses, over the lifetime of the fund.	Preqin
NM	Ratio of the total value distributed to LPs to the total value of the fund's invested capital. Greater than 1 indicates that the fund has returned more capital to its investors than they have invested.	Preqin
BNIRR	Average benchmark of the Net IRR of a benchmark, chosen to represent a specific market, industry, or investment strategy.	Preqin
BNM	Average benchmark of the Net Multiple of a benchmark, chosen to represent a specific market, industry, or investment strategy.	Preqin
NIRRD	Difference between the Net IRR and the average benchmark Net IRR.	Preqin
NMD	Difference between the Net Multiple and the average benchmark Net Multiple.	Preqin
NIRRD_W	The winsorized version of the NIRRD, in which the extreme values have been replaced with less extreme values to reduce the effect of outliers.	Preqin
NMD_W	The winsorized version of the NMD, in which the extreme values have been replaced with less extreme values to reduce the effect of outliers.	Preqin

Table (8) Description of all the independent variables including impact, fund characteristics, and investment focus variables discussed in this research including the sources.

| Variable	Definition	Source
	Other control variables	
IMPACT	Dummy variable that is equal to 1 if the fund is an impact fund and 0 otherwise.	Impact databases
VC	Dummy variable that is equal to 1 if the fund is a VC fund and 0 otherwise.	Preqin
CLOSED	Dummy variable that is equal to 1 if the fund is closed and 0 if the fund is liquidated.	Preqin
YEAR	Continuous variable representing the vintage year of a fund between 1990 and 2019.	Preqin
SIZE	Continuous variable representing capital raised by the fund from investors.	Preqin
LOG(SIZE)	The logarithmic transformation of the continuous variable Size.	Preqin
STRATEGY	Categorical variable consisting of the strategies: Balanced, Buyout, Co-investment, Early stage, Expansion (Late stage), Fund of funds, Growth, Secondaries, Turnaround, and Venture.	Preqin
SECTOR	Categorical variable consisting of the sectors: Business Services, Consumer Discretionary, Diversified, Energy & utilities, Financial & insurance services, Healthcare, Industrials, Information technology, Raw materials & natural resources, Real estate, and Telecom & media.	Preqin
GEOGRAPHY	Categorical variable consisting of the geographic focus areas: East Asia, Europe (E) & Cen. Asia, Europe (W/N/S), LAC, MENA, Oceania, South Asia, Southeast Asia, Sub-Saharan Africa, Unknown, US & Canada.	Preqin
SPECIFIC	Dummy variable that is equal to 1 if the fund has a specific sector focus and 0 otherwise.	Preqin
DEVELOPING	Dummy variable that is equal to 1 if the fund has a geographic focus on developing economies and 0 otherwise.	Preqin

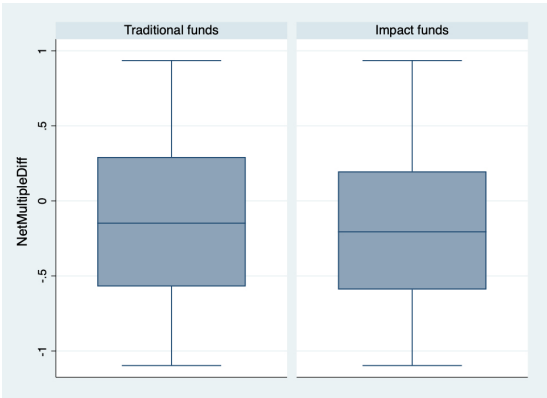Figure (8)   Box plots of the financial differentials with and without outliers.
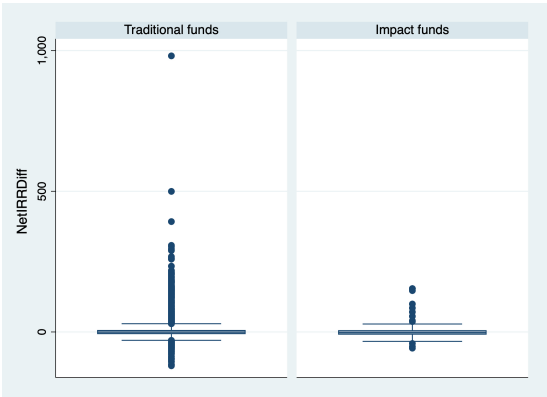
(a) Box plot of the Net IRR Differential including the outliers.
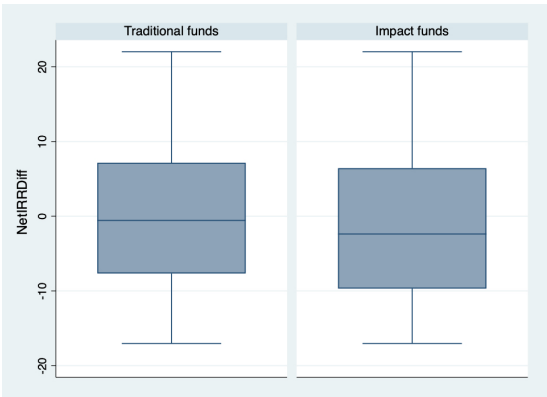
(b) Box plot of the winsorized Net IRR Differential without the outliers.
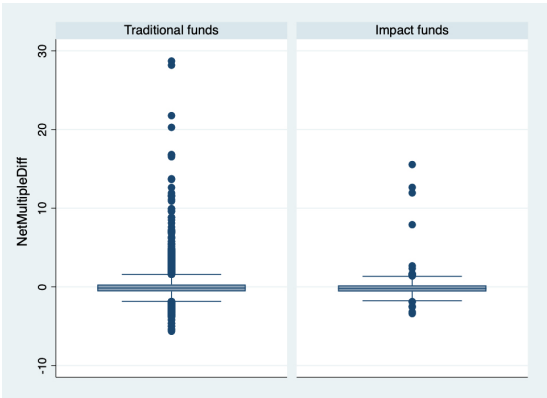
(c) Box plot of the Net Multiple Differential including the outliers.

(d) Box plot of the winsorized Net Multiple Differential without the outliers.