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Sectoral Impact on Private Equity Performance: An in-depth Analysis of Investment Returns & Influencing Factors

Prof. Raffaele Oriani

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SUPERVISOR

Prof.ssa Rosella Santella

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CO-SUPERVISOR

Alessia Tenore
ID: 761511

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CANDIDATE

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ABSTRACT

This thesis titled "Sectoral Impact on Private Equity Performance: An In-depth Analysis of Investment Returns & Influencing Factors" investigates the influence of sectoral investments and sectoral diversification on the performance of Private Equity (PE) funds. Utilizing data from 143 PE funds managed by six major PE firms between 1980 and 2024, the study employs an Ordinary Least Squares (OLS) regression model to analyse the relationship between sectoral investment strategies, sectoral diversification, and fund performance, measured by the Internal Rate of Return (IRR).

The findings highlight the quest to pinpoint the most profitable sectors within PE investments. Notably, the Healthcare sector emerges as a significant contributor to PE fund returns, potentially due to its growth potential, resilience to economic downturns, and diverse investment opportunities. Moreover, to complement and deepen the analysis, a dedicated section will explore the impact of the COVID-19 phenomenon on PE dynamics, providing further insights into its implications for PE fund performance and investment strategies.

In terms of diversification, the study employs the Herfindahl–Hirschman Concentration Index (HHI) to measure sectoral diversification. The results indicate a negative relationship between sectoral diversification and fund performance, suggesting that specialized funds focusing on specific industries may achieve higher returns due to expertise and informational advantages.

Additionally, control variables including fund size, economic cycle, PE firm experience, and 'naive' diversification were incorporated into the analysis. The study finds that while 'naive' diversification has a positive impact on fund performance, fund size, global economic conditions, and PE firm experience do not significantly influence returns in the analysed sample.

Overall, the research offers significant understanding into the elements influencing the performance of PE fund, highlighting the importance of sectoral investment strategies and diversification. The findings contribute to the existing literature on PE and offer practical implications for PE firms, funds, investors, and target companies.

INTRODUCTION

This thesis delves into the intricate landscape of PE, starting with a foundational exploration in **Chapter 1**. Here, the essence and evolution of PE are meticulously examined, tracing its historical development and addressing the industry's contemporary challenges. Additionally, the chapter sheds light on the core mechanics of PE value creation, emphasizing both operational improvements and multiple expansion as pivotal contributors. Chapter 1 further delves into the performance metrics that gauge success in PE, with a special focus on the IRR. The discussion then transitions to the strategies employed by PE firms to exit their investments, highlighting the various exit routes they commonly opt for.

Building upon this foundational understanding, **Chapter 2** shifts the lens towards the characteristics that define an "ideal" target company and the drivers influencing PE performance. This exploration is supported by an extensive review of existing literature, identifying gaps in the current research landscape. The chapter culminates in the formulation of research questions and hypotheses, paving the way for empirical investigation.

In **Chapter 3**, the focus narrows down to the sectoral impact on PE investment returns. Utilizing data from the PitchBook database, the study employs an OLS regression model to analyse the influence of sectoral investment and sectoral diversification on fund performance. Control variables, including fund size, PE firm experience, economic cycle, and 'naive' diversification, are also integrated to refine the analysis. The chapter meticulously presents the empirical results and offers an in-depth interpretation, linking the findings back to the research questions.

Concluding the thesis, **Chapter 4** synthesizes the key findings, highlighting their implications for PE practitioners and stakeholders. It underscores the multifaceted nature of PE fund performance, influenced not only by sectoral investments but also by a myriad of other factors such as management quality, market timing, and business model efficacy. The chapter also underscores the potential limitations of the study and suggests avenues for future research, aiming to further enrich the understanding of PE dynamics and strategies.

CHAPTER 1: THE PRIVATE EQUITY FUNDAMENTALS

1.1 What is Private Equity?

The recent global boom in PE markets has sparked increased interest among academics and practitioners alike in understanding the nature and impact of PE activities. (Caselli, & Negri, 2021). Broadly defined, private equity (PE) [1] indicates all institutional investments carried out into risk capital in the medium to longer-term, aimed at enhancing the company objected of the investment, in order to achieve a greater capital gain at the time of disposal (Wood, & Wright, 2009).

PE investments are generally made by funds that share a common organizational structure (see Fenn, Liang, and Prowse (1997) for more discussion); funds are pooled together from various investors by a General Partner (GP), typically specialized PE firms such as KKR or Carlyle (refer to *Figure 1.1* for an overview of major PE firms).

*Figure 1.1* **LIST OF PE FIRMS – Non Exhaustive (Pitchbook, 2023)**

The GP assumes the role of initiating and administering the fund, managing investments, collecting money from investors, and distributing returns back to

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investors, thus having control over the fund (Cendrowski et al., 2012). On the other hand, Limited Partners (LPs) are the investors and owners in the fund, which include financial institutions, pension funds, endowments, foundations, sovereign wealth funds (SWFs), high net worth individuals, and family offices. Despite being owners, LPs have limited liability for losses (Easton et al., 2023), as they are not involved in managing the fund, with their liability capped at the total value of their committed capital. This contrasts with the GP, who takes on all liability, including legal liability, often structured as Limited Liability Companies (LLCs) to shield individuals within the firm from this liability.

Figure 1.2 **PRIVATE EQUITY STRUCTURE (Fenn et al., 1997)**
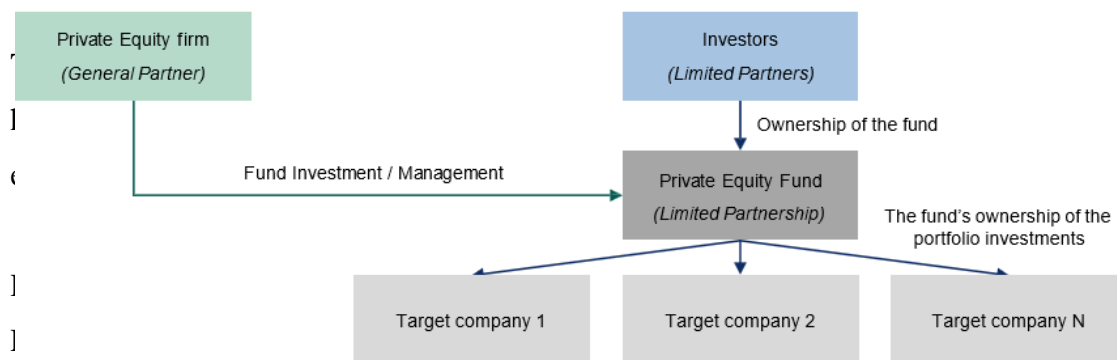
The PE timeline (the Fund Term) typically spans over a fund term of around 10 years, with optional extensions (Gompers et al., 2019). The process involves formation, fundraising, and deal sourcing, where the fund is legally established, fundraising is conducted (with GPs committing a portion of capital to align interests), and initial target companies are identified. Subsequently, investments are made in target companies using capital from LPs, and the GP works with these companies to increase their value through various strategies such as organic business development, internationalization, sector consolidation, sustainability initiatives, and professionalization (Hammer et al., 2017).

After a period of investment and portfolio management, exits from target companies occur, leading to distributions of capital back to LPs. Typically, investments are held for 3-5 years before being realized, with distributions made to LPs as they occur (Stoff & Braun, 2014). However, there are exceptions such as secondary transactions, which are optional and depend on macroeconomic factors. In some

cases, funds may extend their lifespan to fully realize value from investments through continuation funds (Mason & Utke, 2023).

Figure 1.3 **FUND TERM (Stoff & Braun, 2014)** [2]

How PE Firms Earn Money

PE fund managers receive the industry standard "*two and twenty*": a two percent management fee (paid by LPs to the GP in return for managing the fund portfolio) and twenty percent profits interest. The latter is known as *Carried interest*, and it ensures GPs align their interest with the LPs - as this is their main source of wealth creation (for more discussion on monitoring and interest alignment see Easton et al., 2023).

By opting to receive a portion of their compensation in the form of partnership profits, GPs postpone income stemming from their labor efforts and reclassify it from ordinary income to long-term capital gain (Borysoff et al., 2022). Typically, GPs are unable to collect any promote until the fund attains a specified preferred return, often ranging between 5-8% of net profit. This practice ensures that LPs do not begin paying promotes until they have attained a reasonable return commensurate with the risks they undertake. Additionally, most private funds impose an administrative fee, which transfers selected fund expenses and shared services—such as fixed costs related to audit, accounting, and legal matters—to the LPs. They tend to amount to no more than 0.10% to 0.15% of fund assets[3].

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[2] Please be aware that this timeline is for illustrative purposes only. Each fund operates on a unique schedule, especially concerning the investment period and the possibility of extensions. Additionally, the investment and harvesting periods are not rigidly defined; they often overlap significantly. For instance, an investment made early in the fund's life may start generating cash flows before later deals are finalized.

[3] Moreover, private funds frequently receive supplementary fees from third parties associated with the fund's activities. These fees may encompass placement fees, directors' fees, and transaction fees. Ideally, these additional fees are fully credited back to the LPs, thereby diminishing the net management fee paid.

1.2 Private Equity Evolution and Today's key Challenges

The PE industry has undergone remarkable evolution since its inception, originating in the 1940s with the establishment of venture capital firms aimed at financing innovative ideas (Cendrowski et al., 2012). Subsequently, buyout strategies gained prominence in the 1980s, marking a pivotal shift in the industry's focus. Since then, the PE landscape has experienced significant growth, particularly following the global financial crisis (Bernstein, Lerner & Mezzanotti, 2019), which spurred macroeconomic conditions featuring low interest rates and high credit availability. This environment led to a consistent rise in valuations across public and private markets, driving investors to seek high-return asset classes like PE.

As of Q2 2022, global assets under management in the industry totaled $12.8 trillion, underscoring its substantial impact on the global economy (Preqin, 2023).

Figure 1.4 **GLOBAL AUM BY ASSET TYPE - $T (Preqin, 2023)**
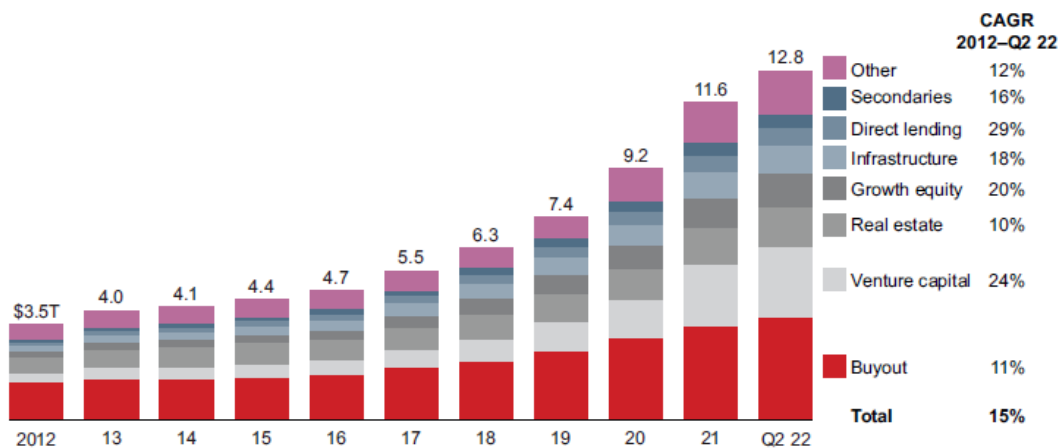
However, despite its growth and contributions, the PE industry faces key challenges in the contemporary landscape. Heightened competition, driven by the proliferation of PE funds and increased valuation expectations from sellers, has made it increasingly difficult for managers to identify attractive investment opportunities, especially for very large funds (Browne et al., 2020). Downward pressure on fees, resulting from regulatory scrutiny and intensified competition, has compelled managers to adopt more transparent fee structures and offer fee discounts to attract investors. Moreover, macroeconomic uncertainty has prompted caution among PE funds in deploying capital into new investments, exacerbated by rising debt costs due to interest rate hikes imposed by central banks. Additionally, regulatory focus on the

PE industry has intensified, particularly with the growing accessibility of retail investors to this investment class, leading to stricter compliance requirements concerning environmental, social, and governance factors (Indahl & Jacobsen, 2019), cybersecurity, data protection, anti-money laundering, and know-your-client checks.


1.3 Private Equity Value Creation

In the realm of PE investment, the pursuit of value creation within portfolio companies stands as a fundamental objective for managing firms. This imperative is underscored by the necessity to realize profitable returns upon divestiture, thereby fulfilling obligations to limited partners (LPs) and securing a favorable carried interest. Kaiser and Westarp (2010) point out that managers employ three main strategies to enhance the exit value achieved by the PE fund: utilization of leverage, multiple expansion, and implementation of operational enhancements.

The landscape of value creation strategies has undergone significant evolution since its genesis in the 1980s (Pratch, 2005). Initially, a substantial proportion of returns derived from leveraging considerable debt to procure portfolio assets, thereby amplifying equity investment yields. Consequently, buyout managers gravitated toward enterprises boasting stable cash flows, often within sectors characterized by moderate but steady growth trajectories such as industrials and consumer staples. However, this approach constrained reinvestment potential due to the allocation of cash flow towards debt servicing, thereby moderating portfolio company growth prospects.

Today, a departure from debt-intensive investment structures is observed (BCG, 2022): contemporary PE strategies pivot towards a paradigm of active ownership, prioritizing operational enhancements to foster portfolio company growth and value. Notably, major PE firms have established dedicated teams specializing in diverse facets of value augmentation, including but not limited to customer acquisition, supply chain optimization, and talent management. Concurrently, while multiple expansion remains a viable avenue for value creation, its efficacy is contingent upon macroeconomic conditions, with downturns typically heralding diminished valuation multiples. Consequently, prudent timing and market awareness become imperative considerations for firms reliant on this strategy (Krysta & Kanbach, 2022).

Figure 1.5 **PE VALUE CREATION METHODS - % (BCG, 2022)**
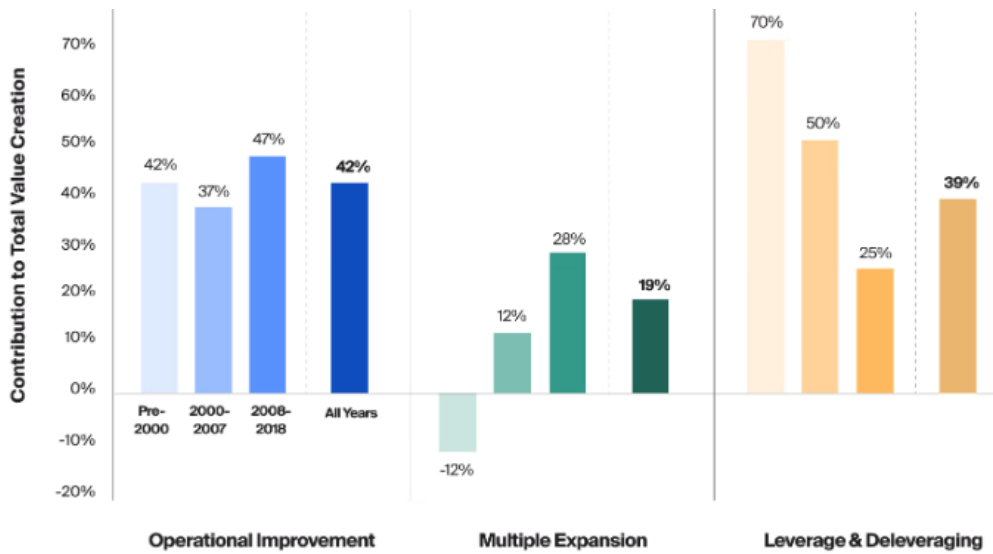
1.3.1. Leverage

A conventional method employed by PE firms to generate value involves leveraging borrowed capital to finance acquisitions. A pivotal mechanism underpinning the high returns achieved through successful LBOs is the reduction of the weighted-average cost of capital (WACC) by augmenting debt, which typically incurs lower costs compared to the sponsor's equity. Consequently, as debt obligations are progressively discharged, equity value appreciates, yielding robust returns, as exemplified below (Krysta, 2022).

Figure 1.6 **LEVERAGE MECHANISM (Krysta, 2022 & Kaiser, 2010)**
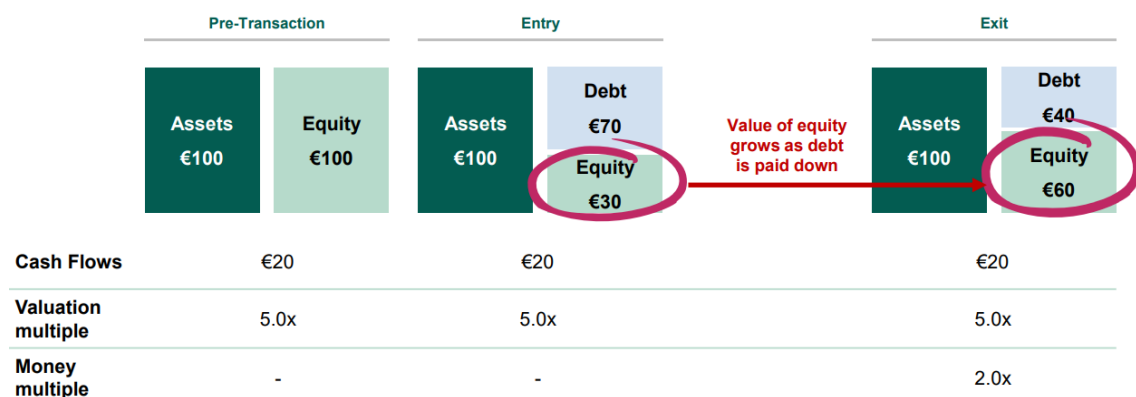
The illustration demonstrates that profitability on the investment can be attained solely through the judicious use of external debt, without necessitating significant company growth. Moreover, leveraging debt enables PE funds to deploy more substantial investments or undertake a greater number of ventures with the equity raised from

limited partners (LPs). Additionally, interest expenses incurred through leveraging are typically tax-deductible, and the heightened leverage lead to enhanced business efficiency, driven by stringent demands from lending institutions, which are vested stakeholders in the venture. However, high leverage amplifies default risk, compromising financial stability; this is exacerbated during periods of economic adversity, wherein company revenues often decline, rendering them unable to meet debt servicing obligations. Furthermore, elevated leverage may curtail strategic and financial agility, impeding the pursuit of operational enhancements due to the strain exerted on the balance sheet. The extent of debt that can be procured for a single investment is scrutinized using various metrics [4] by financial institutions, heavily reliant on the cash flow profile and growth trajectory of the target company. Debt raised for the acquisition is in fact repaid utilizing cash flows generated by the acquired entity, with the company's assets often serving as collateral. It is imperative to note that numerous jurisdictions have legislation prohibiting financial assistance, precluding the acquired company from facilitating its own acquisition. To circumvent this, PE funds commonly establish a special purpose vehicle (SPV) to acquire the target company (Gorton & Souleles, 2007). Debt is then extended to the SPV and repaid using cash flows provided by the target company to the SPV, including dividends and other revenue streams.

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[4] Net Financial Debt to EBITDA: For instance, a ratio of 3.0x implies that the company would require three years of consistent EBITDA to repay the debt. However, this metric may overlook certain cash components excluded from EBITDA, such as capital expenditure and working capital. Interest Coverage Ratio: Calculated as (EBITDA - Capex) / Interest, this ratio enables banks or debt funds to evaluate the likelihood of the company's ability to service at least the interest portion of the debt. Cash Flow Profile and Downside Sensitivities: These factors ascertain the company's capacity to service debt across diverse scenarios, particularly in challenging economic conditions. Gearing / Loan to Value: This metric denotes the % of the purchase price financed with debt.

Figure 1.7 **SPECIAL PURPOSE VEHICLE (Gorton & Souleles, 2007)**
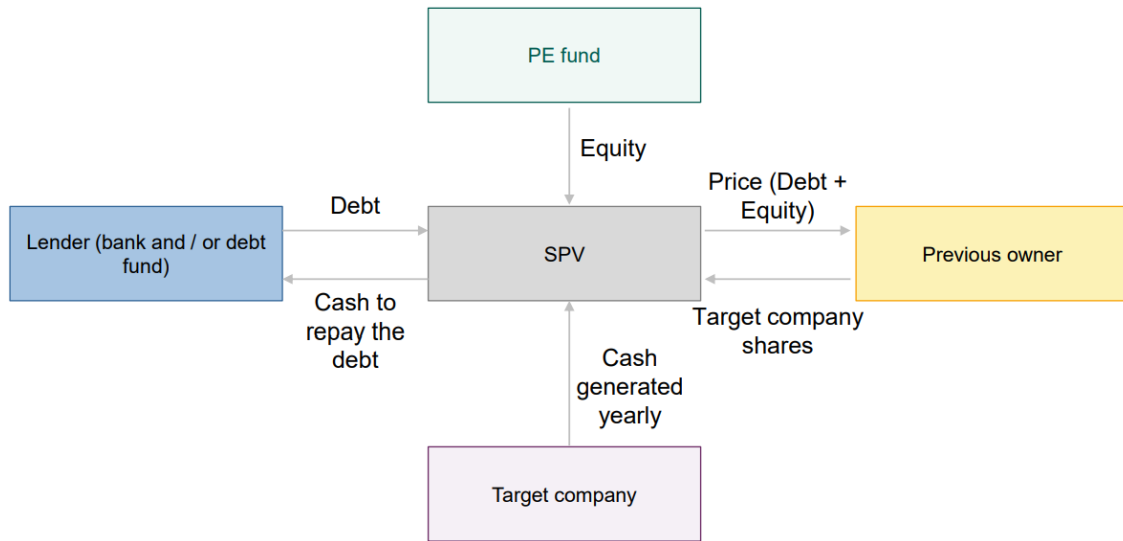
1.3.2. Operational Improvements

In the context of PE investment, operational improvements represent a pivotal avenue through which value is cultivated within the target company. These enhancements encompass a spectrum of initiatives, ranging from customer acquisition and supply chain optimization to talent management and the assimilation of sizable acquisitions. Additionally, they encompass the enhancement of sales force efficacy, reduction of overhead expenses, and the optimization of financial reporting and management information systems. Such endeavours are instrumental in augmenting cash flow, thereby engendering revenue growth and bolstering profitability margins.

Operational improvement stands out as a preeminent source of value generation due to its replicable and enduring nature, which hinges on the expertise and efforts of the GP rather than external market dynamics. However, it is imperative to underscore that not all facets of operational enhancement are universally applicable. The GP exercises discernment by prioritizing 3 to 4 areas that are most conducive to value creation within a given business context. According to Kaiser (2010), the two primary constituents underpin operational improvement strategies are:

1. Revenue Growth, historically the principal contributor to value creation, manifests through both organic and inorganic avenues. Organic strategies entail augmenting sales of existing products or services to current clientele, diversifying product or service offerings, and penetrating new markets, whether by geographical expansion or

product diversification. Inorganic growth, conversely, is often pursued through supplementary acquisitions.

2. Margin Expansion, though making a relatively smaller contribution to total value creation, is achieved through strategies aimed at bolstering Earnings Before Interest, Taxes, Depreciation, and Amortization (EBITDA) margins. These strategies typically involve cost reduction initiatives, alongside the integration of technological advancements and automation.

Figure 1.8 **OPERATIONAL IMPROVEMENTS (Krysta, 2022 & Kaiser, 2010)**
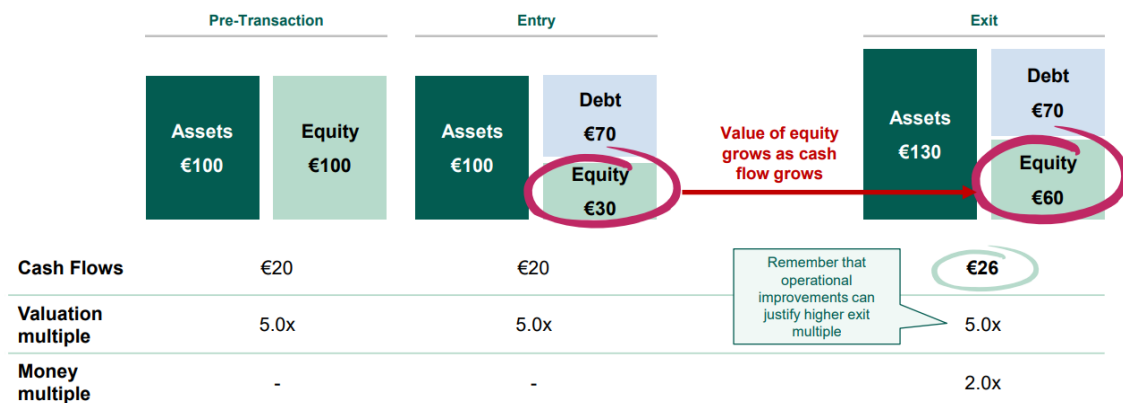
The following table aims to provide some Case Studies reflecting selected operational improvements used by GPs today:

Company	Sponsor	Overview
quirónsalud	CVC Capital Partners	Víctor Madera, who founded IDCSalud, was in search of a partner to help expand his hospital network from Madrid to the entire Spanish market. - CVC made an investment in 2014 to support his vision of establishing the Spanish private healthcare leader operator. - A major initiative among many operational improvements was the merger with Quirón in 2014. CVC aided in the integration of IDCSalud and Quirón, creating Quirónsalud and achieving significant synergies. - In 2016, after two years, CVC sold Quirónsalud to Fresenius, one of the world's largest healthcare conglomerates, for €5.8

		billion, making a gain of €2.6 billion. This sale is recognized as one of the most lucrative PE investments in Spain.
igenomix	Charme Capital Partners	Igenomix is a prominent global biotechnology firm specializing in reproductive genetic testing. Originating from IVI, one of the largest in-vitro fertilization clinics worldwide, it became an independent entity in 2011. Initially, its growth was limited due to its close ties to IVI's core clinic operations. - In 2016, Charme acquired Igenomix to accelerate its international expansion in both developed and emerging markets, enhance its R&D capabilities for pioneering genetic innovations in reproductive medicine, and broaden its range of genetic testing services, including the introduction of new proprietary tests. - During Charme's ownership, Igenomix's EBITDA rose from €8.1 million in 2016 to €26.6 million in 2019. That same year, they sold the company to EQT, a global PE firm, achieving a 4.3x return while retaining a minority stake to continue benefiting from the company's growth.
MONCLER®	EURAZEO	Moncler, established in 1952, initially specialized in technical mountain gear. Today, with support from Eurazeo, it offers a wide range of luxury apparel known for exceptional creativity, design, and quality worldwide. - When Eurazeo acquired a stake in Moncler, the company's growth was propelled by an ambitious strategy focused on two main areas. Firstly, product development: Moncler expanded its product line to be more luxurious and daring while staying true to its original brand identity. Secondly, distribution: Moncler enhanced its retail presence with stores designed as experiential spaces, including flagship locations in key fashion cities such as Paris, Tokyo, London, and Milan, as well as

| | | increasing its footprint in international airports. |
| | | - Eurazeo held a 45% stake in Moncler from 2011 to 2019, a period during which it saw its investment multiply by 4.8x, culminating in proceeds of €2 billion upon selling its stake. |

1.3.3. Multiple Expansion

Valuation multiples, such as the EBITDA/earnings ratio, are influenced by various factors including the market environment, a company's growth potential, operational performance, and competitive positioning. Consequently, a PE firm may seek to capitalize on favourable macro-economic conditions and the growth trajectory of its portfolio company to sell at a higher multiple than the initial acquisition price. Ideally, the PE fund manager should acquire companies when market multiples are lower than average and divest when multiples are higher than average (Baker et al., 2015).This aspect of value creation, while influenced significantly by market timing, should not constitute the primary focus of the General Partner (Krysta et al., 2022). Nevertheless, GPs can implement strategies to potentially influence multiple expansion. The successful execution of operational enhancements may enhance a buyer's readiness to pay a premium valuation. Additionally, GPs may endeavour to reconfigure or expand existing facets of the enterprise that are perceived more favourably and can command superior valuations. Furthermore, the GP's capacity to identify assets at advantageous prices and exercise pricing discipline during mergers and acquisitions may contribute to achieving multiples above the prevailing market rates.

Multiple expansion is driven by three key variables: the initial entry valuation, the revaluation of the asset's worth during the ownership period (achieved through strategic repositioning), and the valuation at the point of exit (Kaiser et al., 2010).

Figure 1.9 MULTIPLE EXPANSION (Krysta, 2022 & Kaiser, 2010)

	Pre-Transaction	Entry	Exit
Cash Flows	€20	€20	€20
Valuation multiple	5.0x	5.0x	6.5x
Money multiple	-	-	2.0x
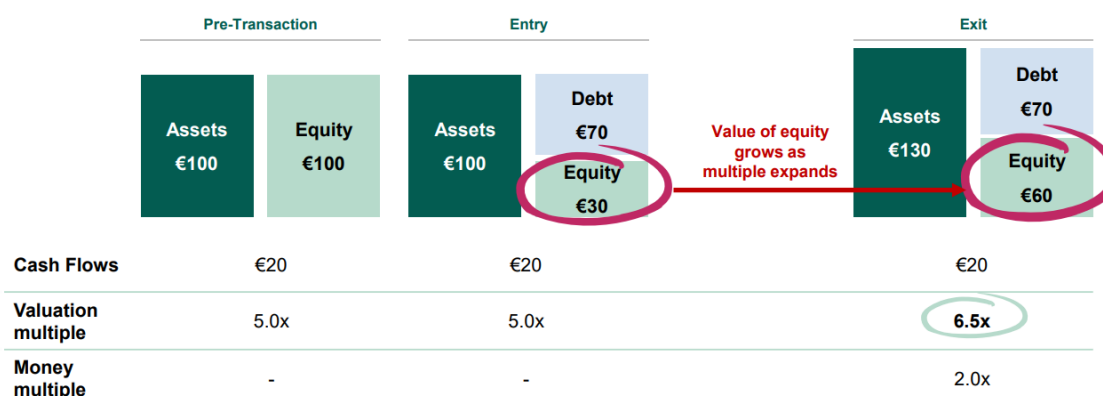
1.4 Performance Measures in Private Equity

The evaluation of financial performance in PE funds plays a crucial role for the investors, namely limited partners, channelling their capital into these funds with the primary objective of yielding returns commensurate with the associated risks, illiquidity, and other expenses (Korteweg & Sorensen, 2023).

However, assessing the performance of private investments poses distinct challenges compared to publicly traded securities. Absence of regularly quoted market prices precludes the use of conventional financial performance models like the capital asset pricing model (CAPM) and other factor models. Instead, evaluation hinges solely on cash flows exchanged between the fund and its limited partners, giving rise to several complexities and constraints.

At present, unanimity eludes the identification of a singular optimal measure or methodology for appraising PE investment performance. Commonly employed measures include (1) multiples such as Total Value to Paid-In capital (TVPI) or Multiple on Invested Capital (MOIC), (2) Internal Rate of Return (IRR), and (3) Index Comparison Methods (ICM), often utilizing the Public Market Equivalent (PME). Each metric carries its own set of advantages and disadvantages, hence it is customary to glean a nuanced perspective on overall performance (Harris et al., 2014).

A typical PE fund operates over a ten-year lifespan. Limited partners, primarily institutional investors with substantial investable assets, commit capital to the fund at inception. However, this capital is not disbursed immediately; rather, it is gradually called upon as needed for investments, typically acquisitions of equity in private

entities. Upon such calls, limited partners *contribute* the requested capital to the fund. Subsequently, after holding the equity investment for a period, typically several years, the fund divests or exits the investment, with proceeds net of fees distributed back to the LPs. In some instances, the fund may directly distribute shares in a private company.

Cash flow between the PE fund and its LPs comprises *contributions* and *distributions*. *Contributions* encompass payments from limited partners to the fund, including management fees. *Distributions*, conversely, represent payments from the fund to limited partners. The irregularity of these contributions and distributions poses challenges, with funds often experiencing extended periods without transactions and occasional bursts of multiple transactions in quick succession.

The **Multiple on Invested Capital (MOIC)**, also referred to as equity multiple or cash on cash multiple (COC), serves as a metric to evaluate the value generated by an investment relative to its initial cost. MOIC quantifies the total distributions received from an investment, considering both realized and unrealized values if the assets remain unsold, divided by the initial investment amount. It encompasses all proceeds accrued by the PE fund, including dividends. Net MOIC adjusts for fees, expenses borne by LPs, and carried interest, while Gross MOIC does not incorporate such deductions. Expressed relatively, MOIC indicates how many times the total proceeds from divestment exceed the initial investment (e.g., if divestment yields €230m from an initial €100m investment, the MOIC is 2.3x).

$$\text{MOIC} = \frac{\Sigma_t Distributions}{\Sigma_t Contributions}$$

From a finance theory standpoint, multiples present a simplistic measure disregarding the timing of cash flows and investment risks[5]. Despite this limitation,

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[5] To illustrate, an investor who contributes $100,000 in 2020, and one year later, in 2021, receives a return of $200,000, has a very different financial performance than if the contribution were followed by a return of $200,000 many years later. Nevertheless, both investments have the same 2x multiple. For this reason, it difficult to use multiples to compare investments across asset classes, with different risks, and over different time periods.

multiples offer simplicity, intuitiveness, and transparency, with minimal susceptibility to manipulation[6] (Korteweg, 2023).

The **Internal Rate of Return (IRR)** is defined as the discount rate equating the net present value of the cash flow stream to zero. Unlike MOIC, which portrays absolute growth in value, IRR offers a time-weighted perspective on returns. Similar to MOIC, IRR can be presented in net or gross terms, considering or excluding fees and expenses. Key advantages of the IRR include its representation as an annual compounding return, enabling comparability with returns from similarly risky investments over varying timeframes.

$$\Sigma_t \left[\frac{(Distributions\ t\ -\ Contributions\ t)}{(1 + IRR^t)} \right] = 0$$

However, its applicability diminishes for more complex cash flow; mathematically, the IRR may not exist, and it may not be unique. Economically, the IRR implicitly assumes that capital can be reinvested at the IRR rate. Moreover, a fund manager can exploit the limitations of the IRR by deliberately structuring the investments and cash flows to inflate the fund's IRR (Korteweg, 2023).

Pioneered by Long and Nickels (1996), **index comparison methods** aim to compare the returns from fund investments to the returns hypothetically attainable in the public market. For every contribution that is made to the fund, a similar amount is invested in this hypothetical portfolio. Similarly, for every distribution received from the fund, the hypothetical portfolio balance is reduced by the same amount. At the end of its life, when the fund is fully realized, its performance can be compared to the performance of the hypothetical portfolio. If the remaining balance on the hypothetical portfolio is negative, the fund investment has outperformed the portfolio and thus outperformed the market. The **Public Market Equivalent (PME)**, introduced by Kaplan and Schoar (2005), quantifies this comparison. Let $R_M^{t,T}$ denote

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[6] For example, a fund cannot inflate its multiple by using credit lines to move contributions and distributions back and forth in time.

the realized return on the market from time t to T. The hypothetical fund's ending balance at time T is then:

$$Balance_T = \Sigma_t \left[Contribution\ t\ (1 + R_M^{t,T}) \right] - \Sigma_t \left[Distribution\ t\ (1 + R_M^{t,T}) \right]$$

A negative ending balance means that the hypothetical portfolio has underperformed the fund. Noting that $(1 + R_M^{t,T}) = (1 + R_M^{0,T})/(1 + R_M^{0,t})$, a negative balance is equivalent to the following ratio, which is the PME, exceeding one:

$$PME = \frac{\Sigma_t \left[\dfrac{Distribution\ t}{(1 + R_M^{0,t})} \right]}{\Sigma_t \left[\dfrac{Contribution\ t}{(1 + R_M^{0,t})} \right]}$$

A PME exceeding one implies outperformance by the fund.

Challenges emerge in interpreting the PME via index comparison, particularly when the fund's risk diverges significantly from the market[7]. Moreover, for funds with substantial early distributions, the hypothetical portfolio may yield a negative balance, misleadingly suggesting superior fund performance. Variations of the PME, such as PME+ and mPME, have been devised to address these concerns (Korteweg & Sorensen, 2023).

Table 1.10 **PROS & CONS OF PE PERFORMANCE MEASURES (Harris et al., 2014)**

Measurement Methodology	*Pros*	*Cons*
Multiples (TVPI, MOIC)	- Simplicity, transparency - Intuitive, Easy to calculate - Minimal susceptibility to manipulation	- Does not account for timing of cash flows and investment risks
IRR	- Time-weighted perspective on returns - Enables comparability with similar investments	- Limited applicability to complex cash flows - Possible lack of or non-uniqueness of IRR

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[7] To illustrate, the return of a low-risk bond fund can be below the realized return on the public market even though the bond fund has outperformed on a risk-adjusted basis.

| | - Represents an annual compounding return rate | - Implicit assumption of reinvestment of capital at IRR rate |
| Index Comparison Methods (PME) | - Allows comparison of fund performance to public market.
 - Indicates whether fund outperformed or underperformed market. | - Difficulty in interpreting PME when fund's risk significantly diverges from market
 - Potential distortion of performance if fund has large early distributions |

1.5 Exit Strategies in Private Equity

PE funds must ultimately divest their portfolio companies, ideally generating a profit, in order to return capital to their LPs. Excluding instances of bankruptcy, PE firms typically undertake over 1,500 exits each year. (Pitchbook, 2023). Distinguished PE funds often contemplate the exit strategy even prior to acquiring a company, integrating this consideration into their investment due diligence process. A McKinsey publication highlights the significance of exit readiness throughout the duration of ownership [8]. A successful exit hinges on several factors, notably market timing, wherein economic cycles significantly influence exit multiples (see *Figure 1.11*), ranging from 2-5x between peak and trough periods, and the application of best practices - i.e. conduct a readiness assessment approximately 18 months before the intended exit date; showcase the potential for further growth to potential acquirers; proactively address and manage potential challenges; gain a deep understanding of the prospective buyer; building trust and credibility with stakeholders, etc (Green et al., 2018). In essence, a critical aspect of effective exit preparation involves continually refining a thoroughly developed, clearly articulated, and evidence-supported perspective on why an asset presents an appealing investment opportunity. (McKinsey, 2019).

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[8] To delve deeper into the entire exit procedure, refer to Alastair Green, Wesley Hayes, Laurens Seghers, and Eyal Zaets, "Private equity exits: Enabling the exit process to create significant value," July 2018, McKinsey.com.

Figure 1.11 **ECONOMIC CYCLES' INFLUENCE ON EXIT MULTIPLES (Jiménez-Blanco & Monteagudo, 2023)**

(€m)	Entry	Exit			
		Base	More growth	More cash generation	More multiple
EBITDA	10	15	20	15	15
Multiple	10x	10x	10x	10x	15x
Enterprise Value	**100**	**150**	**200**	**150**	**225**
Debt	-50	-50	-50	0	-50
Equity	50	100	150	150	175
CoC/MoM		**2.0x**	**3.0x**	**3.0x**	**3.5x**

Figure 1.12 **EUROPEAN PE EXIT MULTIPLES, 2018-2023, Median EV/EBITDA (PitchBook, 2023)** Timing holds significance and accentuates the necessity to enhance operational value within the business prior to exiting, aiming to mitigate the effects of economic cycles [9].
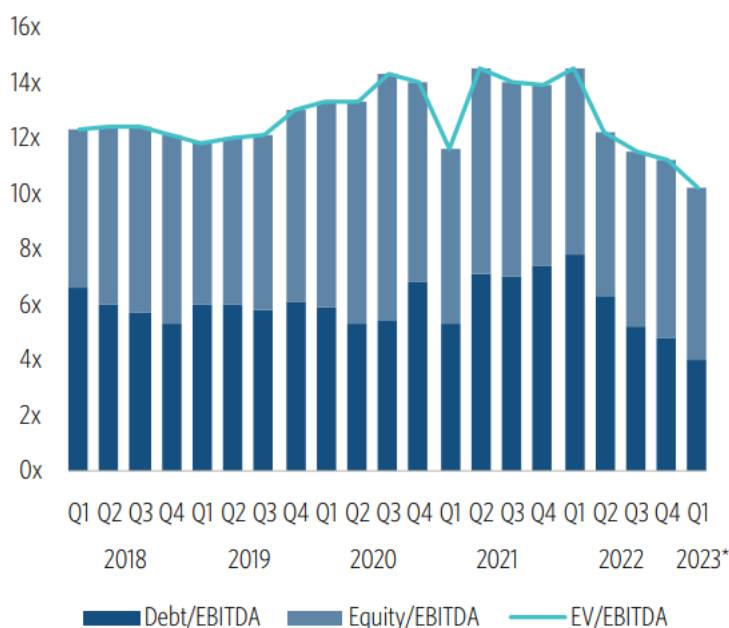
The various avenues for PE exit encompass distinct strategies and considerations, each with its own set of advantages and drawbacks.

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[9] European median buyout multiples experienced a decline from a peak of 14.5x EV/EBITDA in Q1 2022 to 10.2x EV/EBITDA in Q1 2023 on a rolling four-quarter basis. Over the past decade, sponsors have typically realized value through buyout multiple expansion, benefiting from favorable credit conditions. However, with tightening credit conditions, there is expected to be a shift towards placing more emphasis on revenue and margin expansion to continue generating value. This shift is likely to increase pressure on exit activity, as sponsors may opt to hold onto their assets for longer periods to meet return targets.

Initial Public Offering (IPO): An IPO, involving the listing of a company on the stock exchange, represents one of the potential exit routes for PE funds. However, its appeal is tempered by several factors, including market conditions [10] and valuation dynamics. In the past decade, IPOs have represented a small fraction of PE exits (*Figure 1.13*), typically ranging from 1% to 23% (Dealogic, 2023); in fact, they are not consistently favoured due to certain inherent limitations. Notably, IPOs often feature a higher proportion of primary capital issuance compared to secondary stake sales by PE funds. This emphasis on primary capital may convey a perception of limited upside potential to investors, potentially undermining the attractiveness of the offering. Moreover, IPO proceeds are frequently allocated towards debt repayment or strategic initiatives, rather than immediate shareholder monetization. Additionally, the protracted lock-up periods associated with IPOs expose PE funds to prolonged market volatility, potentially impacting investment returns.

Sale to Strategic Acquirer: The sale of a portfolio company to a strategic acquirer operating within the same or related industry is commonly regarded as the preferred exit route for PE funds (*Figure 1.13*). Historically constituting a substantial portion of total exit value by PE, typically around 50-60% (Dealogic, 2023), this approach is favoured for its potential synergies and the opportunity for complete stake divestment. Strategic acquirers are often willing to pay premiums for target companies due to perceived operational synergies, thereby facilitating favourable valuation outcomes. However, the process of selling to strategic acquirers necessitates careful management, as it may provoke resistance from incumbent management and necessitate regulatory approvals. Moreover, the potential leakage of information during negotiations poses risks of employee and client attrition, while regulatory scrutiny may delay transaction completion (Fidrmuc et al., 2012).

Sale to Another Private Equity Firm: Another prevalent exit route involves the sale of a portfolio company to another PE firm, albeit historically less frequent than sales to strategic acquirers (Dealogic, 2023). Despite lacking inherent synergies, PE buyers offer distinct value creation capabilities, often enabling comparable valuation

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[10] "While on its face the increased competition for deals should make exits easier and more lucrative, the timing of a sale is critical. Across industries, the delta between exit multiples at a market peak and a trough can be enormous. Poor timing on deals therefore can wipe out enormous value" (McKinsey, 2019).

outcomes to strategic buyers (Fidrmuc et al., 2012). This approach is favoured by management teams due to the potential for continued participation in wealth creation through equity stakes and incentive plans. However, such transactions may be subject to ego-driven considerations, as incumbent PE funds may resist ceding substantial profits to competitors. Additionally, re-investment requirements and susceptibility to macroeconomic fluctuations represent notable challenges associated with this exit route (Folus & Boutron, 2015).

Figure 1.13 **EVOLUTION OF PE EXITS BY ROUTES (Dealogic, 2023)**
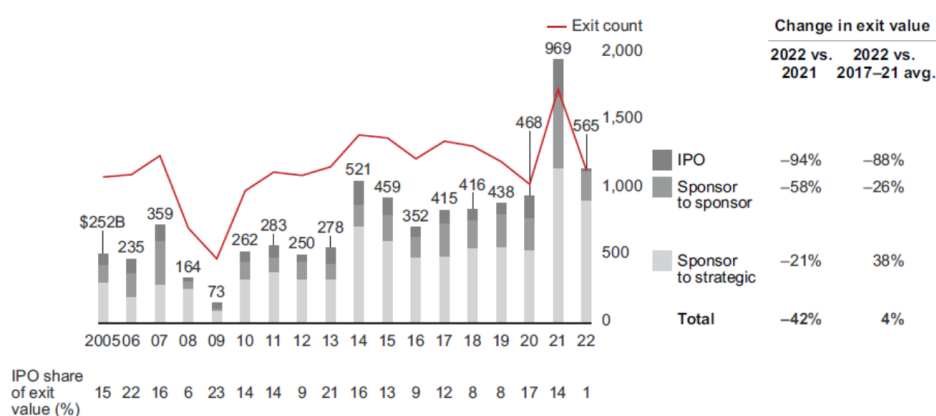
Dividend recapitalization: Involves the portfolio company issuing a substantial dividend payment to the private equity (PE) fund, allowing the fund to recoup a portion of its initial investment. This strategy is typically employed when the PE fund determines that an exit should be delayed, often due to macroeconomic factors. In instances where the portfolio company has significantly reduced its debt since the initial acquisition, it can raise new debt and utilize the proceeds to distribute a dividend to the PE fund. It is important to note that dividend recapitalization does not result in a change in the ownership structure of the company; the PE fund retains the same percentage ownership. This approach facilitates enhanced returns by providing the PE fund with partial proceeds in advance, rather than waiting for a complete sale to realize the full proceeds. However, challenges may arise in tight credit markets, where portfolio companies may struggle to secure financing for dividend recapitalization. Additionally, this strategy can attract negative attention, potentially leading to criticism of the PE sponsor for prioritizing its own gains over the company's interests (Philips & Hope, 2017).

Fund Secondary: Fund secondary transactions involve the participation of secondary PE funds, which invest in primary funds that are several years into their life cycle. In these transactions, primary PE firms have the option to sell their entire PE fund, comprising multiple portfolio companies, to secondary funds (Ortiz, 2023). The secondary PE fund acquires the stakes held by LPs in the primary fund, effectively providing an alternative exit route. This route often offers a quicker liquidity event for LPs, but it typically involves selling at a discount, as LPs may not realize the maximum valuation for their stakes. Despite the potential for a faster exit, the discounted nature of these transactions implies that LPs may not maximize their returns compared to traditional exit routes (Nadauld, 2019).

Figure 1.14 **EXIT BY TYPE OVER TIME (Pitchbook, 2024)**
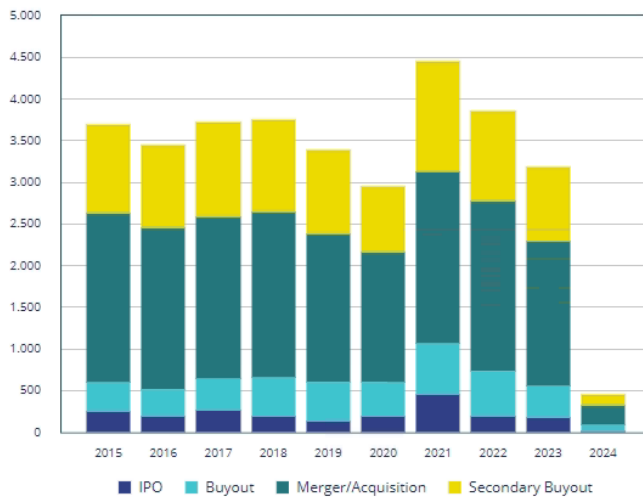
Table 1.15 **PROS & CONS OF DIFFERENT EXIT ROUTES (Fidrmuc et al., 2012)**

Exit Route	Pros	Cons
IPO	- Under good macro-economic momentum can result in higher valuation multiples; - Full support from management, given attractive incentive package, ensured future liquidity, heightened prestige and publicity.	- Limited monetization in day 1; - Lack of complete exit and long lock-up periods; - Costly process (both in terms of time and money); - Ongoing disclosure obligations once listed.

Sale to Strategic	- Strategic acquirers are usually always open to acquisitions; - Full exit in day 1; - Synergies can derive in attractive valuation for PE funds.	- Higher resistance from management, as they perceive their jobs at risk; - Time to complete can be extended significantly (to get Antitrust approval); - Potential loss of key employees and clients.
Sale to Another PE	- Can pay as much as strategic buyers; - Full exit in day 1; - Good support from management.	- More impacted by macro than strategic buyers; - Sometimes require re-investment.
Dividend recapitalizatio n	- If the exit has to be delayed, dividend recapitalization allows the PE to advance some of the proceeds, and complete the sale when possible.	- In a tight credit market, portfolio companies may be unable to secure financing; - Can result in bad press for the sponsor.
Fund Secondary	- Valid alternative for LPs to fully divest; - Usually faster.	- Usually done at a discount (LPs will not maximize valuation).

CHAPTER 2: "IDEAL" TARGET COMPANY CHARACTERISTICS & DRIVERS OF PRIVATE EQUITY FUNDS' PERFORMANCE

2.1 Literature Overview

Buyouts by PE firms are an increasingly important phenomenon of the contemporary corporate landscape, one that has attracted growing interest in the strategy literature (Castellaneta & Gottschalg, 2016; Hoskisson, Shi, Yi, & Jin, 2013). According to data from Web of Science[11], there has been a remarkable upward trend in publications related to private equity over the past two decades. What started as a modest interest in 2001 has grown into a substantial body of research by 2022, with continued growth evident even in the early months of 2024. This escalating interest mirrors the growing prominence of PE in corporate acquisitions and underscores the importance of a detailed analysis of the "ideal" characteristics of target companies (when referring to the "ideal candidate," I am speaking in terms of the likelihood of profitability). In the following paragraph, I will investigate the key determinants of PE performance that have been previously examined in the literature. In doing so, I will refer to accredited research papers, discussing their hypotheses, studies, conclusions, and practical implications. This analysis is crucial not only for PE firms seeking profitable investments but also for scholars and practitioners aiming to understand the dynamics and implications of PE activity in the contemporary corporate landscape.

Kaul et al. (2017) [12] assert that PE firms tend to acquire businesses a) *outside their parent company's core operations*, b) *whose rivals spend more on R&D* than their parents, and c) those with *weak managerial incentives*. This targeting strategy reflects PE firms' aim to unlock unrealized potential in businesses under public ownership. PE ownership serves as a governance mechanism addressing shortcomings in public equity markets' incentive alignment for long-term investments (Williamson, 1988, 1990). Publicly owned firms often face coordination costs, myopic decision-making, and diluted incentives (Zhang & Gimeno, 2010),

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[11] Starting with 64 publications in 2001, the numbers have consistently risen. By 2004, they had increased to 94, followed by a significant jump to 300 in 2008. The momentum continued with 436 publications in 2010, 513 in 2013, 637 in 2017, and a staggering 832 in 2022. Even in the first few months of 2024, there have been 196 publications, indicating that the interest remains robust.

[12] Kaul, A., Nary, P., & Singh, H. (2017). Who does private equity buy? Evidence on the role of private equity from buyouts of divested businesses. Strategic Management Journal.

leading to underinvestment in valuable long-term opportunities (Benner & Zenger, 2016). PE ownership aims to mitigate these issues through enhanced incentives, informed monitoring, patient capital, and fostering business independence. Consequently, PE acquirers prioritize businesses experiencing underinvestment, requiring strategic long-term investments, and possessing weak managerial incentives. This preference is substantiated by:

1. *Coordination Costs*: Coordination costs within large corporations can lead to suboptimal performance as firms become overly diversified (Williamson, 1985; Zhou, 2011; Markides, 1992). While consolidating multiple businesses within a single organization allows for coordination and value creation from co-specialized assets, it often hampers adaptation within each business (Williamson, 1991). Non-core businesses [13] bear the brunt of these coordination challenges. This results in misallocation of resources, limited managerial attention, and difficulty in evaluating their performance accurately[14] (Bergh et al., 2008; Liebeskind, 2000; Bergh, Johnson, & Dewitt, 2008; Kaul, 2012). PE firms can rectify underinvestment by restoring independence to non-core businesses, providing focused attention, and eliminating the costs of coordination. As alternate owners who bring few, if any, synergies to the table, PE firms are likely to offer limited interference in the target's day-to-day operations, their primary role being to monitor and incentivize the target's managers rather than to replace them. In this, they are likely to have an advantage over corporate acquirers, who would logically want to integrate the acquired business in order to realize operating synergies (Barkema & Schijven, 2008a; Kim & Finkelstein, 2009), and may therefore prove more disruptive to the acquired business (Puranam, Singh, & Chaudhuri, 2009). Moreover, even if a corporate acquirer were to try and preserve the independence of the acquired business, the business would still be placed within its existing hierarchy, and the infeasibility of selective intervention would lead to "unavoidable side effects" (Williamson, 1985, p. 138) that would lower the business's performance.

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[13] Businesses that are unrelated to the firm's primary business activities and share few, if any, resources, with them.

[14] Noncore businesses may be especially difficult for financial markets to correctly evaluate, with analysts and investors having a hard time assessing unusual business combinations or businesses that lie outside their areas of expertise (Litov et al., 2012; Zuckerman, 1999, 2000), and the performance of noncore businesses being obfuscated when combined with company-wide results (Folta & Janney, 2004; Rajan et al., 2000).

2. *Myopia in Strategic Investments*: A problem associated with public ownership is managerial myopia, where managers tend to underinvest in long-term strategic assets due to pressure from public markets (Edmans, 2009; Graham et al., 2005). These assets include research and development (R&D) and long-term capacity (Aghion, Van Reenen, & Zingales, 2013; Bushee, 1998; Zahra, 1996; Souder & Bromiley, 2012; Souder & Shaver, 2010; Zhang & Gimeno, 2010), as managers prioritize short-term gains (Williamson, 1985)[15]. Several factors contribute to the susceptibility of long-term strategic investments to myopic behaviour and highlight advantages for PE firms in making such investments. Firstly, the secretive nature of strategic investments hinders public disclosure, impacting the ability to raise funds from public markets (Bettis, 1983; Williamson, 1985; Aggarwal & Hsu, 2014)[16]. PE firms can overcome this challenge by offering confidential disclosures to investors (Folta & Janney, 2004). Moreover, PE firm managers are not subject to the same short-term pressure to justify individual investments to their investors, so long as they can produce long-term performance (Fenn, Liang, & Prowse, 1997); nor are they subject to the same disclosure requirements as managers of public corporations.

Secondly, the uniqueness of long-term investments makes them difficult for public equity markets to accurately value[17], providing an advantage for PE firms with superior access to information and analysis[18] (Benner & Zenger, 2016; Litov et al., 2012; Hertzel & Smith, 1993). Additionally, the speculative nature of public equity investors may discourage investments in long-term assets, creating a need for patient

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[15] "To maximize immediate net receipts" (Williamson, 1985, p. 138). Consistent with these arguments, Graham, Harvey, and Rajgopal (2005) conducted a survey involving 400 public company executives, revealing that 78% of them acknowledged sacrificing long-term value in favor of smoothing earnings. Similarly, Bushee (1998) discovered that companies with a significant ownership stake held by short-horizon institutional investors are more inclined to cut back on research and development (R&D) efforts as a means of reversing an earnings decline.

[16] Given the strategic nature of such investment opportunities, firms would rationally be loath to share all relevant information about them with the general public, for fear of destroying their value. Yet, the very secrecy necessary to preserve the value of the opportunity may also compromise the firm's ability to raise funding for such investments from the public markets.

[17] Strategies that confer long-term competitive advantage are likely to be unique (Litov et al., 2012), and investments in such opportunities are likely to involve subjective judgment in the face of uncertainty (Kaul, 2013; Knight, 1921). These very characteristics, however, make it challenging for public equity markets to accurately value such investments (Benner & Zenger, 2016), with analysts and investors having a hard time assessing innovative investments (Benner, 2007, 2010; He & Wang, 2009) or valuing strategies that depart from the categories or configurations they are familiar with (Campbell, Sirmon, & Schijven, 2016; Litov et al., 2012; Zuckerman, 1999, 2000).

[18] As dedicated, active, and well-connected players in the market, PE firms have superior access to information and analysis (Hertzel & Smith, 1993) and may therefore be less reliant on the crude and potentially biased signals used by less sophisticated investors (Schijven & Hitt, 2012; Shiller, 2003), and less susceptible to cognitive biases (Barberis & Thaler, 2003).

capital[19], which PE firms can provide (Edmans, 2009; Manso, 2011; Cremers & Pareek, 2016). By the very nature of the business, investors in PE funds will tend to be more patient, longer-term investors, so that PE firms may be less concerned with short-term liquidity or quarterly earnings than corporate acquirers, especially those that are public themselves (Fenn et al., 1997; Folta & Janney, 2004). At the same time, because PE firms and their investors realize most of their returns when they exit the business, they will have a strong need to realize substantial performance improvements in acquired businesses within a 5–10 year time horizon, which may not be the case for large and highly diversified public corporations with substantial amounts of financial slack (Bercovitz & Mitchell, 2007). Thus, the investment horizon that PE firms bring to bear may be just right to support strategic investments—long enough to make immediate gains less salient and allow for uncertainty and tolerance of initial failure, but short enough to enforce accountability.

3. *Weak and misaligned incentives*: To begin with, excessive pressure from public equity markets may cause managers to behave myopically: not only may they underinvest in long-term strategic assets (Graham et al., 2005; Zhang & Gimeno, 2010), they may also compromise long-term performance in other ways, for example, by undertaking less maintenance or making excessive use of existing assets (Williamson, 1985). These tendencies may be partially offset by the provision of appropriate long-term incentives—such as stock options or stock ownership—which may better align managerial interests with those of shareholders, increasing managerial willingness to invest in long-term assets (Baysinger et al., 1991; Holthausen, Larcker, & Sloan, 1995; Kor, 2006; Sanders, 2001), and potentially improving firm performance (Carpenter & Sanders, 2002; Finkelstein & Hambrick, 1988; Holthausen & Larcker, 1996). However, such high-powered incentives may themselves lead to unintended adverse consequences (Williamson, 1985), such as excessive risk-taking by managers (Sanders & Hambrick, 2007), unless they are properly designed (Makri, Lane, & Gomez-Mejia, 2006) and accompanied by active and informed monitoring by corporate boards (Kor, 2006; Wright, Kroll, & Elenkov, 2002; Walters, Kroll, &

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[19] Because investments in long-term strategic assets often lead to early short-term losses (Manso, 2011), they may be received negatively by impatient equity market investors, placing managers' employment at risk (Edmans, 2009; Stein, 1989). Investments in such long-term assets may require patient financial capital, that is, capital that is invested with no intention of liquidation for substantial periods of time (Cremers & Pareek, 2016; Sirmon & Hitt, 2003; Teece, 1992).

Wright, 2008). High-powered incentives linked to stock market performance may be especially problematic given the cognitive limitations of equity market investors (Barberis & Thaler, 2003; Shiller, 2003), so that making managerial compensation responsive to market prices may lead to decisions that are subject to the investors' biases and susceptible to manipulation by self-seeking managers (Campbell et al., 2016; Graffin, Haleblian, & Kiley, 2016; Schijven & Hitt, 2012).

In comparison, PE firms may have several advantages in providing high-powered managerial incentives (Jensen, 1989; Phan & Hill, 1995; Wiersema & Liebeskind, 1995), being able to offer incentives that are both longer-term (Guo et al., 2011; Holthausen & Larcker, 1996), and more closely linked to the stand-alone business (Feldman, 2016; Holthausen et al., 1995). More importantly, PE firms may also have stronger incentives as owners. As long-term investors whose payouts are strongly linked to the business's eventual success[20] (and therefore its value at exit), PE fund managers typically have very strong incentives to ensure the success of their deals (Wiersema & Liebeskind, 1995)—much stronger, for instance, than the average corporate board member—making them ideally capable of subjecting the businesses they acquire to more vigilant monitoring (Cotter & Peck, 2001; Hertzel & Smith, 1993).

It follows that PE firms will systematically target businesses whose parents provide weak incentives to their executives. Weak incentives at the overall parent level may not only be associated with a general firm-wide tendency for the firm to underinvest in long-term performance, but top management teams who have weak incentives may be more lax in monitoring and correcting their subordinates, so that the underinvestment and agency problems[21] at the divisional level in such organizations

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[20] Carried interest, also referred to as the incentive fee or promote, serves as the primary mechanism through which GPs align their interests with those of the LPs, constituting their principal avenue for wealth generation.They are linked to the performance of the fund: GPs take 15% - 20% of the fund's net profit (after management fee).
DISTRIBUTION WATERFALL The waterfall is detailed in each fund's Limited Partnership Agreement (LPA):
1. The LP receives all cash distributions until the total amount equals the original capital investment.
2. Next, the LP continues to receive 100% of the cash until they have obtained a preferred return, usually set at 8%, on the capital invested in the initial step. This hurdle rate ensures that the LPs achieve a satisfactory return for their risk before any incentives are paid out.
3. Subsequently, there is a "catch-up" phase where the GP receives 100% of the distributions until the GP has accumulated 20% of the total distributions from steps 1 and 2, plus the distributions from this step.
4. Afterward, any additional cash flows are divided, with 80% going to the LP and 20% to the GP, reflecting the GP's carried interest.
[21] PE-backed buyouts have traditionally been viewed as a means of enhancing efficiency by streamlining organizational processes, reducing workforces, and cutting unit costs (Harris, Siegel, &

may be more severe. Divestments from such firms are therefore likely to offer substantial opportunities for PE firms to improve long-term performance by introducing high-powered incentives.

Table 2.1 **TARGET SELECTION BY PE FIRMS (Kaul et al., 2017)**

Type of Ideal Target for PE Firms	Reason
Businesses outside the parent company's core operations	PE firms aim to restore independence to non-core businesses, providing focused attention, eliminating coordination costs, and allowing for strategic investments without interference from corporate acquirers.
Businesses with weak managerial incentives, particularly at the divisional level	Weak incentives at the parent level may lead to underinvestment and lax monitoring at the divisional level, offering PE firms opportunities to introduce high-powered incentives and improve long-term performance through vigilant monitoring.
Businesses whose rivals spend more on R&D than their parents	PE firms target businesses experiencing underinvestment, including those with weaker R&D spending relative to rivals, as they possess unrealized potential for strategic investments and can benefit from PE's patient capital and informed monitoring.
Practical implications: These findings provide strong support for the theoretical argument that PE ownership represents a unique form of governance that helps to overcome underinvestment problems resulting from the high coordination costs, weak incentives, and myopia associated with large public corporations (Kaul, Nary, & Singh, 2017).	

Wright, 2005; Wright, Hoskisson, & Busenitz, 2000). In these buyouts, investors and a management team join forces, often with the assistance of debt financing, to purchase shares in a company from its existing owners, thereby creating a new independent entity. The predominant theoretical framework for studying buyouts has been agency theory, which focuses on controlling and incentivizing managerial behavior to enhance performance (Fox & Marcus, 1992; Jensen, 1993). This stands in contrast to mature, publicly traded firms, where weak corporate governance and managerial incentives can lead to a decline in firm value. In addition to their efficiency-improving aspects, buyouts can also serve as a platform for strategic innovation and renewal, providing opportunities for entrepreneurial growth (Wright, Hoskisson, Busenitz, & Dial, 2001). However, while an agency perspective acknowledges the potential for growth, the controls inherent in PE transactions, such as high leverage and financial oversight, may constrain strategic flexibility and risk-taking associated with growth (Jensen & Meckling, 1976).

Concerning PE firms' targeting strategy and their goal of unlocking unrealized potential, I took a Private Equity course taught by Professor Julio Jiménez-Blanco, Principal at Greenhill, during my study abroad at IE University. Esteemed industry professionals, including José María Retana Manzano-Monís from Sherpa Capital, Fernando Cassinello from Vitruvian Partners, Felipe Cisneros Rodriguez-Vila from Macquarie Group (MAM), David Jimenez-Blanco Unciti from Newdock, Diego Jimenez-Blanco from Hayfin Capital Management LLP, and Carlos de la Esperanza from GP Bullhound (VC & Growth Equity), enriched the course with their expertise. The course extensively covered various PE investment strategies and emphasized three essential characteristics of an "*ideal candidate*" for PE investment:

a) *Upside potential*: This refers to favourable market dynamics, such as leading positions in attractive growing markets, and the potential for value creation (alpha).

b) *Downside protection*: This includes factors such as low cyclicality in the industry, recurring sales with good visibility, strong and predictable cash flows, high barriers to entry, the ability to reduce costs when things go wrong, strong liquidity, and a robust capital structure.

c) *Clear entry and exit plan*: This entails having a clearly defined long-term equity story, potential credible buyers down the road, accompanied by a strong management team, and high-quality assets.

By focusing on these aspects during the acquisition process, PE firms aim to identify targets that offer the greatest potential for generating returns on investment.

Table 2.2 **TARGET SELECTION BY PE FIRMS (self-elaboration from IE University Course, 2023)**

Ideal Target's Characteristics for PE	Reason
Upside potential	Leading positions in growing markets offer opportunities for revenue growth and market dominance.
Downside protection	Low cyclicality reduces susceptibility to economic downturns. Predictable cash flows ensure financial stability. High barriers to entry deter competition. Robust capital structure provides financial resilience.
Clear entry and exit plan	A clear equity story attracts investors and supports strategic decision-making. Potential credible buyers

	ease exit strategies, ensuring liquidity. Strong management ensures effective execution of plans. High-quality assets increase the attractiveness of the investment.

After analysing the ideal characteristics of the target company at the firm-level, as summarized by *Table* 2.1 and *Table* 2.2 (under the assumption that a target company possessing such characteristics is more likely to represent a profitable investment for the PE firm, leading to higher IRR), the analysis proceeds to consider extrinsic characteristics of the target and factors related to the PE firm itself (such as its size or experience) or certain market characteristics (i.e. MSCI Index). Various determinants of the PE fund's performance will then be examined, followed by a focus on the effect of diversification on PE performance.

Since the year 2000, there's been a consistent rise in articles examining the rate of return of PE investments. This trend has unveiled certain features[22]. Notably, Kaplan & Schoar (2005) and Gottschalg et al. (2004) have highlighted a positive and concave correlation between fund size and PE fund return rates.

Initially, larger funds tend to achieve higher returns due to economies of scale, better diversification, and enhanced market access. However, beyond a certain size threshold, diminishing returns may occur due to challenges in identifying lucrative investment opportunities, managing larger portfolios effectively, and potentially becoming overly concentrated in specific sectors or deals. Therefore, while larger funds may enjoy advantages initially, they may face diminishing returns as they grow beyond a certain size.

Secondly, they (Kaplan & Schoar, 2005; Kaserer & Diller, 2004) suggest that *firm experience* positively impacts the IRR of PE funds.. Experienced firms have better access to high-quality investment opportunities, conduct more thorough due diligence, possess advanced value-adding capabilities, and implement effective portfolio management practices. These factors collectively enable experienced firms to make more informed investment decisions, enhance the performance of portfolio companies, and ultimately generate higher returns for investors. Thus, the more experience a PE firm has at the time of fund formation, the higher the rate of return of PE funds, ceteris paribus.

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[22] Lossen, U. (2007). Portfolio strategies of private equity firms: theory and evidence. Springer Science & Business Media.

Thirdly, Kaserer & Diller (2004) find a negative influence of the *annual rate of return of the MSCI Europe Index*[23] in the vintage year of European PE funds *on their rate of return.*

Fourthly, an increasing *amount of new funds raised* by the PE industry in the vintage year of a PE fund is associated with a rise of its rate of return (Kaserer & Diller 2004, Gottschalg et al. 2004). The positive correlation between new fund amounts and PE fund returns underscores the benefits of increased competition[24], enhanced deal flow, diversification, and favorable economic conditions in driving higher investment performance.

Moreover, Gottschalg et al. (2004) indicate that a higher *proportion of capital invested in Europe* negatively impacts the rate of return for PE funds. Historically, European PE funds have yielded lower returns compared to their US counterparts. Additionally, some researchers, such as Kaplan and Schoar (2005) and Kaserer and Diller (2004b), report that *venture capital (VC)* funds outperform *buyout (BO) funds.* In contrast, other studies either find no significant difference (Gottschalg et al. 2004) or suggest that VC funds perform worse than BO funds (Ljungqvist & Richardson 2003a) [25]. The cited studies offer valuable insights. However, there is still limited knowledge about how diversification affects the performance of PE funds.

2.2 Performance of PE funds: does diversification matter?

A substantial and expanding[26] body of literature delves into the returns of PE investing (Cochrane 2005, , Kaplan & Schoar 2005, Ljungqvist & Richardson 2003, Cumming & Walz 2004, Jones & Rhodes-Kropf 2003, Kaserer & Diller 2004c, Ick 2005, Gottschalg et al. 2004). The majority of these studies focus on the comparative performance of PE versus public markets. However, there remains a gap in understanding the influence of *diversification* on the performance of PE funds. The sample funds exhibit a wide range of diversification levels. Some funds are highly

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[23] The MSCI World Index is a comprehensive global equity index that reflects the performance of large and mid-cap stocks across 23 developed market countries. It encompasses about 85% of the free float-adjusted market capitalization in each of these countries country and provides a comprehensive gauge of the global equity market's performance.

[24] This competition can drive up valuations of target companies, reflecting strong market demand and growth potential, thus leading to higher returns.

[25] To examine and account for these effects, I will incorporate relevant control variables into my analysis.

[26] The proliferation of articles on the returns of PE investments has been propelled by the accessibility of larger datasets and a growing fascination with PE..

specialized, whereas others are extensively diversified. PE firms can diversify their funds across five dimensions: (1) through "naive" diversification across the number of portfolio companies, (2) via "dynamic" diversification across time, (3) employing "systematic" diversification across financing stages, (4) spanning various industries, and (5) encompassing different countries (Lossen and Ulrich, 2006).

Within the literature, there are two contrasting views regarding the correlation between diversification and the performance of PE funds. One stance advocates for PE funds to concentrate on specific industries (Metrick and Yasuda, 2011) and countries to attain specialized knowledge. This expertise is considered essential for overcoming the inherent information asymmetries (Hellmann and Puri, 2002; Amit et al., 1998) and principal-agent problems associated with selecting and overseeing private companies.

Following Lossen and Ulrich (2006), specialized PE firms hold several distinct advantages compared to their non-specialized counterparts. Firstly, these specialized firms undergo a rigorous and multi-staged selection process before investing in a company (Tyebjee & Bruno 1984, MacMillan, Zemann & Subbanarasimha 1987, Birley, Muzyka & Hay 1999). This process involves navigating significant information asymmetry between the PE firm and the management team or vendor of the potential portfolio company. Specialized knowledge in the technology and business of the potential investment empowers the PE firm to narrow this information gap, thereby discerning successful from unsuccessful investments.

Secondly, upon providing financing to a company, a principal-agent problem arises between the PE firm (acting as principal) and the management team of the portfolio company (acting as agent). The personal incentives of the management team may not always align with those of the PE firm. Gompers (1995) identifies potential sources of agency costs, such as the pursuit of strategies or projects offering high personal returns for the management team but low expected payoffs for shareholders, or investments in high-variance strategies due to equity stakes resembling call options. To address such agency conflicts, PE firms deploy various mechanisms, including staged capital infusions (Gompers 1995) and extensive control rights (Sahlman 1990, Kaplan & Strömberg 2000). Deeper industry and market knowledge equips PE firms to implement stage financing and control rights more effectively.

Thirdly, PE firms claim to enhance the value of their investments through active involvement in the managerial activities of portfolio companies (Gorman & Sahlman

1989, Hellmann & Puri 2001, Hellmann & Puri 2002). Once again, a richer understanding within the PE firm of the activities of portfolio companies enables the provision of more value-added services.

Das et al. (2003) argue that the success of a PE fund's investments is likely tied to the expertise of its managers in overseeing and developing their portfolio companies. As such skills are both valuable and resource-intensive, it's reasonable to assume that specialized funds possess a higher level of proficiency and informational advantages within their respective areas or industries (e.g., Cressy et al. 2014), leading to superior performance. In essence, specialization enables PE firms to make better investment decisions and provide more valuable services to their portfolio companies, thereby boosting the return on their investments. Consequently, PE funds specialized in specific financing stages, industries, and countries are expected to yield higher IRR and experience fewer portfolio company losses (Gupta & Sapienza 1992, Norton & Tenebaum 1993). This specialization hypothesis suggests a negative correlation between diversification levels and the IRR of PE funds.

A contrasting perspective is provided by modern portfolio theory, which posits that investors can reduce risk by diversifying their portfolios across assets with different characteristics (Markowitz 1952, Sharpe 1964). This theory recognizes that a portfolio's risk is influenced not only by the variance of its assets but also by the covariances between them. Given that PE funds comprise risky assets, diversification tends to decrease their overall risk. One notable characteristic of PE funds is their active engagement in investments. In addition to providing capital, PE managers actively oversee and support their portfolio companies (e.g., Hellmann and Puri 2002; Metrick and Yasuda 2011). They contribute expertise and networks, often holding positions on the board of directors and participating in strategic decision-making. However, these activities are resource-intensive and time-consuming. As a result, PE managers can only effectively monitor a limited number of investments (e.g., Gompers and Lerner 2000; Diller and Kaserer 2009), exposing the fund to significant idiosyncratic risk. Since idiosyncratic risk is typically not rewarded with a risk premium according to modern portfolio theory, conventional wisdom suggests that investors should maintain diversified portfolios, which generally offer higher risk-adjusted returns. This perspective is supported by studies such as those

conducted by Weidig & Mathonet (2004) and Schmidt (2004), which demonstrate risk reduction through "naive" diversification.

In line with the specialization hypothesis as proposed by Lossen and Ulrich (2006), the returns of sample funds tend to *decrease with diversification across financing stages*. However, in contrast to this hypothesis, the returns of sample funds actually *increase with diversification across industries*. This finding suggests that the benefits of accessing additional investment opportunities across various industries outweigh the costs of diversification. Consequently, it supports the argument for PE firms to adopt an opportunistic investment approach. Instead of specializing in specific industries or countries, PE firms should focus on process expertise that is independent of industry or country, enabling them to invest in any portfolio company with promising returns regardless of its technology or location. Moreover, *no significant impact of diversification across countries* on the returns of PE funds is observed. This empirical result is corroborated by Huss and Steger (2020), who similarly *did not find* a substantial *correlation* between *geographical diversification* and performance. The *same holds true for diversification across time*. Additionally, empirical research suggests that the returns of PE funds tend to increase with the *number of portfolio companies* they manage.

These findings carry significant implications for both the management and investment strategies employed in PE funds. Contrary to prevailing belief, the results suggest that there is no discernible return premium for funds specializing in specific industries or countries compared to diversified funds (Huss and Steger, 2020). PE funds that focus on particular industries or countries do not seem to outperform in terms of investment decisions or the value-added services they provide to their portfolio companies when compared to diversified PE funds. There are two complementary explanations for this observation (Lossen and Ulrich, 2006). Firstly, the advantage of PE firms specializing in specific industries or countries in addressing the information asymmetries and principal-agent problems inherent in selecting and overseeing private companies may be limited. It's possible that the specialized expertise is not as significant as previously assumed, or it can be obtained from external specialists by the PE firm. Another explanation is that PE firms exhibit specialization within their organizational structure (Gompers and Lerner 2000; Diller

and Kaserer 2009). Individual PE managers specialize in particular industries or countries. Consequently, diversified PE firms may be equally adept at overcoming the information asymmetries and principal-agent problems associated with selecting and overseeing private companies as specialized PE firms.

Table 2.3 **CORRELATION BETWEEN DIVERSIFICATION AND PE PERFORMANCE (Lossen, 2006; Huss and Steger, 2020)**

Type of Diversification	Correlation with PE Performance
1) 'naive' diversification across the number of portfolio companies	Performance increases
(2) 'dynamic' diversification across time	No impact on performance
(3) 'systematic' diversification across financing stages	Performance decreases
(4) diversification across industries	Performance increases
5) diversification across countries	No impact on performance

2.3 Research Gap: Investment Sectoral Impact on PE Performance

Apart from these studies mentioned in the previous paragraphs, existing research has paid relatively little attention to the nature of targets that PE firms pursue, focusing more on the performance consequences of buyouts. This study focuses on target selection because, instead, I believe the choice of buyout targets is an important yet understudied question in PE research. Understanding which businesses PE firms target may thus help enhance our understanding of the strategies of PE firms, and the role they play relative to corporate acquirers (Maupin, 1987; Singh, 1990).

Despite the evident emergence of certain trends, such as the technology industry, which stands out as one of the most interesting sectors for PE (Il Sole 24 Ore, 2024), there do not seem to be explicit reflections on **which investment sector might be more profitable for a PE fund**.

The following figures illustrate the main trends concerning the sector with a focus on Italy. The data are provided by the Italy Private Equity Confidence Survey - Outlook for the first semester of 2024 (Deloitte).

Figure 2.4 INVESTMENTS PRESENT IN PORTFOLIO (Deloitte Survey, 2024)[27]

Question - My portfolio companies operate mainly in the following industries:
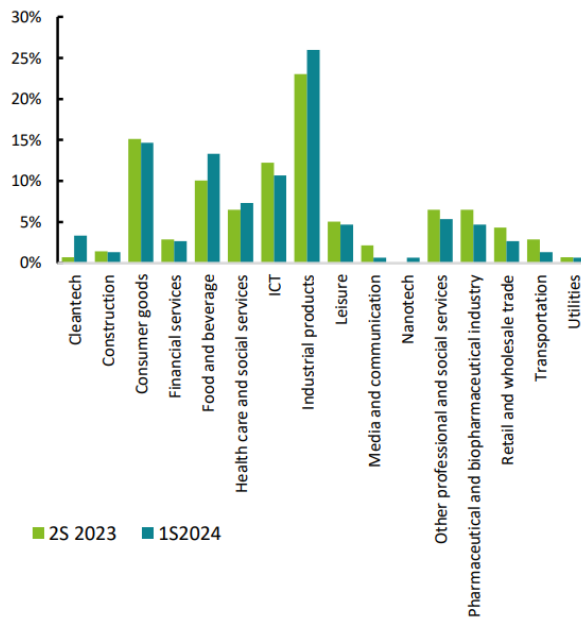
Figure 2.5 INVESTMENTS FORECASTS FOR THE NEXT HALF-YEAR (Deloitte Survey, 2024)[28]

Question - During the next months, I will focus my investments in the following industries:

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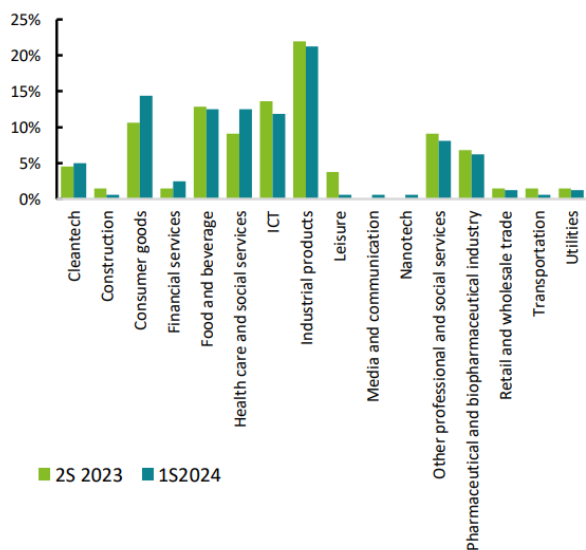
[27] When interviewed regarding the investments present in their portfolio, 26,0% of operators declared that they focus on the Industrial products sector, confirming it as the one of greatest interest. The second most prominent sector in the respondents' portfolio is Consumer Goods, with 14,7%, followed by Food & Beverage, which grows by 3,2% compared to the last six months, reaching 13,3% of choices. The ICT sector instead decreased to 10,7% (-1,5 p.p.). Interest in the pharmaceutical sector continues to decline, falling by 1,8% and reaching 4,7% of the total.

[28] The forecasts for the next half-year confirm the Industrial Products sector as the sector preferred by operators, receiving 21,3% of the consensus. The Consumer Goods sector stands out in second place with 14,4% of responses, highlighting a notable growth in interest (+3,8 p.p.). Food & Beverage and Health Care services both capture 12,5%, while attention towards investments in the ICT sector decreases, declining to 11,9% (-1,7 p.p.)

Therefore, the following research aims to explore how (and if) the variable of the industrial sector in which the target company operates (independent variable, measures by the investment percentage of each fund in a specific sector) can influence the performance of a PE (and consequently its investment decisions), measured through its IRR and, where available, its TVPI[29] (dependent variables).

To achieve this, the historical returns of leading PE funds (e.g., The Blackstone Group, The Carlyle Group CG, Kohlberg Kravis Roberts KKR, Bain Capital, Apollo Global Management, TPG) will be analysed and compared. Such performances (IRR) will then be associated, through an Ordinary Least Squares (OLS) regression conducted in Stata, with the different percentages of investment of each fund in each of the seven sectors[30] under analysis. The data regarding both the performance and the investment strategy (% invested by the PE in each industrial sector) are accessible through PitchBook[31]. Specifically, PitchBook's database provides data on the historical returns of the various PE funds of each PE firm, which will be the primary focus of analysis in this thesis. The goal is to:

Firstly, identify the sector(s) that have proven to be more profitable (an area where the literature is lacking).

Subsequently, understand the impact of diversification across industries (Type 4 in Table 2.3) on performance; regarding this latter point, as highlighted in paragraph 2.2, empirical studies have already been conducted, albeit often yielding mixed results. However, there is a desire to "create novelty" in this aspect, by endeavouring to determine whether **there exists** (and if so, defining it) **a threshold beyond which sectoral diversification has negative effects on PE performance**, partly[32] contradicting assertions made, for instance, by Lossen and Ulrich, (2006)[33]. As seen, however, diversification across industries/sectors is not the only type of

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[29] TVPI (Total Value to Paid-In) is a measure that expresses the ratio between the current total value of a fund's assets and the total amount of money that investors have contributed (or 'paid in') to the fund up to that point. In other words, TVPI provides an estimate of the total value generated by the investment relative to the amount of money invested. It can be calculated using the formula:
TVPI = Current Total Value of Assets / Total Amount Invested.

[30] According to PitchBook classification, sectors are classified as follows: B2B, B2C, Information Technology, Financial Services, Healthcare, Energy, Materials & Resources

[31] PitchBook is a financial data and technology company that provides information, research, and analysis on PE, venture capital, and mergers and acquisitions. It offers a wide range of information on companies, deals, investors, and funds in the private markets.

[32] Estimating a positive and concave relationship between the fund diversification and its rate of return.

[33] See paragraph 2.2 "Performance of private equity funds: does diversification matter?"

diversification possible for a PE. The reason for choosing to analyse diversification across sectors is that such diversification is closely linked to the main research hypothesis under study (as well as the title of the thesis itself): *Sectoral Impact on PE Performance: An in-depth Analysis of Investment Returns & Influencing Factors*.

Finally, after identifying the sector(s) that have proven to be more profitable (through a quantitative analysis, supplemented by the introduction of some control variables, aimed at providing additional insight into the main drivers of performance), a primarily qualitative analysis will follow, aimed at understanding the reasons behind the success or failure of specific sector(s). To achieve this, the research will go further in the analysis of different sectors' characteristics (i.e. Sector Cyclicity, Sector Innovation, Sector Market Size & Growth Rate, Sector Competitiveness) leading to different performances. The analysis of these variables will contribute to a deeper and more practical understanding of the sector's effect on PE performance.

2.4 Research Question & Hypothesis

Hypothesis 1: **PE investments in certain sectors yield higher returns compared to others**. In particular, investments in emerging sectors (i.e. Information Technology) can provide higher returns compared to established sectors (i.e. Materials & Resources). In particular, the better performance of the PE fund is linked to specific characteristics of each sector, such as:

a) *Sector Cyclicity*: more cyclical sectors[34] may experience broader economic performance fluctuations, affecting value creation opportunities and the success of PE investments. The sector's sensitivity to economic cycles can impact growth prospects and the ability to generate stable cash flows (which is one of the "ideal" target characteristics, as mentioned in Table 2.2).

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[34] According to the Corporate Finance Institute, A cyclical industry is one whose revenue generation is closely tied to the fluctuations of the business cycle. Essentially, it thrives during periods of economic expansion but struggles during economic downturns. This stands in contrast to counter-cyclical industries, which perform well during economic downturns but may face challenges during periods of economic growth. Analysts often assess the cyclicality of an industry by delving into company financial statements and analyzing top-line revenue. Industries with higher revenue volatility are typically considered more cyclical than those with lower volatility. Beyond financial statements, understanding consumer purchasing behavior is crucial in identifying cyclical industries. If consumers significantly reduce spending on goods and services from a particular industry during economic downturns, it is likely cyclical. For instance, the airline industry experiences reduced demand during economic downturns as consumers become more cautious about discretionary spending, particularly on air travel. In contrast, non-cyclical industries, such as pharmaceuticals, maintain demand for their products regardless of economic conditions due to the essential nature of their goods.

Figure 2.6 **SECTOR CLASSIFICATION BY ECONOMIC SENSITIVITY (de Longis, 2022)**

	Classification	
GICS® Sectors	**MSCI**	**Morningstar**
Consumer Discretionary	Cyclical	Cyclical
Consumer Staples	Defensive	Defensive
Energy	Defensive	Sensitive
Financials	Cyclical	Cyclical
Health Care	Defensive	Defensive
Industrials	Cyclical	Sensitive
Information Technology	Cyclical	Sensitive
Materials	Cyclical	Cyclical
Real Estate	Cyclical	Cyclical
Communication Services	Cyclical	Sensitive
Utilities	Defensive	Defensive

b) *Sector innovation*: more innovative sectors lead to potentially higher returns. High innovation or technologically advanced sectors may present value creation opportunities but require specific expertise to fully exploit such opportunities. Moreover, as studied by Kaul (2017), PE firms typically target businesses experiencing underinvestment, including those with weaker R&D spending relative to rivals, as they possess unrealized potential for strategic investments.

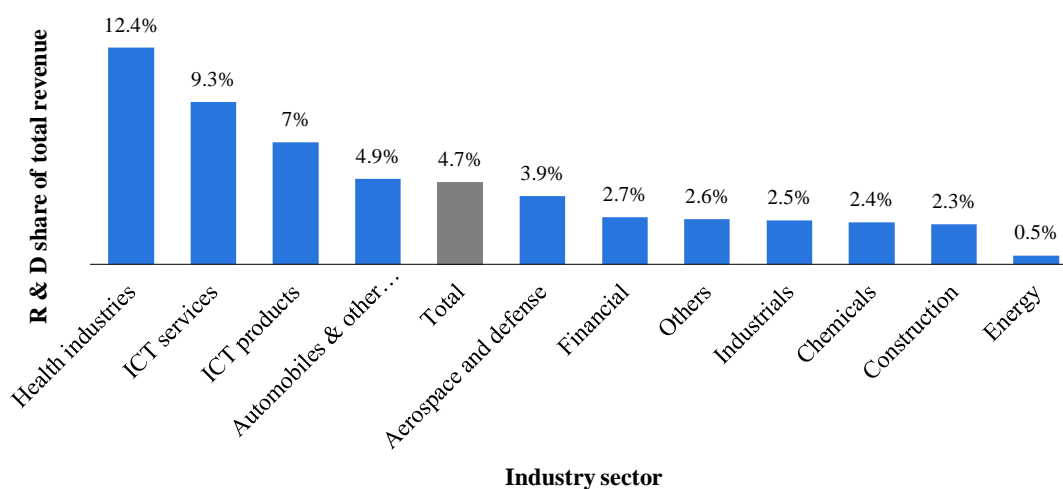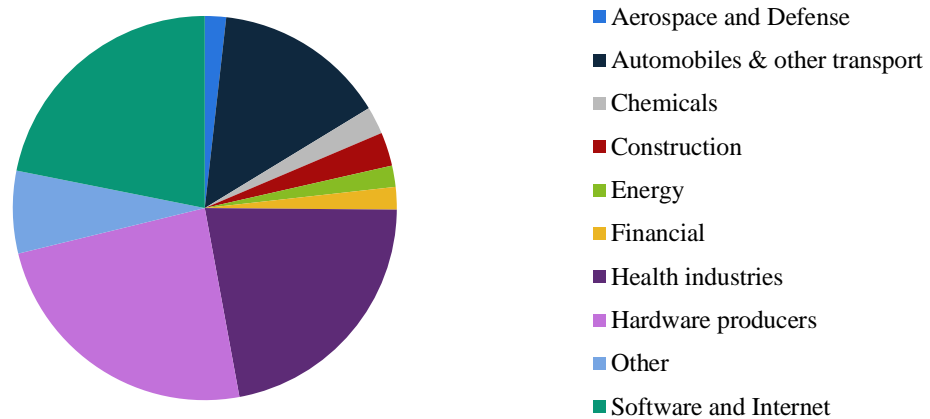***Figure 2.7*** **R&D % OF TOT REVENUES BY INDUSTRIAL SECTOR (Statista, 2021)**

Figure 2.8 **% OF GLOBAL R&D SPENDING, BY INDUSTRY (Statista, 2022)**

- ■ Aerospace and Defense
- ■ Automobiles & other transport
- ■ Chemicals
- ■ Construction
- ■ Energy
- ■ Financial
- ■ Health industries
- ■ Hardware producers
- ■ Other
- ■ Software and Internet

c) *Sector Market Size & Compound Annual Growth Rate (CAGR)*: The market size influences the scope of opportunities and challenges, hence the potential for significant returns (We are referring to the "Upside potential" of Table 2.2). Growing sectors may offer more return opportunities. The sector's growth dynamics can influence the valuation of target companies and their ability to generate profits.

d) *Sector Competitiveness* (relatively to the PE industry): measured in terms of number of funds raised by the PE industry in each sector. Following Kaserer & Diller (2004), competition can drive up valuations of target companies, reflecting strong market demand and growth potential, thus leading to higher returns.

Hypothesis 2: There exists a concave relationship between the diversification of PE funds across industries and their rate of return. Initially, as PE funds diversify across industries, the rate of return (IRR) tends to increase, suggesting that the benefits of accessing additional investment opportunities outweigh the costs of diversification (Following Lossen and Ulrich, 2006). However, **beyond a certain threshold of diversification, the positive effects diminish**. This decline can be attributed to challenges such as overcoming information asymmetries and principal-agent problems inherent in selecting and monitoring private companies. Additionally, providing value-added services to portfolio companies becomes more challenging and costly as diversification increases. Therefore, it is reasonable to assume that specialized funds, which focus on a specific industry, may possess higher levels of

expertise and informational advantages, ultimately leading to potentially higher returns (specialization hypothesis, Metrick and Yasuda, 2011).

Figure 2.9 **GRAPH OF A CONCAVE[35] FUNCTION** (re-elaboration from Wikipedia)

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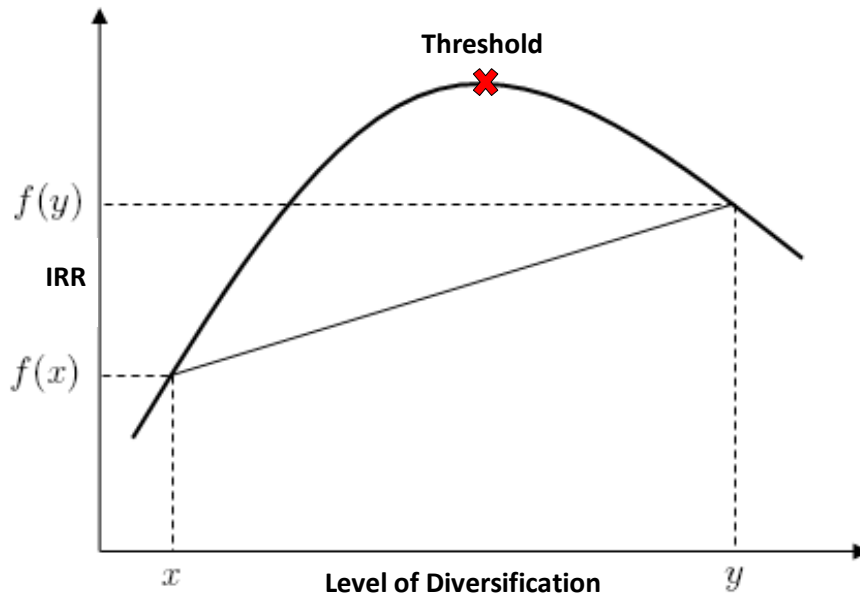
[35] A concave function is a mathematical function that curves downward. This implies that for any two points on the graph, the straight line connecting them will fall below or touch the graph, indicating that the function curves inward.

CHAPTER 3: SECTORAL INVESTMENT IMPACT & SECTORAL DIVERSIFICATION IMPACT ON PRIVATE EQUITY INVESTMENT RETURNS

3.1 Sample Design & Data Source

The data for this study have been collected manually and drawn from PitchBook database. In particular, the study examines the performance of PE partnerships trough a unique dataset comprised of fund returns (IRR) and cash flows (TVPI) gathered by the investors - two performance measures discussed in Chapter 1 (Paragraph 1.4). In addition to returns, these data sets provide information regarding the investment strategy of each fund (percentage invested in each sector), their level of sectoral diversification, and other control variable information that might influence the performance. The hypotheses are tested in a sample of 143 PE funds that raised capital between 1980 and 2024, currently (as of April 2024) managed by six of the major PE firms: The Blackstone Group, The Carlyle Group CG, Kohlberg Kravis Roberts KKR, Bain Capital, Apollo Global Management, TPG . In fact, large PE corporations typically manage several funds[36]. Each observation represents an individual PE fund, with only one observation per fund. Each fund is a separate corporate entity with its own distinct legal identity. The sample excludes funds that lack return, but includes those with negative returns. In the following table, a general overview of the main characteristics of the PE firms under study is provided.

Table 3.1 **PE FIRMS' OVERVIEW** (PitchBook)

PE firm	*General Information*
The Carlyle Group CG	- Foundation: 1987 - Headquarter: Washington, District of Columbia - Size (AUM): €392,03B - Total Investments: 2.683 - Deal Size: Large - Deal Type: Specialist - Industry: Generalist - The firm's investment preferences span financial services, consumer goods, aerospace, government services, media, commercial products, and

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[36] For example, the Carlyle Group PE firm has thirty-nine separate funds in the sample.

	retail. The firm seeks to invest in companies operating in the aerospace, government services, commercial products, consumer, media, retail, financial services, aviation finance, energy, real estate, healthcare, infrastructure, industrial, technology, and transportation sectors.
The Blackstone Group	• Foundation:1985 • Headquarter: New York, New York • Size (AUM): €957,54B • Total Investments: 2114 • Deal Size: Large • Deal Type: Specialist • Industry: Generalist - The firm prefers to invest in real estate, real assets, infrastructure, public debt and equity, growth equity, life sciences, non-investment grade credit, and secondary funds on a global basis.
Kohlberg Kravis Roberts KKR	• Foundation: 1976 • Headquarter: New York, New York • Size (AUM): €509,15B • Total Investments: 173 • Deal Size: Large • Deal Type: Specialist • Industry: Generalist - The firm seeks to invest in business products, business services, consumer products, consumer services, energy, financial services, semiconductors, infrastructure, healthcare, industrials, software, information technology, media, telecommunications, materials, resources, SaaS, manufacturing, life sciences, oncology, cybersecurity, internet of things, and technology-based sectors across Europe, America, and Asia.
Bain Capital	• Foundation: 1984 • Headquarter: Boston, Massachusetts • Size (AUM): €165,73B • Total Investments: 1253 • Deal Size: Large • Deal Type: Specialist • Industry: Generalist - The firm prefers to invest in companies operating in the consumer, industrial, healthcare, technology, financial & business service sectors. The firm

	also looks for public equity, credit, fixed income, VC, and real estate investments across different industries and geographies.
Apollo Global Management	- Foundation: 1990 - Headquarter: New York, New York - Size (AUM): €599,38B - Total Investments: 930 - Deal Size: N/A - Deal Type: N/A - Industry: Generalist - The firm focuses to make investments in business services, industrial sectors, chemicals, leisure, consumer and retail, manufacturing, services, and financial services based in the United States, Europe, Asia, Americas and Middle East region.
TPG	- Foundation: 1992 - Headquarter: New York, New York - Size (AUM):204,57B - Total Investments: 1845 - Deal Size: Large - Deal Type: Specialist - Industry: Generalist - The firm provides growth capital and prefers to invest in companies operating in the consumer, healthcare, business services, internet, digital media & communications, software, and enterprise technology sectors. The firm also makes impact and real estate investments.

3.2 Dependent Variables & Independent Variables

The **dependent variables** measure a fund's performance. I use the natural logarithm (log) of the internal rate of return (IRR) as dependent variable[37]. The IRR is defined as the discount rate that makes the net present value of a stream of cash inflows and outflows equal to zero. Secondly, through a robustness test, I will examine the total-value-to-paid-in-capital (TVPI), following Kaplan and Schoar (2005). This measure

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[37] I use the the natural logarithm of the IRR following what has been done already in the literature (Huss and Steger, 2020)

is defined as "the ratio between the total value that the LP has derived from its interest in the partnership (i.e., distributed cash and securities plus the value of the LP's remaining interest in the partnership) and its total cash investment in the partnership, expressed as a multiple" (Preqin, 2010). These two metrics offer comprehensive insights into the financial performance and efficiency of PE investments.

Turning to **independent variables**, this study considers two different factors (one for each of the two hypotheses under study) that may influence fund performance and investment strategy. For the first hypothesis, I consider as independent variable the percentage (%) of investment of the fund in specific sectors, such as Business-to-Business (B2B), Business-to-Consumer (B2C), Information Technology, Financial Services, Healthcare, Energy, and Materials & Resources.

Furthermore, for the second hypothesis, I incorporate a measure of diversification across industries. By examining the allocation of investments across these sectors, the research aims to understand how sectoral diversification impacts fund performance and risk exposure. For this sectoral diversification measure I have first considered the number of different sectors in which the fund invests. However, as pointed out by Lossen (2006), a simple count metric may not comprehensively reflect the diversification characteristics of a particular fund, given that individual investments of a fund are heterogeneous in size. Further, funds may have a few, potentially small co-investments in industries or areas outside their traditional focus, which may overstate diversification in a count metric. Therefore, following what Huss and Steger (2020)[38] suggest, I decide to use the Herfindahl–Hirschman Concentration Index (HHI) to better proxy for the portfolio diversification of a fund. I calculate the HHI[39] as the sum of the squared weights of the investments of a private equity fund in each sector, relative to the sum of all investments as a more precise measure of portfolio diversification. The HHI is bounded between values from zero to one, whereas a HHI of zero indicates a perfectly diversified fund, and a HHI of one indicates that the fund is not diversified at all. In the regression

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[38] Huss, M., & Steger, D. (2020). Diversification and Fund Performance—An Analysis of Buyout Funds. *Journal of risk and financial management, 13(6),* 136.

[39] The index is calculated as follows: $\sum_{i=1}^{N} p_i^2$, where p is the weight of the i-th group in a specific industry. In the case of all investments having the same value, the HHI takes the value of $1/N$.

analysis, I transform the HHI variable to "1-HHI" for easier interpretation, as regression coefficients calculated from the transformed variable have the same sign as those calculated from the count metric, where higher values indicate more diversified portfolios. I choose to explore sectoral diversification based on the studies of Lossen (2006), Huss and Steger (2020), who found a positive correlation between funds' diversification across industries and rate of return, supporting the thesis that while specialization within certain industries may offer benefits, diversification across industries can provide enhanced investment opportunities and mitigate risk.

By analysing these variables within the framework of an OLS regression model, this study seeks to uncover the drivers of PE fund performance and inform strategic decision-making within the industry. The approach integrates quantitative analysis with qualitative insights, providing a comprehensive understanding of the dynamics shaping the PE's performance landscape.

3.3 Control Variables

In addition to the main variables of interest, I incorporate several **control measures** into our model to ensure more precise estimates and avoid result distortions.

Firstly, I include a measure of *Fund Size*, following the methodology of Kaplan & Schoar (2005) and Gottschalg et al. (2004). These studies suggest a positive and concave relationship between fund size and the rate of return of PE funds. This measure is sourced from PitchBook for each fund.

Secondly, the research integrates measures of *PE Firm Experience*, quantified as the years elapsed since the fund's inception (Years of experience = 2024 - vintage year[40]). Kaplan & Schoar (2005) and Gottschalg (2004) propose a positive impact of PE firm experience on the rate of return of PE funds. Experienced firms tend to have better access to high-quality investment opportunities, conduct thorough due diligence, possess advanced value-adding capabilities, and implement effective portfolio management practices. These factors collectively enable experienced firms

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[40] The vintage year of a PE fund refers to the year in which the fund is officially launched and begins to raise capital from investors. It serves as a crucial reference point for assessing the fund's performance, as it determines the timing of fund deployment and subsequent investment activities, ultimately shaping the fund's return profile over time.

to make more informed investment decisions, enhance portfolio company performance, and ultimately generate higher returns for investors.

Thirdly, I introduce a control for the economic cycle (Kaserer & Diller, 2004), considering a potential negative influence of the annual rate of return of the *MSCI World Index* in the vintage year of European PE funds on their rate of return.

Fourthly, I aim to control for *'naive' diversification* across the number of portfolio companies in each fund. Empirical research (Lossen and Ulrich, 2006) suggests a positive relationship between the rate of return of PE funds and the number of portfolio companies. PE funds actively engage in their investments by providing capital, closely monitoring and supporting portfolio companies, and actively participating in strategic decisions. However, these activities are costly and time-consuming. Therefore, PE managers can only oversee a limited number of investments, exposing the fund to considerable idiosyncratic risk. As idiosyncratic risk is not compensated with a risk premium according to modern portfolio theory, investors are advised to hold diversified portfolios to achieve higher risk-adjusted returns. This perspective is supported by the findings of Weidig & Mathonet (2004) and Schmidt (2004), which demonstrate risk reduction through 'naive' diversification.

Table 3.2 presents concise descriptions of all variables utilized in the primary analysis, while *Table 3.3* display summary statistics.

Table 3.2 VARIABLES AND MEASURES

VARIABLE	CATEGORY	DESCRIPTION	SOURCE
IRR (%)	Dependent Variable	Discount rate that makes the NPV of a stream of cash inflows and outflows equal to zero	PitchBook
Percentage Invested in sector n (%)	Independent Variable	Number of deals in sector n divided by the aggregate count of deals undertaken by the fund.	PitchBook
Sectoral Diversification	Independent Variable	HHI = Sum of the squared weights of	PitchBook

		the investments of a PE fund in each sector, divided by the sum of all investments	
(1-HHI)			
Fund Size (€)	Control Variable	Total amount of capital committed by investors to the fund	PitchBook
PE Fund Experience (years)	Control Variable	Years elapsed since the fund's inception (Years of experience = 2024 - vintage year of the fund)	PitchBook
MSCI World Index in the vintage year of the PE fund (%)	Control Variable	Equity index representing the performance of large and mid-cap equity across developed markets worldwide	https://www.msci.com
Naive Diversification (n)	Control Variable	Number of portfolio companies in each fund	PitchBook

Table 3.3 **SUMMARY STATISTICS**

VARIABLE	MEAN	MIN	p50	MAX
IRR (%)	14.958	-47.000	13.700	93.850
Percentage Invested in B2B (%)	26.018	0.000	22.220	100.000
Percentage Invested In B2C (%)	21.550	0.000	18.750	75.000

Percentage Invested In IT (%)	21.449	0.000	15.380	100.000
Percentage Invested In Financial Sector (%)	12.139	0.000	3.583	100.000
Percentage Invested In Healthcare (%)	13.167	0.000	5.260	100.000
Percentage Invested In Energy (%)	3.271	0.000	0.000	33.330
Percentage Invested In Materials & Resources (%)	4.841	0.000	0.000	100.000
Sectoral Diversification (1-HHI)	0.549	0.000	0.663	0.833
Fund Size (€)	3684.122	40.500	1889.750	23064.850
PE Fund Experience (years)	15.006	2.000	12.000	44.000
MSCI World Index (%)	8.376	-37.290	10.520	46.200
Naive diversification (n)	15.357	1.000	12.000	103.000

3.4 Statistical Methodology

To empirically investigate the relationship between:

1) *PE fund performance and percentage invested in each sector* (in other worlds, testing the impact of sectoral investment strategy on the fund's IRR) - This involves analyzing how the allocation of investments across different sectors affects the overall performance of the fund;

2) *PE fund performance and sectoral diversification* (or diversification across industries) - This involves examining if and how diversification of investments across various sectors influences the performance of the PE fund;

I employ an Ordinary Least Squares (OLS) regression model, which will be conducted using Stata statistical software. OLS regression is a widely used statistical technique for estimating the relationship between a dependent variable and one or more independent variables. It is suitable for situations where the dependent variable is continuous[41], as in this case with performance metrics such as IRR or TVPI.

The objective of OLS regression is to minimize the sum of the squared variances between the observed and predicted values of the dependent variable. This method operates under the assumption that the relationship between the independent variables and the dependent variable is both linear and additive, and further assumes that the error terms follow a normal distribution with constant variance.

In this model, the dependent variable is the performance indicator (IRR) of the PE fund, while the independent variables are the percentage of investment in each sector for Hypothesis 1, and the industry diversification for Hypothesis 2. I also include other control variables to account for additional factors that may influence fund performance. The descriptive analysis gives a comprehensive overview of the data. Once the model is built and the regression is conducted, I will analyze the coefficients to assess the significance and direction of the relationship between sector investment and sector diversification and fund performance, controlling for other variables. OLS regression provides estimates of the coefficients along with standard errors, t-statistics, and p-values, which allow us to determine the statistical significance of the relationships. By using OLS regression in Stata, I aim to provide statistically sound insights into how sector allocation and diversification affect PE

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[41] A continuous variable is a type of quantitative variable that can take on an infinite number of values within a certain range. Unlike discrete variables, which can only take on specific, distinct values, continuous variables can assume any value within a given interval.

fund performance, thereby contributing to a better understanding of investment strategies in the PE industry.

The sample size of 143 PE funds is limited. Hence, before I start with the regression analysis, a closer look is taken at the functional form of the dependent variables as well as on collinearity issues. In line with previous articles, the distributions of IRR is assumed to be right skewed (*Fig. 3.4*).

Fig. 3.4 **HISTOGRAMS OF PERFORMANCE MEASURE (Lossen, 2006)**
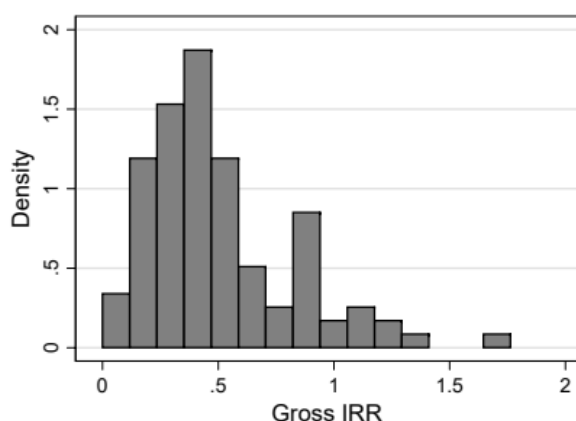
Note: The y-axis is scaled so that the sum of the bars' areas equals one.

Cochrane (2001) and Jones & Rhodes-Kropf (2003) suggest that the return of PE investments and funds can be represented best by means of a lognormal distribution. Consequently, some authors used a logarithmic transformation of returns as dependent variables in their analyses instead of the returns themselves (Hege, Palomino & Schwienbacher 2003, Cumming & Walz 2004, Gottschalg et al. 2004, Huss and Steger, 2020). Therefore, the regression model has the following form (inverse semilogarithmic):

$$ln\ Y_i = \alpha + \beta_1 X_i + u_i$$

Note: "ln" denotes the natural logarithm (i.e., logarithm to the base e); ui represents the stochastic disturbance term.

This model resembles a typical linear regression model, with the parameters α and β_1 being linear. However, the key distinction lies in the fact that the dependent variable (regressand) is the logarithm of Y, while the independent variable (regressor) is "sectoral investment". Such models are commonly referred to as semilog models, where only one variable (in this case, the regressand) is expressed in logarithmic

form. For descriptive purposes, a model with the dependent variable in logarithmic form is termed a log-lin model.

The resulting two equations of the model are respectively:

1) $ln\ Y_i = \hat{\alpha} + \hat{\beta}_{B2B}X_{B2B} + \hat{\beta}_{B2C}X_{B2C} + \hat{\beta}_{IT}X_{IT} + \hat{\beta}_{FS}X_{FS} + \hat{\beta}_{HC}X_{HC} + \hat{\beta}_{EN}X_{EN} + \hat{\beta}_{M\&R}X_{M\&R} + \hat{u}_i$

Where:

- $ln\ Y_i$ represents the fund's performance indicator (IRR)
- α represents the intercept of the model
- $\hat{\beta}_i$ represents the coefficient associated to the % of investment in each sector, which measures the sectoral investment effect on performance; the sectors are respectively: B2B, B2C, IT, Financial Services, Healthcare, Energy, and Materials & Resources
- X_i represents the % of investment in each sector
- $\hat{u}_i$ represents the stochastic disturbance term

2) $ln\ Y_i = \hat{\alpha} + \hat{\beta}_{diversif.}\ X_{diversif.} + \hat{u}_i$

Where:

- $ln\ Y_i$ represents the fund's performance indicator (IRR)
- α represents the intercept of the model
- $\hat{\beta}_{diversif.}$ represents the coefficient associated to the sectoral diversification, which measures the diversification across industries effect on performance
- $X_{diversif.}$ represents the diversification level (measured by 1-HHI)
- $\hat{u}_i$ represents the stochastic disturbance term

Prior to unveiling the regression outcomes, it is imperative to scrutinize the model's characteristics. Within this framework, *the slope coefficient delineates the constant proportional shift in Y for any absolute variation in the regressor's value* (the variable *i*). Consequently, each incremental unit alteration in the regressor is anticipated to induce a steady proportional transformation in the dependent variable Y, as indicated by the slope coefficient.

$B_i = \frac{relative\ change\ in\ regressand}{absolute\ change\ in\ regressor}$

By multiplying the relative change in Y by 100, the equation yields the percentage change, or growth rate, in Y resulting from an absolute change in X, the independent variable (or regressor). The coefficient , β_2 , of the trend variable in the growth model indicates the instantaneous rate of growth at a specific point in time, rather than the compound rate of growth over a period of time.

3.5 Empirical Results

Table 3.5 OLS EGRESSION RESULTS

The sample consists of 143 PE funds. The dependent variable is log(IRR). Independent variables include: sectoral investment strategy (measured in terms of % invested in B2B, % invested in B2C, % invested in IT, % invested in Financial Services, % invested in Healthcare, % invested in Energy, % invested in Materials & Resources) and sectoral diversification (measured in terms of 1-HHI). Control variables include: log(Fund Size), MSCI World Index, log (naive diversification) and PE fund experience (measured in terms of years elapsed since the fund's inception). The Table reports estimated coefficients and robust standard errors.

VARIABLES	(1) log_IRR
B2B	0.484***
	(0.0874)
B2C	0.487***
	(0.0881)
IT	0.484***
	(0.0871)
FinancialServices	0.480***
	(0.0871)
Healthcare	0.488***
	(0.0873)
Energy	0.482***
	(0.0872)
MaterialsResources	0.468***
	(0.0877)
SectoralDiversification	-0.666*
	(0.410)
log_FundSize	0.0125
	(0.0571)
MSCIWorldIndex	0.00131
	(0.00389)
log_NaiveDiversification	0.133*
	(0.0785)
PEfundexperience	0.0104
	(0.00805)
Constant	-46.00***
	(8.676)
Observations	143
R-squared	0.276

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

This paragraph delves into the empirical findings obtained from the regression analysis conducted to examine the impact of sectoral investments and sectoral diversification on PE investment returns.

The results of the regression analysis are presented in the table above (*Table 3.4*), which reports the estimated coefficients along with their standard errors for each variable. Through the utilization of an OLS regression model, the study aims to identify: a) the most profitable sectors within PE investments; b) the different variables influencing the performance of PE funds.

3.6 Empirical Analysis (Potential Explanation for the observed results)

In this paragraph, the regression results are analysed in line with the hypotheses and previous literature to provide insights into investment strategies in the PE industry.

R-squared Value: The R-squared value of 0.276 indicates that approximately 27.6% of the variability in fund performance (log(IRR)) is explained by the model. While not exceptionally high, this suggests a significant portion of the variation is captured by the independent variables under study.

Sectoral Investment Strategy and Fund Performance: Exploring Hypothesis 1

All sectors, including B2B, B2C, IT, Financial Services, Healthcare, Energy, and Materials & Resources, exhibit statistically significant positive coefficients at the 1% significance level ($p < 0.01$). The coefficients range from approximately 0.468 to 0.488, suggesting that investments across these sectors are associated with higher fund returns. While these findings partially support Hypothesis 1, they challenge the notion that emerging sectors like Information Technology (IT) inherently provide higher returns compared to more established sectors such as Materials & Resources. The regression results reveal that Healthcare stands out as a significant sector for investment returns, with a coefficient of 0.488, significant at the 1% level. This indicates that investments in Healthcare are associated with the highest positive impact on PE fund returns compared to other sectors.

Graph 3.6 **OLS EGRESSION RESULTS – BAR CHART**
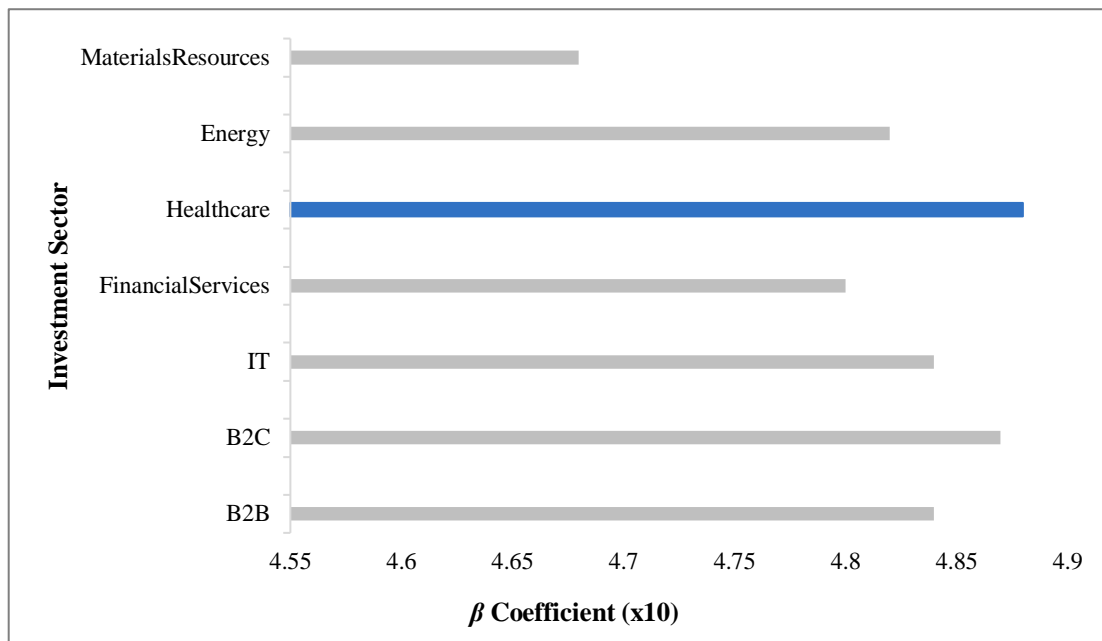
Potential explanations for **Healthcare being the most profitable sector** for a PE fund could be attributed to several factors. First, the Healthcare sector may be experiencing robust growth and innovation, offering high-potential investment opportunities. Advances in medical technology, increasing demand for healthcare services, and favourable regulatory environments could contribute to its attractiveness for investors. Second, Healthcare investments often exhibit a mix of defensive and growth characteristics. In economic downturns or market volatility, Healthcare tends to be more resilient due to the constant demand for medical services and products, making it a preferred sector for risk-averse investors. Third, the Healthcare sector may offer diverse sub-sectors and investment avenues, including biotechnology, pharmaceuticals, medical devices, and healthcare services, providing investors with ample opportunities to diversify within the sector itself. Lastly, the global emphasis on healthcare, especially highlighted by recent events like the COVID-19 pandemic, has increased the focus and funding in this sector, potentially driving higher returns for Healthcare investments. According to The Economist "Private equity is piling into health care" , with firms like KKR making substantial investments in various healthcare segments, from hospital providers to medical device makers. This surge in private equity interest suggests that the sector offers attractive opportunities for returns. As Dmitry Podpolny of McKinsey notes, "Ten years ago only a few private-equity houses had dedicated health-care teams. Today

nearly everyone does." This statement underscores the growing recognition among investors of the potential and profitability of healthcare investments. Considering this context, the Healthcare sector's coefficient of 0.488 in the regression analysis can be better understood.

Except for this sector, however, the coefficients across sectors are remarkably similar. For instance, the coefficients for IT and Financial Services are 0.484 and 0.480, respectively, suggesting comparable returns despite their different developmental stages. The observed distribution of investments across sectors suggests that large PE firms strategically diversify their portfolios. If certain sectors consistently underperformed or outperformed others, investments would be reallocated accordingly.

Robustness Checks

The robustness test involves using the Total-Value-to-Paid-In-Capital (TVPI) as an alternative measure of PE fund performance, instead of the IRR I previously employed. There are several reasons why I want to conduct this test. Firstly, while IRR is widely used in assessing PE fund performance as it accounts for timing and magnitude of cash flows and returns, it may not fully capture the effectiveness of PE investments, especially in contexts where there are significant cash flows post-exit of an investment. TVPI, on the other hand, offers a broader view of financial performance, considering the total value investors have realized relative to their initial investment. Additionally, TVPI can provide more detailed insights into the ability to generate long-term value by PE funds, taking into account both distributed returns and the residual value of investors' stakes. This is particularly important when evaluating long-term investments, such as those in the PE sector. Ultimately, conducting this robustness test will enable readers to assess the consistency and reliability of the results of the empirical analysis, providing a more comprehensive perspective on the relationship between investment strategies in the PE sector and fund performance.

The robustness test confirms the reliability of the previous results obtained using IRR as the performance metric. Firstly, all coefficients remain statistically significant, indicating consistent relationships between sectoral investment strategies and fund performance. Secondly, similar to the regression with IRR, all sector betas are positive, suggesting that investments across sectors are associated with higher fund

returns. Thirdly, the coefficients across sectors are remarkably similar, reinforcing the hypothesis that there are numerous determinants of fund performance beyond sectoral focus. Furthermore, the sector with the lowest beta remains Materials and Resources, with a coefficient of 0.0538, indicating its relatively lower impact on fund performance compared to other sectors. This consistency in the lowest coefficient underscores the robustness of our findings across different performance metrics.

Regarding the sector with the highest beta in the TVPI regression, B2C emerges with the highest coefficient, albeit closely followed by Healthcare. Notably, Healthcare maintains its position among the top-performing sectors, with a coefficient of 0.0586. While B2C surpasses Healthcare marginally in this context, the difference in coefficients between the two sectors is not substantial. This reaffirms Healthcare's status as one of the leading sectors in terms of fund performance.

Table 3.7 **OLS EGRESSION RESULTS FOR ROBUSTNESS TEST**

The sample consists of 124 PE funds. The dependent variable is log(TVPI). Independent variables include: sectoral investment strategy (measured in terms of % invested in B2B, % invested in B2C, % invested in IT, % invested in Financial Services, % invested in Healthcare, % invested in Energy, % invested in Materials & Resources). The Table reports estimated coefficients and robust standard errors.

VARIABLES	(1) log_TVPI
B2B	0.0584***
	(0.00915)
B2C	0.0614***
	(0.0104)
IT	0.0578***
	(0.00838)
FinancialServices	0.0543***
	(0.00857)
Healthcare	0.0586***
	(0.00886)
Energy	0.0543***
	(0.00867)
MaterialsResources	0.0538***
	(0.00880)
Constant	-5.282***
	(0.886)
Observations	124
R-squared	0.139

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Note: The decreasing number of observations from 143 to 124 is attributed to the unavailability of TVPI data for certain funds

Diversification and Fund Performance: Exploring Hypothesis 2

To test Hypothesis 2, which posits a concave relationship between PE fund diversification across industries and their rate of return (IRR), I initially performed separate regressions for different diversification levels. However, since these did not yield statistically significant results, likely due to the limited sample size, an alternative approach was adopted. The sample was aggregated into a single group consisting of 143 observations, and a single regression was performed to analyse the relationship between diversification and IRR. The resulting coefficient for sectoral diversification was -0.666, significant at the 10% level. The negative coefficient implies that as sectoral diversification increases (1-HHI increases), the fund's performance tends to decrease. Thus, Hypothesis 2 is only partially supported. The results align with the specialization hypothesis by Metrick and Yasuda (2011) which suggests that specialized funds focusing on a specific industry might have higher returns due to their expertise and informational advantages. The following table synthesizes the main reasons supporting the empirical findings, namely in support of the negative coefficient between sectoral diversification and performance.

Table 3.8 **REASONS TO SUPPORT THE SPECIALIZATION (vs. diversification) HYPOTHESIS**

Author (Year)	Reason in favour of Specialization
Metrick and Yasuda (2011)	**Specialization hypothesis:** Specialized funds focusing on a specific industry might have higher returns due to their **expertise and informational advantages**
Gupta & Sapienza (1992), Norton & Tenebaum (1993), Huss and Daniel Steger (2020)	**Specialization hypothesis:** Specialization allows PE firms to **make better selection decisions** and **offer more value-added services to portfolio companies**, resulting in higher rates of return. The larger the know-how of the PE firm in the activities of the portfolio company is, the more value adding services the PE firms should be able to offer.
Cressy et al. (2014)	**Specialization hypothesis:** Specific knowledge in the technology and business of the potential investment

	assists the PE firm to **reduce the information gap**, and hence, to distinguish successful from unsuccessful investments.
Gompers (1995), Sahlman (1990), Kaplan & Stromberg (2000)	**Principal - Agent Theory:** Industry expertise is necessary to **overcome the principal agent problems** inherent in the selection and oversight of private companies - The more knowledge a PE firm has about the industry and markets of the portfolio company, the **more effectively** it is able to **execute stage financing and control rights.**
Das et al. (2003), Hellmann & Puri (2002) Gorman & Sahlman (1989), Hellmann & Puri (2001),	**Specialization hypothesis:** The investment success of a PE fund is likely to be positively related to the **managers'** skills, and expertise in monitoring and developing their portfolio companies. Given that these skills are a costly resource, it appears appropriate to assume that specialized funds have a **higher level of skills**, and informational advantages in their area, or industry, of expertise translate into superior performance.
Ocasio (1997)	**Attention based view of the firm**: Organizational decision-making is influenced by the limited attentional capacity of decision-makers and structural factors that affect their attention. In the case of PE funds, excessive emphasis on diversification across industries may divert attention from critical tasks such as due diligence and strategic planning. This diversion of attention could lead to suboptimal decision-making in other areas, ultimately impacting fund performance.

However, it's essential to note that Lossen and Ulrich (2006), present contrasting findings[42]. Their empirical results indicate that while diversification across financing stages is associated with declining returns, diversification across industries leads to increasing returns. This discrepancy might be attributed to various factors, including sample composition, time periods studied, or methodologies employed, highlighting the complexity of the relationship between diversification and fund performance.

Nevertheless, my thesis, utilizing a heterogeneous sample that enhances the generalizability of the results, demonstrates prevailing negative effect.

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[42] For further explanations on this topic, refer to Chapter 2, Section 2.2.

Control Variables Coefficients: Fund size, global economic cycle, and PE fund experience don't significantly impact returns in our study. On the contrary, 'naive' diversification shows a positive impact.

In examining the coefficient for *log(Fund Size)*, I find it to be 0.012 with a non-significant p-value, indicating that fund size does not significantly impact PE fund returns in our sample. This finding diverges from the conclusions drawn by Kaplan & Schoar (2005) and Gottschalg et al. (2004), who observed a positive and concave relationship between fund size and PE fund returns, suggesting decreasing returns to scale. Conversely, Robinson and Sensoy (2016) reported a positive association, while Huss and Daniel Steger found a negative relationship that was statistically significant across most regressions. This variance in findings across studies highlights the complexity of the relationship between fund size and PE fund performance. The results may be influenced by the composition of the sample, which includes a higher proportion of smaller buyout funds, or could reflect the inherent variability and contextual nature of the relationship, as indicated by prior literature such as the studies by Lopez-de-Silanes et al. (2015) and Harris et al. (2014), which did not find a significant relationship. The lack of significance for fund size in this study challenges the traditional belief that larger funds inherently possess a competitive advantage due to economies of scale. It suggests that smaller funds may not necessarily be disadvantaged in terms of performance, emphasizing the need for a nuanced understanding of the impact of fund size on PE fund performance, considering various contextual factors such as fund strategy and market conditions.

Turning the attention to the coefficient for *MSCI World Index*, it shows a value of 0.001 with a non-significant p-value, suggesting that the global economic cycle doesn't significantly influence PE fund returns in our study. This finding diverges from some prior research that has highlighted the importance of macroeconomic factors, including global economic conditions, in shaping PE fund performance. For instance, studies such as that by Kaserer & Diller (2004b), Huss and Steger (2020), find a strong negative link between rate of return of the MSCI World Index in vintage year and rate of return of a PE fund which is statistically significant at least at the 5% level in all regressions. According to their studies, a well performing global economy at the time of fund formation forces PE firms to pay high prices for their

investments lowering the rate of return of their funds, all else equal. Several reasons could account for the divergence in findings. Firstly, the composition of the PE funds in this sample might be skewed towards strategies or sectors that are less sensitive to global economic fluctuations. For example, funds focused on growth-stage companies or niche industries may be less affected by broader economic cycles compared to those investing in mature or cyclical sectors. Secondly, the resilience and adaptability of portfolio companies to economic downturns, which can vary widely across funds, might play a role in attenuating the impact of global economic cycles on PE fund returns. Moreover, the non-significant relationship in my study may also reflect the robustness and diversification strategies employed by PE funds to mitigate the risks associated with global economic volatility. These strategies could include geographical diversification, sector-specific expertise, and active portfolio management to navigate through different economic environments. In conclusion, while the global economic cycle has been identified as a potential determinant of PE fund performance in some studies, my findings suggest that its influence may be more nuanced or even negligible in certain contexts. The non-significance of the MSCI World Index coefficient underscores the need for a more granular analysis of the factors affecting PE fund returns, taking into account fund-specific strategies, sectoral focus, and the adaptability of portfolio companies to economic fluctuations.

The following control variable, *'Naive' diversification*, represented by log(Naive Diversification), shows a positive and significant coefficient of 0.133 at the 10% significance level. These results underscore the value of 'Naive' diversification as a risk management strategy for PE funds. While active engagement is crucial, maintaining a diversified portfolio also plays a key role in overall fund performance. Literature, such as Lossen and Ulrich (2006), supports this finding by highlighting the positive relationship between PE fund returns and the number of portfolio companies. These activities, however, come with costs and time commitments. Idiosyncratic risks are not compensated, suggesting the importance of diversification, as supported by Weidig & Mathonet (2004) and Schmidt (2004).

In a conclusive examination, the coefficient for *PE fund experience* is 0.010 with a non-significant p-value, indicating that the experience of the PE firm doesn't significantly impact fund returns in this sample. Kaplan & Schoar (2005) and

Gottschalg (2004) propose a positive impact of PE firm experience on the rate of return of PE funds. Experienced firms tend to have better access to high-quality investment opportunities, conduct thorough due diligence, possess advanced value-adding capabilities, and implement effective portfolio management practices. These factors collectively enable experienced firms to make more informed investment decisions, enhance portfolio company performance, and ultimately generate higher returns for investors. Huss (2020) offers an interesting perspective by measuring PE firm experience through the logarithm of the fund sequence number. He assumes that the additional experience a PE firm gains with each new fund decreases as the fund sequence number increases. This implies that while early funds contribute significantly to a firm's experience, subsequent funds add relatively less value in terms of experience. Given these insights from the literature, my findings seem to deviate from the expected positive relationship between PE fund experience and fund returns. Several reasons could explain this divergence. Firstly, my sample might include a mix of both experienced and less-experienced firms, thereby diluting the impact of experience on returns. Secondly, the operational definition of 'experience' in this study might differ from those in previous studies. Another possible reason could be the changing dynamics of the PE industry. With the evolving landscape of investment opportunities and technological advancements, the traditional advantages associated with experience might be diminishing. Newer firms with innovative strategies and approaches might be able to compete effectively with more experienced firms. In conclusion, while my findings do not support the positive impact of PE firm experience on fund returns as suggested by previous literature, they highlight the complexity of factors influencing PE fund performance. Further research is needed to explore the nuances of PE firm experience and its impact on fund returns in different contexts and time periods.

3.7 PE Fund Performance: Unveiling the Impact of COVID-19

Through the following analysis, I aim to offer valuable insights into the dynamic interplay between PE performance and external disruptions such as the COVID-19 pandemic. COVID-19 has undeniably sent shockwaves through the global economy, significantly impacting short-term financial performance indicators such as revenue and cash flows. Moreover, the pervasive uncertainty surrounding the duration and severity of the pandemic has clouded the decision-making process for new investments. In light of these circumstances, this section endeavours to present an in-depth examination of of the impact of the COVID-19 pandemic on PE firms and the broader industry, as well as the strategic adjustments they have made in response to the crisis. *Table 3.7* provides a short summary of pertinent research findings on the subject. Studies by various authors offer valuable insights into the market sentiment, investment trends, and the overall impact of the pandemic on the PE landscape.

Table 3.9 **THE IMPACT OF THE COVID-19. SUMMARY TABLE (Chen et al., 2021)**

Authors	Research questions	Findings
Helmut et al. (2021)[43]	PE surveys 2020: Market sentiment - COVID-19 impact.	Although travel restrictions bring difficulties of fundraising, in the long run, the PE fund managers are still optimistic about the market.
Kraemer-Eis et al. (2020)[44]	European PE and venture capital: Impact of the COVID-19.	The European PE market experienced a huge negative impact caused by the COVID-19. Managers think the PE ecosystem will recover and be more mature.
Saraswathy Dr C et al. (2020)[45]	Study on trend and evolution of PE investment in India.	In India, failure to due diligence and lack of in-person meetings caused negative impaction to PE investment. At the same time, fund managers reduced new investments and maintained a cautious attitude towards

[43] eifwps/202171.html
[44] Krämer-Eis, H., Botsari, A., Lang, F., et al., The market sentiment in European private equity and venture capital: impact of covid-19. EIF Working Paper, 2020.
[45] Swaminathan, N., Saraswathy, C., A study on trend and evolution of private equity investment in India. Journal of Xi'an University of Architecture & Technology, 2020

|		the future market.
Zeidan (2020)[46]	Sustainable finance and the COVID19 crisis.	Financial return is the main goal for PE during the COVID-19. Epidemic pushes PE companies to revolutionize and be more flexible.

Amidst the disruption caused by the pandemic, PE fundraising and investment decisions have encountered significant hurdles, primarily due to constraints on due diligence activities and uncertainty surrounding cash flows. However, as highlighted by Chen, Yang & Zhang (2021), the crisis has also prompted introspection and adjustment within the industry. According to findings from Gompers & Kaplan's survey[47], a substantial proportion of PE portfolio companies have been either unaffected or moderately affected by the pandemic, underscoring the resilience of those that have adapted swiftly. Indeed, the crisis has compelled PE firms to deepen their crisis awareness and identify the most investable and resilient segments in the market, such as healthcare and online service (Chen, Yang & Zhang, 2021), thereby making their future investment portfolios more defensive and profitable.

The global response to contain the spread of the COVID-19 virus has necessitated stringent measures that have disrupted travel and logistics worldwide. Due to the travel restriction, fund managers cannot do due diligence, so investment activity has declined. The COVID-19 epidemic is also tested invested companies the ability to respond to the crisis. However, while short-term challenges persist, the crisis has also provided an opportunity for reflection and recalibration of investment strategies. As the primary market gradually returns to rationality from previous overheated conditions, the long-term trajectory of the PE market remains relatively stable, with firms adapting to the evolving landscape and identifying avenues for sustainable growth.

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[46] Zeidan, R., Obstacles to sustainable finance and the covid19 crisis. Journal of Sustainable Finance & Investment, June, 2020, pp. 1-4.
[47] According to Gompers & Kaplan's survey, of the companies in PE firm portfolios, 50.9% were unaffected by the pandemic, 39.9% experienced some impact, and 9.6% were severely impacted.

Graph 3.10 **AVERAGE IRR (%) TRAJECTORY FROM 2019 TO 2024 (self-elaboration from PitchBook)** [48]
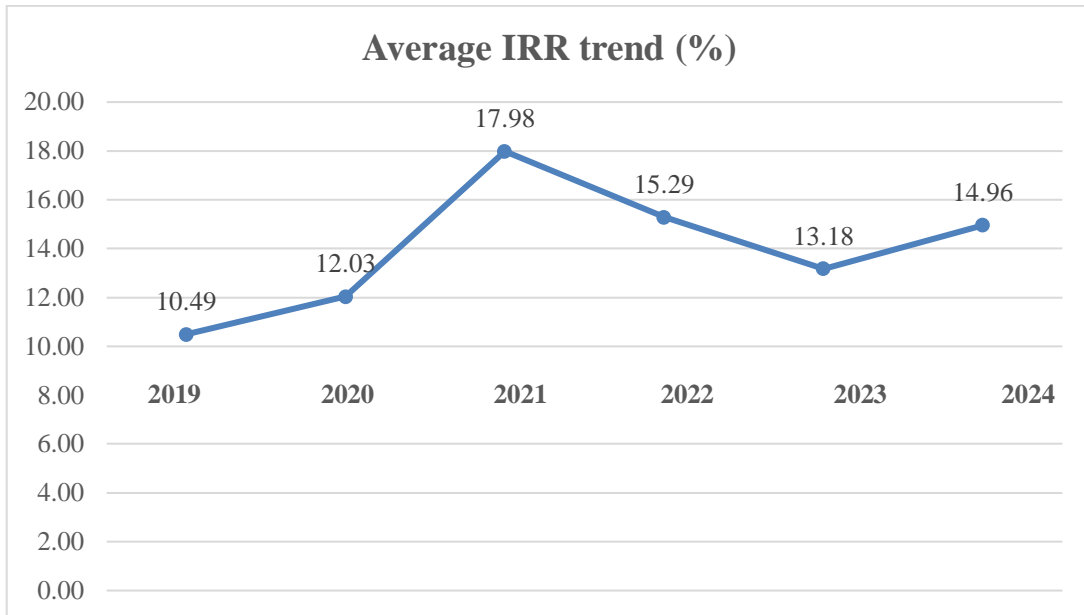
Graph 3.11 **MEDIAN IRR (%) TRAJECTORY FROM 2019 TO 2024 (self-elaboration from PitchBook)**
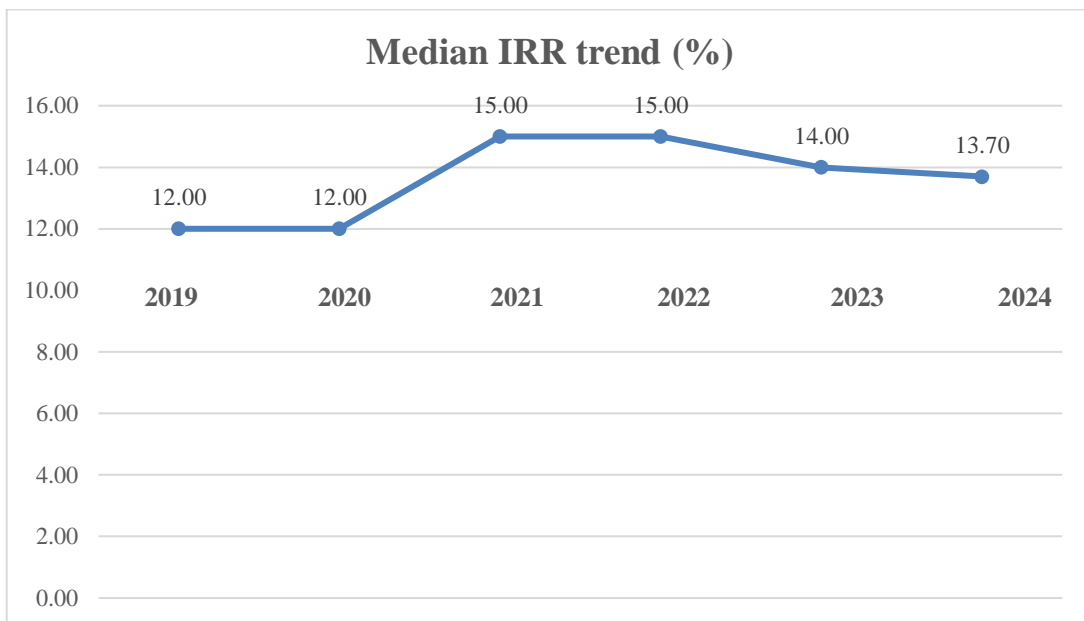
[48] In order to scrutinize the trajectory of IRR from 2019 to 2024, delineating distinct phases of pre-COVID, COVID-affected, and post-COVID periods, I enriched the database constructed thus far, sourced from PitchBook and manually collected data from the the "Returns Data" section of each fund. Specifically, I added IRR data for the years 2019, 2020, 2021, 2022, and 2023. The data for 2024 had already been collected for the previous analysis. Calculating both the mean and median IRR allows us to isolate the effect of outliers and present a more accurate depiction of the overall performance trends over time, discerning the fluctuating patterns of PE performance in response to the unprecedented challenges posed by the COVID-19 crisis.

Moreover, it will be an opportunity to reshape the industry and promote the return of value. As mentioned before, the epidemic's arrival is actually an unexpected opportunity for PE firms to make positive and trend-following adjustments.

Table 3.12 **THE RESPONSE OF PE FIRMS. SUMMARY TABLE (Chen et al., 2021)**

Authors	Research questions	Findings
Arundale and Mason (2020) [49]	How did PE firms weather the pandemic?	PE firms find opportunities through undervalued companies and restructuring under-performing businesses.
Bruch et al. (2021) [50]	The **substantial role of PE investment in healthcare** during and after the pandemic.	The pandemic has created an urgent need for PE involvement. With PE, the implications for **patient care** and societal resources are an important domestic policy issue.
Song et al. (2020) [51]	Economic and Clinical Impact of the COVID-19.	Millions of workers have filed for unemployment during the pandemic and some small **healthcare** institutions in financial peril had to furlough additional workers, cut salaries, and near closure or selloff.
Wang and Day (2020) [52]	The funding of digital health in 2020	The year 2020 is the largest funding year ever for **digital health**. The stock market's sharp recovery and pandemic-initiated policy changes intensify serious competition and commercialization activities.
Tashanova et al. (2020) [53]	Investment opportunities and strategies in an era of pandemic.	Online service, **healthcare** and food industry are the main sectors that gained during the pandemic and could help in creating a full picture of the stock

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[49] A year of disruption in the private markets. McKinsey, April 2021.

[50] Bruch, J., Gondi, S., Song, Z., COVID-19 and private equity investment in healthcare delivery, JAMA Health Forum, 1 Mar., 2021.

[51] Song, Z., Giuriato, M., Lillehaugen, T., et al., Economic and clinical impact of the Covid-19 on provider practices in Massachusetts, Mejm Catalyst Innovations in Care Delievery (Massachusetts Medical Society), 2020.

[52] Wang, E., Day, S., A new annual record for digital health. Rockhealth, 2021.

[53] Tashanova, D., Sekerbay, A., Chen, D., et al., Investment opportunities and strategies in an era of coronavirus pandemic, 3 Apr., 2020.

		performance on the market.

The analysis concerning the impact of Covid-19 on the PE industry, following an accurate literature review, concludes with an empirical investigation aimed at identifying the **sectors that exhibited the highest performance before, during, and after Covid-19**. This analysis begins with the dataset previously constructed (sourced from Pitchbook), which includes data on the performance (IRR) of PE funds and the percentage of investment of each fund in various sectors. It is based on dividing the time period 2018-2024 into three phases: The first phase, labeled as "pre-COVID," encompasses the years leading up to 2019. The second phase, termed "COVID-affected," spans from 2020 to 2022, considering the onset of the pandemic from March 20, 2020, when it was officially declared. The third phase, identified as "post-COVID," covers the years 2023 and 2024, reflecting the period following the anticipated resolution or stabilization of the pandemic's effects. The objective is to delve into sectoral performance dynamics, focusing on prominent sectors across these phases. Leveraging the results of regression analysis, I will examine the coefficients associated with various sectors to discern any notable shifts in their relative performance over time.

At the core of this analysis lies an assumption that serves as a foundation. Given the unavailability of data regarding the percentage of investment in various sectors on a year-by-year basis, it is assumed that these percentages remain relatively constant over time, reflecting the investment strategy of a particular fund. This assumption is grounded in the understanding that PE funds typically adhere to long-term investment strategies, which may involve maintaining a consistent allocation of investments across different sectors. Additionally, the lack of significant fluctuations in sectoral investment percentages may also be attributed to the nature of PE investments, which often entail longer holding periods and strategic decisions that are not subject to frequent changes. Therefore, while acknowledging the potential for variations in sectoral investments, this assumption provides a reasonable basis for conducting the analysis and interpreting the findings within the context of sectoral performance dynamics over the designated time periods.

In the context of the first column representing the Pre-COVID period, it's noteworthy that the coefficient with the highest magnitude belongs to the B2C sector (0.00778), demonstrating statistical significance at the 5% level. Notably, all coefficients exhibit positive values, except for Energy. Energy could have a negative coefficient in the first column for several reasons. First, the energy sector may have been particularly affected by specific factors during the pre-COVID period, such as fluctuations in commodity prices, regulatory changes, or geopolitical instability, which could have negatively impacted investment returns. Additionally, there may have been an overproduction in the energy sector, leading to a decrease in prices and profit margins.

Table 3.13 **OLS EGRESSION RESULTS**

The dependent variables are the logarithm of IRR in the pre-COVID period (calculated as the average from 2018 to 2019), the logarithm of IRR during the COVID period (calculated as the average from 2020 to 2022), and the logarithm of IRR in the post-COVID period (calculated as the average from 2023 to 2024). The independent variable is sectoral investment strategy (measured in terms of % invested in B2B, % invested in B2C, % invested in IT, % invested in Financial Services, % invested in Healthcare, % invested in Energy, % invested in Materials & Resources).

VARIABLES	(1) log_Avg_IRR_ PreCovid	(2) log_Avg_IRR_ Covid	(3) log_Avg_IRR_ PostCovid
B2B	0.00355	0.000529	0.501***
	(0.00266)	(0.00278)	(0.0122)
B2C	0.00778**	0.00568**	0.504***
	(0.00376)	(0.00260)	(0.0137)
IT	0.00359*	0.00299	0.501***
	(0.00209)	(0.00205)	(0.0112)
FinancialServices	0.00176	0.00143	0.498***
	(0.00303)	(0.00241)	(0.0114)
Healthcare	0.00379	0.00181	**0.506***
	(0.00239)	(0.00294)	(0.0117)
Energy	-0.0111	0.00681	0.502***
	(0.0156)	(0.00666)	(0.0105)
MaterialsResources	0.00185	0.000804	0.496***
	(0.00637)	(0.00432)	(0.0122)
Constant	2.088***	2.338***	-47.57***
	(0.156)	(0.114)	(1.168)
Observations	122	151	146
R-squared	0.080	0.040	0.328

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

However, it's necessary to acknowledge that only B2C and IT coefficients demonstrate statistical significance at the 10% level. Consequently, drawing generalized conclusions from these findings regarding the contribution of the regression analysis to comprehensively describe PE fund performance in the Pre-COVID period is challenging.

Moving to the second column denoting the COVID period spanning from 2020 to 2022, all coefficients display positive values, affirming the hypothesis elucidated in paragraph 3.6 under the section titled "Sectoral Investment Strategy and Fund Performance: Exploring Hypothesis 1." This hypothesis posits that large PE firms strategically diversify their portfolios. However, in the context of the COVID column, it's noteworthy that the sole coefficient exhibiting statistical significance at the 5% level is B2C, albeit observing a decrease in its value compared to Column 1. One possible explanation for this occurrence may be linked to alterations in consumer behaviour and market dynamics amid the pandemic, consequently impacting the performance path of the B2C sector.

Lastly, for the third column representing the Post-COVID period, all coefficients demonstrate positive values, exhibiting a remarkable degree of similarity amongst them. Notably, the **Healthcare** sector emerges as the most performing sector in terms of IRR.

Shifting focus to the analysis of the non-significance of most of the coefficients in columns 1 and 2, several common causes of weak statistical power could explain these results. Studies with small sample sizes are more likely to suffer from weak statistical power primarily due to their limited capacity to detect real effects. In this context, the sample size in the first column (122 observations) is smaller compared to the third column (146 observations). Additionally, the absence of control variables may contribute to this issue. Without controlling for other factors that influence IRR, the estimates might be less precise and less likely to achieve statistical significance. Furthermore, as seen in Graph 3.11 of the median, the variability of IRR is higher during the COVID period (particularly during the year 2021 and 2022) compared to the post-COVID period (2023 and 2024). Research studies characterized by high variability are often susceptible to weakened statistical power due to the increased presence of noise within the data, making it harder to detect significant effects of the investment strategies.

Overall, the findings from the regression analysis, especially the identification of the Healthcare sector as the most performing one in terms of IRR, resonate with the observations outlined in the literature. This convergence enhances the credibility of the regression analysis and underscores its implications for understanding the dynamics of PE involvement in healthcare. The pandemic has exacerbated financial challenges for healthcare providers, leading to an increased need for capital and creating opportunities for PE firms to step in (Bruch, Gondi & Song, 2021). PE acquisitions in healthcare have been on the rise, reflecting continued investor interest despite broader economic downturns. As reported by the Thomson ONE database, the volume of PE deals in the US healthcare sector remained remarkably high throughout the pandemic. The fourth quarter of 2020 witnessed a total of 86 deals [54], marking the highest number for any fourth quarter over the past two decades.

PE investments in healthcare are typically driven by the perceived inefficiencies prevalent in various aspects of the US healthcare delivery system. These inefficiencies provide an opportunity for PE firms to implement cost-saving measures and capitalize on potential savings. Furthermore, the fragmented nature of care delivery in many markets presents an attractive prospect for a traditional PE approach—consolidating smaller entities under a unified management structure to achieve economies of scale and wield greater market influence for enhanced pricing strategies. Additionally, a key factor that might have accelerated PE acquisitions in healthcare is the intensified financial distress within the healthcare sector caused by the COVID-19 pandemic, prompting hospitals to seek immediate access to resources, including through PE investment. Likewise, many physician practices, especially in primary care[55], are experiencing significant economic difficulty despite modest federal support. Along with acquiring physicians' practices, PE firms are seeing digital health as a new investment opportunity in care delivery[56].

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[54] The 153 PE deals in health care that were announced in the second half of 2020 cover a range of health care subsectors: 98 (64.1%) in providers and services, 32 (20.9%) in equipment and supplies, 10 (6.5%) in pharmaceuticals, 8 (5.2%) in hospitals, and 5 (3.3%) in biotechnology.

[55] In a survey of Massachusetts providers from May 2020 to June 2020, respondents were asked what they would do with their practice in the foreseeable future without additional financial assistance. One-third of independent primary care providers selected "sell the practice (eg, to private equity firm)" as one of their considerations (https://www.mass.gov/doc/economic-and-clinical-impact-of-covid-19-on-provider-practices-in-massachusetts/download)

[56] Digital health companies in the US raised an estimated $12 billion from private equity and venture capital in 2020, the highest annually raised amount within the past decade (https://rockhealth.com/reports/q3-2020-digital-health-funding-already-sets-a-new-annual-record/).

4. CONCLUSIONS

4.1 Key findings Summary

The aim of this thesis, titled *Sectoral Impact on Private Equity Performance: An In-depth Analysis of Investment Returns & Influencing Factors*, was to analyze the influence of sectoral investment and sectoral diversification on the performance of PE funds. While the return of PE financing has received a tremendous amount of attention from academic researchers, the role of sectoral investment strategy in PE funds has obtained little systematic consideration. Based on a hand-collected dataset of 143 funds managed by six major PE firms between 1980 and 2024, the analysis employed an OLS regression model to explore the relationship between sectoral investment strategies, sectoral diversification, and fund performance, measured by the IRR.

The primary findings of this research indicate that the healthcare sector stands out as a significant contributor to PE fund performance, highlighting its growth potential, resilience to economic downturns, and diverse investment opportunities. The robustness and innovation within the healthcare sector, further emphasized by recent events such as the COVID-19 pandemic, have proven crucial in enhancing PE fund returns. This sector, with its defensive characteristics during economic recessions, has emerged as a strategic choice for PE investors, suggesting that healthcare market dynamics will continue to be a focal point for investment.

In terms of sectoral diversification, the study used the Herfindahl-Hirschman Concentration Index to measure diversification. Unlike most prior studies, which rely on a simple count metric to proxy for diversification, these data allows taking the heterogeneity of initially invested amounts in each portfolio company into account. Notably, a large variation across the diversification levels of PE funds is found. While some PE funds are highly specialized, others are highly diversified. The study found a negative relationship between sectoral diversification and fund performance. This implies that specialized funds focusing on specific industries tend to achieve higher returns due to their expertise and informational advantages. The negative coefficient for diversification supports the specialization hypothesis, suggesting that

specialized funds can leverage their in-depth knowledge and sector-specific strategies to outperform more diversified funds. These findings are well in line with results that have been reported in prior studies on venture capital funds. They provide empirical backing for the hypothesis that the provision of know-how and support, in addition to the investment of capital, forms an important part of the value creation of private equity funds (Hellmann and Puri 2002; Metrick and Yasuda 2011). My results support the hypothesis of Das et al. (2003), who argue that specialized funds are likely to have a higher level of skills. Such (industry) specialists may therefore take superior investment decisions.

Control variables, including fund size, economic cycle, PE firm experience, and 'naive' diversification, were also incorporated into the analysis. The study found that while 'naive' diversification had a positive impact on fund performance, variables such as fund size, global economic conditions, and PE firm experience did not significantly influence returns in the analysed sample. This highlights the complexity of factors affecting PE fund performance, where strategic sectoral focus and diversification play pivotal roles, but other commonly considered variables may have less impact than previously thought.

Additionally, the research underscored the importance of sector-specific investment strategies, revealing that all major sectors analysed (B2B, B2C, IT, Financial Services, Healthcare, Energy, and Materials & Resources) positively contributed to fund performance. This suggests that a balanced yet strategic approach to sectoral investments can significantly enhance returns. The nuanced findings of this study contribute to the existing literature on PE, offering practical implications for PE firms, fund managers, investors, and policymakers in making informed decisions about sectoral investment strategies and diversification to optimize performance.

4.2 Limitations & Avenues for Future Research

However, it is important to acknowledge several limitations inherent in this study. First, the findings presented do not establish causal relationships but rather highlight correlations between a) investment strategy and fund performance; b) diversification and fund performance.

Secondly, the dataset utilized in this thesis is of limited size. Hence, future research endeavours should replicate the analyses conducted herein with a more extensive dataset.

Additionally, the sample comprises 143 PE funds managed by 6 PE firms. It is plausible that certain outcomes stem from unobserved disparities among these firms rather than the variables under scrutiny. However, due to constraints in the dataset's size and structure, controlling for firm fixed effects proves challenging. In the evaluation of PE fund performance, certain variables such as the experience of PE fund managers, specific characteristics of each target company (e.g., market share, entry barriers, liquidity, etc.), geographical diversification, systematic diversification across financing stages, dynamic diversification over time, and exit strategy were not accounted for due to data availability constraints. These variables could potentially exert further influence on the IRR and consequently alter the obtained results. Subsequent studies could thus delve deeper by incorporating these dimensions as control variables.

Moreover, for the examination of performance and its correlation with investment strategies in various sectors, it was necessary to assume—due to the absence of year-by-year data—that the percentage of investment in each sector for different funds remains constant. This assumption is based on the understanding that PE funds typically adhere to long-term investment strategies, maintaining consistent investment allocations across sectors. Additionally, the lack of significant fluctuations in sectoral investment percentages may be attributed to the nature of PE investments, characterized by prolonged holding periods and strategic decisions immune to frequent changes. Therefore, while acknowledging the potential for variations in sectoral investments, this assumption provides a reasonable foundation for conducting the analysis and interpreting the findings within the framework of sectoral performance dynamics over the designated time spans.

Finally, in the analysis of sector-wise performance, sectors were categorized into B2B, B2C, Information Technology, Financial Services, Healthcare, Energy, and Materials & Resources, as per the available data on Pitchbook. Nonetheless, it is evident that B2B and B2C sectors encompass additional sub-sectors that this analysis fails to address. This limitation is compounded by the relatively modest sample size, where a more extensive array of sectors could potentially dilute the significance of the analysis results. Future analyses, upon enlarging the sample size, could proceed with a more detailed categorization.

4.3 Practical Implications and Recommendations

These limitations notwithstanding, the practical implications of this work, which distinguish this thesis from previous literature, are to identify which sectors are truly the most profitable for PE funds. These findings have implications for both General Partners and the target companies acquired by PE funds.

For GPs, the insights suggest that a strategic allocation of capital towards the Healthcare sector could enhance portfolio performance. Given Healthcare's demonstrated high returns, robust growth, and resilience, GPs should consider increasing their investment in this sector. Additionally, diversifying within the Healthcare sector—across sub-sectors like biotechnology, pharmaceuticals, and medical devices—can optimize risk-adjusted returns. Investing in Healthcare also serves as a defensive strategy during economic uncertainties. The sector's stability and consistent demand help mitigate portfolio volatility and provide a hedge against economic downturns. The resilience shown by Healthcare during crises like the COVID-19 pandemic further supports maintaining or increasing exposure to this sector to protect investments during future economic shocks. Enhanced due diligence in this sector is crucial, focusing on sector-specific growth drivers and regulatory environments, as well as paying attention to advancements in medical technology and innovation. In fact, with PE poised to play a substantial role during and after the pandemic, the implications for patient care and societal resources are an important domestic policy issue. The consolidation of healthcare organizations under PE ownership, while promising economies of scale, has raised concerns about its impact

on patient care, access, and quality[57]. Evidence suggests that PE acquisitions may lead to increased healthcare costs, lower patient satisfaction, and financial instability for hospitals[58]. The growing presence of PE in healthcare underscores the need for vigilant oversight by policymakers to ensure transparency, prevent abuse, and safeguard the delivery of affordable, high-quality care.

For target companies within the Healthcare sector, these findings indicate an opportunity to attract more capital and resources for growth and expansion. Access to funding can support R&D, technological advancements, and market expansion initiatives. Furthermore, PE funds often provide operational expertise and strategic guidance, helping Healthcare companies optimize operations, improve efficiencies, and scale their businesses more effectively. Healthcare companies should prioritize innovation, particularly in medical technology and biotechnology, to maintain their competitive edge and attract further investment. Aligning growth strategies with emerging trends and demands in the Healthcare sector can enhance market positions and drive sustainable growth. Additionally, building resilience through robust crisis management and contingency planning is essential, ensuring supply chain stability and maintaining critical operations during economic disruptions. Given the importance of regulatory environments in Healthcare, companies should invest in compliance and risk management frameworks to navigate complex regulations and mitigate associated risks.

Except for this sector, however, the coefficients across sectors are remarkably similar. The results show a diversified investment pattern across sectors, indicating that PE funds do not systematically favour one sector over another based solely on expected returns. This leads us to consider alternative factors that might influence PE fund performance. According to a survey with PE and Venture Capital funds on

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[57] Bruch, J. D., Gondi, S., & Song, Z. (2020). Changes in hospital income, use, and quality associated with private equity acquisition. JAMA Internal Medicine, 180(11), 1428-1435.

[58] After PE acquisitions, hospitals often increase their charges and report larger profits compared to non- PE -owned hospitals. However, PE-owned hospitals tend to exhibit lower patient satisfaction and have fewer full-time equivalent employees per occupied bed compared to hospitals of similar size and location. Large hospital chains affiliated with PE have faced challenges in meeting loan obligations due to the high levels of debt incurred, leading to instability in local health markets (Bruch et al., 2021). Recent evidence has also linked PE with surprise billing practices in hospitals, prompting congressional investigations. Additionally, the closure of PE-owned hospitals, such as Hahnemann University Hospital in Philadelphia, has raised concerns that private equity firms may view hospital acquisitions primarily as real estate investments, potentially resulting in the closure of hospitals serving predominantly low-income patients.

"Important factors contributing to successful investments," [59] the most frequently mentioned driver behind successful investments is the *management team* (indicated by 96% of respondents), followed by the *offering* (product, service, or technology) at 72%. *Timing*, *industry conditions*, and the *business model* are also cited as significant factors [60]. Even *good luck* is considered to contribute to successful investments by a third of the respondents. Only few highlight their *own contribution* as a critical factor for success. In light of these insights, the variable *sector of investment* (the independent variable measured in terms of % invested in each sector), which directly correlates with *industry conditions* mentioned in the survey, ranks only fourth. Moreover, industry conditions are dynamic and continuously evolving, making it challenging to consistently associate a sector with these conditions over time. To conclude, while sectoral investment plays a role in PE fund performance, these findings suggest that it is not the sole determinant. Due to limited available information and an excessively broad research scope, these factors were not included in the regression model or analysed. However, they warrant consideration in understanding the multifaceted nature of PE fund performance. Beyond the factors discussed, there are also other drivers impacting PE fund performance, as indicated by the literature review.

Furthermore, these findings carry significant implications for understanding the impact of sectoral diversification on fund performance, potentially enabling professional money managers to make more informed investment decisions. These practical implications hold relevance for both GPs and the target companies. For GPs, the results suggest that a higher level of sectoral diversification may negatively impact fund performance. Specifically, as sectoral diversification increases, the fund's performance tends to decrease. This indicates that GPs might achieve better returns by focusing on specialization rather than diversification across multiple industries. The negative coefficient for sectoral diversification supports the specialization hypothesis, suggesting that funds concentrating on specific industries benefit from expertise and informational advantages. GPs can use this insight to refine their investment strategies by prioritizing industry-specific knowledge and building deeper expertise in fewer sectors. This approach can lead to better selection

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[59] Source: Practices Of European Venture Capitalists, April 2023
[60] As indicated by 56%, 43% and 39% respectively.

decisions and more effective value-added services to portfolio companies, ultimately resulting in higher returns. From an operational standpoint, GPs should consider the importance of sector-specific knowledge in reducing information gaps and enhancing the ability to distinguish successful from unsuccessful investments. Specialization allows for more effective oversight and management of portfolio companies, addressing principal-agent problems inherent in PE investments. Interestingly, the study also found that 'naive' diversification, measured by the number of portfolio companies a fund invests in, presents a positive coefficient. These results underscore the value of naive diversification as a risk management strategy for PE funds. While active engagement and specialization are crucial, maintaining a diversified portfolio in terms of the number of investments also plays a key role in overall fund performance. Consequently, the advice to investors following from this study is to select funds that diversify *within*, but not *across* industries.

Another suggestion, considering that the coefficient for sectoral diversification is negative while that for naive diversification is positive, could be to *diversify* (to benefit from the risk reduction advantages) *within closely related sectors*. This approach would allow investors to maintain the benefits of specialization, such as improved expertise, informational advantages, and more effective oversight and management of portfolio companies.

For target companies, the findings imply that being part of a specialized fund can provide substantial benefits. Companies within specialized portfolios may receive more focused attention and tailored support from their PE investors, who possess deep industry knowledge and experience. This can translate into better strategic guidance, operational improvements, and higher growth potential. Additionally, the results highlight the importance of targeted expertise in navigating industry-specific challenges and opportunities. Target companies can leverage the specialized skills and networks of their PE investors to enhance their market positioning and drive innovation.

All these findings highlight the importance for a PE fund to evaluate and balance both micro and macro factors in its investment decisions. Micro factors include characteristics of the target company, such as the quality of the management team, the offering (product, service, or technology), the predictability and stability of cash flows, growth potential, and business model. Assessing these micro factors helps in

understanding the intrinsic value and operational strengths of the target company. On the other hand, macro factors involve broader considerations like industry conditions, exogenous events (i.e. Covid-19), the level of diversification of the fund, and timing. These factors provide a context for the investment, helping to gauge external influences and market dynamics that could impact the investment's performance.

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