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THE DETERMINANTS OF THE RISK PREMIUM REQUIRED BY ITALIAN PRIVATE EQUITY FUNDS

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ABSTRACT

This research aims to identify the determinants of the ex-ante risk premium required by Italian private equity funds (PEFs) when valuing privately-held target companies. In theory, perceived risk is a key driver of expected returns and anticipated value, but: “Although PE (private equity) has experienced rapid growth, the risk and return profile of this asset class is not well understood.” (Jegadeesh et al., 2009).

Some papers have attempted to assess the ex post returns pioneered by Lerner & Gompers (1997). Yet such studies reveal both contradictory conclusions and hitherto inexplicable phenomena: what some authors call the “private equity premium puzzle” (Moskowitz & Jorgensen, 2000). Such contradictory conclusions include a wide spread of abnormal realized returns ranging from -6% (Phalippou & Gottschalg, 2009) to +32% (Cochrane, 2005).

In this research, the perceived risk and expected return drivers refer not to the ex-post realized return that PEF investors actually achieve, but to the required return the PEF hopes to gain from the target investment. At this stage, two important indicators adopted in PEF parlance have to be differentiated: (i) the Expected IRR (E.IRR) and (ii) the Threshold IRR (T.IRR). The first is the IRR as an output of a business plan, and the second
assesses the return expected by PEFs according to the risk perceived in the business plan. Put simply, these are respectively, the anticipated return and the (risk-adjusted) required return.

The study of the T.IRR is one of the main contributions of this thesis since it has never been studied before by academia as an indicator of the ex-ante perceived risk of a PEF target company. This is partly due to two important reasons. First, most previous papers examine ex-post performance, and only a few (e.g. Manigart et al., 2002), try to assess return expectations and risk perceptions using an ex-ante perspective. Second, most of the prior studies are quantitative and try to measure statistical effects captured by the ex-post IRR.

By studying 26 deals (in 13 Italian PEFs) in detail (qualitatively and quantitatively), this research project has been able to observe how PEFs assess risk and estimate the T.IRR. The research project reveals that PEFs apply neither rational-based models nor explicit formulae to assess risk ex-ante. By observing a set of phenomena unique to the PEF sector (fees effect, investment speed effect, persistence effect, money-chasing deal phenomenon, illiquidity effect, etc) whose existence has been suggested by many recent papers, this thesis has been able to propose an adjusted version of the three-factor model of Fama and French (1993, 1995) to assess risk.

The application of a quasi-rational-based asset pricing model to guide PEFs assessments is also an important contribution of this thesis. In fact, Franzoni,
Nowak and Phalippou (2010), claim to be the first to calculate the PEFs’ cost of capital by applying asset pricing models.

However, their approaches are not only based on the observations of realized returns, but also consider only one additional factor to the standard Fama & French three-factor model (1993), the liquidity factor.

In contrast, the results and the model proposed by this thesis are based on qualitative and quantitative ex-ante information and include not only the classical factors of that model, but also some other factors intended to explain some of the phenomena listed above which might also drive the risk premium in private equity funds. Based, therefore, on explaining the behavior of PEFs, the research develops a framework that can be applied by Italian PEFs and perhaps other PEFs in a more rational manner than their past behavior suggests.
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DEDICATION

This thesis is dedicated to my father and mother and to the loving memory of my first son who was especially present during this process.
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1 INTRODUCTION

1.1 Background

This chapter introduces the reader to the proposed subject and creates a background as to the main objective and the relevance of this research project. Section 1.2, gives a brief description of the scope and framework of this thesis, followed in section 1.3 by the description of the main characteristics of private equity funds, (PEFs). Section 1.4 will introduce the scenario of the PEFs by presenting the main procedures and variables involved in their deals. Section 1.5 will briefly describe both the epistemological approach and the methodology used in this research project. Subsequently, section 1.6 will outline the main contributions for both practice and academia achieved by this work. Finally, section 1.7 will provide a general outline of the whole thesis.

1.2 Scope and framework of the Thesis

This inquiry aims to identify the drivers of the risk premium incorporated in the required return (RR) assessed by Italian private equity funds (PEFs) for valuing their privately-held target companies (PHCs). By studying both valuation models used to calculate the internal rate of return, (IRR) and also particular risk situations found in selected PEFs’ deals, this research study intends to reveal the ex-ante (Return expectations and risk perceptions in an ex-ante perspective) risk-return drivers which determine the RR for valuing privately-held companies (PHCs).
The phrase “ex-ante risk-return drivers” does not refer to the final realized return that the private equity investors will receive, but refers to the required return that a PEF expects to gain from its investments (in an ex-ante perspective). Therefore, the main questions to be explored are:

- What is the nature of the factors incorporated in the RR? Are they rational? Do they respond to the efficient market hypothesis (EMH) as developed for organized markets? Do they have some relationship with the factors included in the capital asset pricing models (CAPMs)? Do all of them have a risk dimension? Do they respond to some other theory outside the realm of traditional finance?

- How can the risk drivers for a PEF portfolio and for each single deal, be measured (in an ex-ante perspective)?

- What is the value of the RR and, therefore, the adequate premium to offset all the risks and costs involved in the target deal? In this sense, this work will propose a model which, although perhaps far from perfect, will set the basis for a new and more complete criterion to approach and assess PEFs’ deals.

These are the questions that this study will try to answer and make a contribution for both academia and practitioners thus offering more effective and suitable solutions than those employed nowadays which are highly subjective and arbitrary in nature.
1.3 Private Equity: Definition and a Brief introduction

According to the European Private Equity and Venture Capital Association (EVCA) definition:

“Private Equity is a provision of equity capital by financial investors – over the medium- or long-term – to non-quoted companies with high growth potential.” (EVCA, 2007:6).

PEFs can be used to develop new products and technologies, to expand working capital, to make acquisitions. They can also resolve ownership and management issues – a succession in family-owned companies, or the buy-out or buy-in of a business by experienced managers may be achieved using private equity funds.

The main purpose of such investment vehicles is to increase the value of the PEF target companies in the medium-term (between 3 and 5 years) and to provide an adequate remuneration (A premium which compensates for the risk involved in the operation) for the PEFs at the end of the investment period.

“Private equity (PE) refers to equity securities in private companies that are not publicly traded.” (Jegadeesh et al. 2009:2).
The praxis normally distinguishes between Venture Capital and Private Equity. The first focuses on the early start-up stages of a company life-cycle. The second is aimed at adding value at a more advanced phase of a company life-cycle. This thesis will be focused on the more mature stages of a company life-cycle and therefore will refer only to the term “private equity funds” (PEFs).

The development of the PEF has helped to shape the modern world financial system, at least, until the onset of the financial crisis. To have an idea of this impact it is useful to look at the figures presented in one such worldwide research study conducted by Morgan Stanley (2007)\(^1\) in which the total amount invested by PEFs in 2006 exceeded US$1,300 billion\(^2\) with an average annual growth rate of 24% (from 1980 to 2007). Furthermore, the capital collected exhibited an overall growth of 260% between 2003 and 2006\(^3\) (Cornelius et al. 2007). In 2011, the total amount invested worldwide was US$ 2,400 billion (TheCityUK Private Equity 2011). In Europe, in 2010, there were 1,696 active PEFs managing € 523 billion (EVCA yearbook 2011). In Italy, in 2010, there were 272 active PEFs with a total amount invested of € 21,5 billion in 1,160 companies (AIFI yearbook, 2011).

\(^1\)Big is better: Growth and Market Structure in Global Buyouts, Cornelius, Langerlaar, Van Rossum (2007).
\(^2\) Cumulated amount still invested in deals and valued at the acquisition value.
\(^3\) Capital collected in 2006 divided by the capital collected in 2003.
Michael Jensen (1989) predicted the eclipse of public equity by private equity and, in fact, in 2004, The Economist dubbed private equity funds as “Capitalism’s new kings” which have become bigger than public equity markets (Moskowitz and Jorgensen, 2000).

Despite the explosive growth of the importance of PEFs in the economy, there is still a limited understanding of the economic characteristics of this industry:

“Little is actually known about what private equity funds do, and how they add value.” (Jenkinson, 2008:2).

Nowadays, there are three major areas of debate:

- First, the question whether private equity funds enhance macro-economic growth.
- Second, the information advantages of allocating savings through the private equity channel.
- Third, the rate of return determinants and characteristics of private equity funds’ (PEFs) investments.

As described in section 1.2, this thesis will specifically focus on the third issue in the Italian private equity sector. However, most papers use the word “performance” implying an ex-post focus which this study does not intend to

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adopt. In fact, almost all papers in this arena have focused on ex-post studies and tried to reveal risk drivers by looking at past performance. In contrast, this study will take the opposite perspective: namely, an ex-ante one.

1.4 Structure of a Typical PEF Deal

In order to understand this issue of perspective (ex-ante or ex-post), this section will briefly explain the complete process of a PEF deal. A PEF is raised and managed by investment professionals of a specific private equity firm (the general partners GPs). GPs raise capital from investors called limited partners (LPs).

The general partners’ (GPs) team is normally able to invest all the capital subscribed in the first five years of the fund. Figure 1.1 gives an overview of the investment and exit process for a hypothetical target company.

**Figure 1.1 Deal Process: Example for an LBO**

Source: Author’s own work
Figure 1.1 shows the following steps for a typical LBO example:

- Firstly, the PEF creates a new company (NewCo) with equity and leverage.
- The NewCo then buys out some or all of the shares held by the entrepreneur.
- The NewCo is then merged with the target company.
- Thereafter, the company creates value with the help of the PEF: By eliminating the operating inefficiencies and by optimizing the overall performance.
- There are five ways in which PEFs can exit an investment: Trade sale, entrepreneur or management team repurchase, sale of the investment to another financial purchaser or secondary buy-out, initial public offering (IPO), and liquidation.
- Finally, Figure 1.1 shows, on opposite sides, two eyes looking out on two different perspectives: The ex-ante perspective and the ex-post perspective. The first has to do with the initial valuation of the target company, risk perceptions and return expectations. The second instead, looks at past performance, realized return and realized premium. Most academic papers concentrate on this second perspective (as shown in chapter 3). By contrast, the challenge of this thesis is directed at studying the first perspective, where there is a distinct gap in academic knowledge.

The most commonly-used measure of performance within the private equity sector is the internal rate of return or IRR which is the
“rate of discount which equates the present value of the cash outflows associated with an investment with the sum of the present value of the cash inflows accruing from it and the present value of the valuation of the unrealised portfolio.” (EVCA, 2006:25).

For the purpose of this thesis, it is important to identify two groups of IRRs: The first looks at the return expectations and risk perception based on future business plans. The second explores realized returns: This IRR is measured only when all investments have been realized and the cash has been paid to the PEF. This pure IRR is also known as the net (‘cash-on-cash’) return on the wholly-realized investment portfolio and it is calculated by the cash multiple ratio: Cash Out / Cash In.

1.5 Research Approach

Past research in this field rests on inductive reasoning: Researchers in this field infer causations and build explanatory models (generalizations) by looking at past statistical information. In addition, recent research\(^6\) has developed models for the PEFs’ premium using adjusted capital asset pricing models (CAPMs) (For instance: Korteweg & Sorensen, 2009; Franzoni et al, 2010).

\(^6\) See chapter 3 for the literature review in this field.
This thesis will take a completely different approach in order to complement past research. First: Risk perceptions and return expectations cannot be inferred by looking only at past information:

“We strongly suggest that the investment community draw a distinction between past excess returns (observed returns from the past) and expected risk premiums (expected return differences in the future) to avoid continued confusion and to reduce the dangerous temptation to merely extrapolate past excess returns in shaping expectations for the risk premium.” (Arnott & Bernstein, 2002:82).

“Given the large standard errors of historical estimates, and the likelihood that risks and equity premiums are non-stationary, one cannot determine a precise, forward-looking expected premium.” (Dimson et al., 2008:467)

“We cannot directly infer a causal effect from a statistical effect.” (Marsh, 1988: 229).

Second: In order to avoid both the danger of falling into weak induction and the temptation of relying only on theories and models developed for organized markets (like the EMH and the CAPM), it is desirable to adopt an approach that allows researchers to interview PEFs’ managers and discuss in depth how exactly they behave in the field: What are their risk perceptions and return expectations and how they really consider them in their valuations.
Due to the specific characteristics of the private equity asset class, e.g. the illiquidity of the investment, the stickiness of fund flows, the restricted number of target companies and the segmentation from other asset classes, the market may be far away from being frictionless and perfectly competitive, at least in the short run.” (Diller and Kaserer, 2007:3).

Therefore, in order to understand the nature of the risk-return relationships in this asset class, instead of analyzing only past statistical data or addressing questionnaires by telephone (as the majority of previous studies do), this research has conducted in-depth interviews with practitioners, analyzed several deals, qualitatively and quantitatively, thus revealing the determinants that are priced by PEFs in an ex-ante perspective.

The key innovation of this research project (in terms of methodology) is that it looks at the ex-ante IRR (That is: return expectations and perceived risks) through a qualitative, case-based research methodology directed at revealing phenomena within the context and through an explanatory approach able to reach sufficiently far back along the causal chain.

The case study method is an ideal strategy when “how” or “why” questions are being posed:

“The distinctive need for case studies arises out of the desire to understand complex social phenomena.” (Yin, 2003:2).
In other words, this thesis intends to complement the recent quantitative studies with a more qualitative approach capable of finding causations and explanations (that is, the determinants of the RR) without inferring them from statistical patterns. In this sense, a qualitative approach through interviews was adopted to understand causations of patterns.

To summarize, referring to the Burrell and Morgan spectrum (Burrell & Morgan, 1979), this research project will be positioned (like past research studies) in the objectivist approach, that is, adopting realism regarding the ontological question, and positivist regarding the epistemological question.

However, contrary to past research studies in this area, this research approach will be completely different in terms of methodology. In fact, similar research methods can belong to either an objective or subjective philosophical approach having a dual utilization. For instance, case studies (the methodology chosen for this research project) which involve in-depth interviews, have frequently been regarded as a primarily qualitative method. However, increasingly, researchers relying on the case study method have quantified the answers in order to conduct statistical analysis of case-study results (in the accounting and finance sphere, some examples can be found in Kaplan & Norton, 1993 and Barkham et al., 1996).
1.6 Contribution

There are no previous studies analyzing in detail the determinants of the ex-ante IRR. Specifically, there are no theories nor models using tools or drivers outside traditional finance besides those of the CAPM and the EMH models.

Therefore, this project aims to make a contribution to the following specific areas:

1. Corporate finance and valuation: In particular, to the risk-return nature and drivers of both private equity funds and privately-held companies: By revealing the determinants of the RR (that is, causes behind the RR), this project will be shedding some light on the valuation issues and theory.

2. Strategic finance and risk management: by revealing the risk premium drivers, this thesis aims to help GPs to assess a more value-oriented strategy in terms of investment decisions and portfolio management. In addition, although this work is not about hedging, it will contribute to GPs’ decision-making in terms of finding new ways to both manage and mitigate the risk of the PEF portfolio.

3. This type of study is unique for Italy where there is no previous research experience in this area. In fact, being younger and less developed than in other EU countries like the UK or France, the Italian private equity sector still tends to be very reluctant to reveal information.
4. As mentioned in section 1.5, this project also makes a contribution in terms of methodology in relation to work in this area. This project adopts a different approach: The use of critical realism and positivism like previous research studies, but using an explanatory case study method based on in-depth interviews in the field.

Overall, it will make a distinctive contribution to PEFs who will be able to better understand the nature of their value drivers in the inefficient privately-held markets. After the completion of this study, they will be able to better assess their valuations by classifying the determinants of the RR (value drivers) and by calculating its final value, according to a new model which will consider both rational and irrational factors. In other words, these contributions are positive and normative respectively, since they aim to explain how the drivers work as well as to recommend how to assess them.

This research project is more appropriate for a DBA thesis than an orthodox PhD, since it mainly deals with a significant business problem and needs to explore deeply the practitioners’ arena thus being capable of offering practical advice within the context of a theoretical framework. However, there is also a contribution to academic knowledge. After the completion of this study, academia will benefit from a new, semi-rational valuation model applicable to contrast with the more overtly rational ones proposed by orthodox valuation theory. Figure 1.2 shows a spectrum in which this project can be located.
1.7 General Outline of the Thesis

This thesis consists of nine chapters. Chapter 2 will review and discuss the literature regarding the market equity premium, the EMH, the CAPM, and the relatively new behavioural theory. In addition, chapter 3 will deal with the literature review studying the risk premium in private equity funds. Chapter 4 will explain the epistemological and methodological approach adopted in this research. Subsequently, Chapter 5 will exhibit the data collected during the interviews. Chapter 6 will analyze the data quantitatively. Thereafter, chapter 7 will propose an explanatory model directed at both revealing all the risk premium determinants and improving GPs’ strategic decisions. Chapter 8 will propose a quantitative model based on the explanation and analysis of chapter 7. Finally, chapter 9 will conclude by outlining the main contribution of this thesis as well as its weaknesses, leaving the door open for future research.
2 LITERATURE REVIEW PART I – THE MARKET RISK PREMIUM

2.1 Introduction

As stated in the previous chapter, in comparison with other areas in finance, knowledge in the arena of the firm risk-premium and risk–return drivers of the private equity sector is very limited. For the listed firms, the risk premium derives from the market risk premium, which itself is a subject of controversy. This presents two issues: First, what the value of the market risk premium (one of the most important contemporary issues in financial economics Dimson et al., 2003, 2008): Second, is it acceptable to adopt the organised market premium for use by PEFs firms?

As the scope of this thesis is to investigate the ex-ante risk-return characteristics of PEFs aiming to propose a model directed at estimating the required premium for their privately-held company (PHC) targets, it is necessary to examine this essential concept in finance in order to assist the positioning of the present study.

For decades, researchers have been trying to answer this question and there are still conflicting theories and a diversity of opinions which have yet to be reconciled. Most of the difficulties found in coming to a consensus regarding the equity premium are rooted in the anomalies found in theories developed by traditional finance. Such anomalies might reveal investors’ irrational behavior and seem to contradict the EMH (at least in its strong form).
Since PEFs have to deal with privately-held company markets (PHCMs), it is important to approach the concept of the market premium in situations where lack of information and irrational behavior are more pronounced than in organized markets.

However, since valuation models applied to PHCMs are inherited from assumptions developed to assess risk and returns in organized markets, it is first necessary to explore theories proposed for such markets.

Therefore, the first part of the chapter discusses the market risk premium: section two of this chapter will start by exploring the main assumptions of the traditional finance theory and its implications. Section three will analyze current discussions regarding the value of the market premium for organized markets. Section four will briefly examine anomalies found in these markets, that is; the price deviation from the fundamental values established by traditional and rational models upon which the EMH relies. Section five will briefly outline some concepts of the behavioural finance theory (BFT).

A later part of the chapter discusses the single stock premium (cross sectional studies): Section 2.6 starts studying single stocks risk premium by introducing the Fama and French three-factor model (1993). In fact, this model partially captured the cross-sectional variation in past average returns (single type of firms’ anomalies - backward-looking). However, this model is also useful to predict future returns (forward-looking). Actually, the title of the Fama and French paper (1993) is “The Cross-section of Expected Returns. Finally, section 2.7 analyse the risk premium in privately held companies.
(which are the targets of the PEFs). This last section is about single firms in PHCs where anomalies and the concept of Jensen’s alpha introduced in section 2.6 are particularly important.

2.2 Introduction to the Traditional Finance Theory – The EMH.

The EMH has been the central pillar of finance theory over the last 40 years. According to traditional theory, stock prices must equal fundamental values due to the facts that all investors are rational and that arbitrage⁷ eliminates any price anomaly. Fama has defined:

“an efficient financial market as one in which security prices always fully reflect the available information.” Fama (1970: 383).

Jensen stated:

“There is no other proposition in economics which has more solid empirical evidence supporting it than the EMH.” Jensen (1978: 95).

The EMH explicitly assumes rationality. Rationality implies: Firstly, that investors are risk-averse; Secondly, that they are unbiased in their forecasts; Thirdly, that they respond instantaneously to new information. Moreover, the

⁷ Arbitrage Definition: Attempting to profit by exploiting price differences between identical or similar financial instruments, on different markets. The arbitrage pricing theory (APT) was developed by Stephen Ross (1976:346).
acceptance of the EMH allowed researchers like William Sharpe (1964), to introduce the Capital Asset Pricing Model (CAPM); a construct which can be empirically tested by its capability to predict past returns\(^8\). The CAPM, which is interdependent with the EMH (they are called joint hypotheses), extended Harry Markowitz’s portfolio theory to introduce the notions of systematic and specific risk\(^9\).

### 2.2.1 Theoretical foundations for the EMH

The EMH is based on three interrelated concepts. First, the investors are rational. Second, if some of them are not, their interactions are random and non-correlated thus eliminating any irrational impact on pricing. Third, if some of them are not correlated, the rational arbitrageurs present in the market offset the non-correlated irrationality of the markets.

The first assumption implies that all investors should value each stock according to its fundamental value:

“A rational investor assesses a stock by its fundamental value.” (Blanchard 2000:257)

\(^8\) One of the first empirical studies that found evidence for the CAPM was that of Black, Jensen and Scholes (1972). These authors found that the relationship between the average return and beta is almost linear and the portfolios with high (low) betas have high (low) average returns.

\(^9\) See Modigliani and Miller (1958).
That is: Valuation is the mechanism by which investors trade cash today for future claims on cash flows and the value refers to those future cash flows discounted at a rate which incorporates their levels of systematic risk.

Additionally, research by Samuelson (1965) and Mandelbrot (1966) supported the first assumption by showing how in competitive markets, with risk-neutral rational investors, returns are unpredictable and stock prices follow a “random walk”. According to Fama (1970), rationality implied the impossibility of earning superior risk-adjusted returns. Under this perspective, investors cannot beat the market.

The third assumption has been studied in detail by Friedman (1953) and Fama (1965). Friedman (1953) observed that competition amongst arbitrageurs will ensure that irrational traders will tend to accumulate losses and to reduce their wealth, leaving the arena open to rational investors. If either response is correct, prices will return to equilibrium and market efficiency will hold.

2.2.2 Empirical foundations for the EMH

The empirical evidence found in the 1960s and 1970s seemed to support the EMH. In general, the empirical implications of the EMH can be divided into two important categories. Firstly, the rapid and exact price response to relevant information. Secondly, the non-reaction to irrelevant information.
Fama (1970) revealed three types of information by which three levels of the EMH can be defined. First: The weak-form by which prices are based on past information. In this case, it is impossible to earn risk-adjusted excess profits or to make accurate predictions by looking at past stock price movements (Fama 1965). Second: The semi-strong form (pioneered by Fama et al., 1969) in which prices are based on all available public information. This is the case where it is only possible to earn risk-adjusted excess profits by getting “inside information”. Third: the strong-form by which even inside information is incorporated into pricing. Fama (1965) demonstrated the weak-form and showed evidence regarding the semi-strong form.

The non-reaction to irrelevant information was particularly studied by Scholes (1972:179) through his “substitution hypothesis”, in which he showed that the accessibility of close substitutes for a security, leads to extremely low impact on the stock price, as this is determined not by share supply but by the relative price of the alternative asset.

No market is believed to be strong-form efficient. However, various studies tried to challenge this statement by confirming the existence of inside information. Neiderhoffer and Osborne (1966:897) showed that specialists from the NYSE obtained superior returns using their monopolistic access to the book of limit order\textsuperscript{10}.

\textsuperscript{10} A limit order is an order to buy a security at no more (or sell at no less) than a specific price. This gives the customer some control over the price at which the trade is executed, but may prevent the order from being executed.
The next section will deal with the value of the market risk premium. The value of the market risk premium is a key issue in financial economics since it is critical for asset allocation and wealth projections for individual investors. It is also used in calculating a company's cost of capital.

2.3 The Value of the Market Risk Premium.

In finance, the risk premium percentage can be defined as the expected rate of return above the risk-free interest rate. As a consequence, the risk premium helps to drive the allocation of resources, at a micro- and a macro-economic level.

“One of the most important contemporary issues in finance is the magnitude of the equity risk premium.” (Dimson et al., 2003:1).

2.3.1 Current Academic Discussion and Different Approaches

Nowadays, the discussion (both in academia and practice) about what is the value of the risk market premium is a central issue in financial economics.

The most commonly-used method to estimate the equity premium is an extrapolation of the historical realized equity premium into the future. Brealey and Myers (1996:180) advised this method and suggested a premium between 8% and 8.5% as sourced from the Ibbotson 1995 yearbook.
However, historical averages are widely criticized and present many limitations. From an epistemological point of view, by using the past premium, it is assumed that investor expectations and their risk perceptions are only based on past realized returns. In fact, the equity premium could be based on other drivers like: changes in the level of investors’ risk aversion (the higher the risk aversion, the higher the required rates of return), variations in stock volatility (the higher the volatility, the higher the required stock returns), future macroeconomic expectations\textsuperscript{11}, etc.

Many researchers (\textit{e.g.} Fama and French 2002, Campbell and Shiller 1988, and Blanchard 1993) instead of using the CAPM, have used predictive regressions of fundamentals\textsuperscript{12}. For instance: Fama and French (2002) aimed at estimating the equity premium in the US markets using realized dividend and earnings growth rates to measure the expected rate of capital gain over two periods: 1872-1950 and 1951-2000. These estimates for the period 1951-2000, 2.55 percent (dividend growth model) and 4.32 percent (earnings growth model), are much lower than the equity premium produced by the average stock return, 7.43 percent. Hence, discussions about the puzzle intensified.

\textsuperscript{11} This could be the case of removal of trade barriers which might be non-repeatable and imply projections for the premium that deviate from the past.

\textsuperscript{12} Future expected returns relies on the observation that, in the very long run, expected corporate payouts and expected investments returns must be equal. The stock price today must be the present value of all future dividend payouts (dividend method) or earnings (earnings method).
Since fundamentals are more precise (given the lower standard errors), Fama and French (2002) suggested that the output given by fundamentals is closer to real past expectations. These authors concluded that “the expected equity premium of the last 50 years is probably far below the realized premium.” (p.658). The main conclusion was that the average stock return of the last half-century was a lot higher than expectations, suggesting that fundamentals are better estimators of past expectations.

Furthermore, although there are three ways according to financial theory by which capital gains could be upwardly biased (realistic cash flows with low discount rates; optimistic cash flows with normal discount rates or high growth expectations in 1950; both effects acting together), the authors took a courageous step by suggesting that the high value for the second period is due only to a decline in discount rates.

Blanchard (1993) also observed a decrease in the equity premium after 1950. He concluded that decreases in the equity premium are likely to translate to both an increase in expected bond rates and a decrease in expected rates of return on stocks (discount rates). From a different path, he arrived at a similar conclusion to Fama and French (2002).

Claus and Thomas (2001) arrived at similar conclusions regarding the high value of the equity premium. However, they addressed the problem from the evidence of survivor-bias and suggested that the equity premium estimates were biased upward because a great deal of optimism can be found in earnings forecasts (problems in cash flows instead of discount rates).
However, few researchers have agreed on the equity premium being overestimated (as Fama and French (2002), Blanchard (1993), and Claus and Thomas (2001) have suggested) and one would expect most analysts to continue advising investors about future expectations based on the commonly recognized average equity premium (between 5 and 6 percent, according to most authors).

Another method used to estimate the expected equity premium is based on calculations of what reasonable expected rates of return are necessary to entice investor to be indifferent between investing in stocks and bonds, given historical aggregate volatility and covariances. Mehra and Prescott (1985), using that approach estimate a value between 1% and 3%. This method might be more consistent with how PEFs might assess the premium in an ex-ante perspective and will be addressed in coming chapters.

In summary, there are wide discrepancies in estimating the equity premium: both the ex-ante equity premium (past expectations) and the ex-post equity premium (realized returns). Therefore, there are even more divergences in assessing the current expected (ex-ante) equity premium. The range is between -10% and +20%, depending on the source of the forecast and the method used to calculate it. However, since this thesis is concerned with an ex-ante perspective, it is important to underline that a negative market required risk premium makes no economic sense since no individual would be willing to invest.
2.3.2 The Value of the Market Risk Premium in Practice.

Nowadays, investors have more cause than ever to ask what returns they can expect from equities, and what the future risk-reward tradeoff is likely to be (Dimson et al., 2008). This is also true for private equity funds whose risk premium will be the target of this thesis.

In 1998, Ivo Welch started to study the opinions of 226 financial economists who were asked to forecast the average annual market risk premium over the next 30 years. Their mean forecast was 7.1%; the median was 7.0%; and the range ran from 1% to 15%. (Welch, 2000). On the other hand, macro-economists argued at the time that even the 7% seemed too high and stated that stock prices had risen in the 1990s because rational and informed investors required and expected lower future equity rates of return (between 1% and 3% over a 30-year horizon) (Welch, 2000).

In August 2001, Welch updated his earlier survey and found that the respondents to the follow-up questionnaire had revised their estimates downward by an average of 1.6%. They now estimated an equity premium averaging 5.5% over a 30-year horizon, and 3.4% over a one-year horizon.

Figure 2.1 shows in the first bar that the arithmetic mean premium based on the Ibbotson Yearbook data was 8.9% per year. The second bar shows that the key finance textbooks were on average suggesting a premium of 8.5%, a little below the Ibbotson mean (authors were shading the Ibbotson estimates...
(downward). The Welch survey mean is in turn lower than the textbook figures, but according to Dimson et al. (2008), since the respondents claimed to lower their forecasts when the equity market rises, this may be attributable to the market’s strong performance in the 1990s.

Figure 2.1 Estimated Risk Premiums.

![Figure 2.1 Estimated Risk Premiums.](image)

Source: Dimson et al. (2008)

However, according to Dimson et al. (2008), predictions of the long-term equity premium should not be so sensitive to short-term stock market fluctuations. The changing consensus might reflect new approaches to estimating the premium or new facts such as evidence from other countries.

Dimson et al., (2003) shed light on the matter of the future expected premium by extending the analysis of long periods of capital market history beyond the US markets. Table 2.1 shows the historical equity risk premium for 16
countries over 103-years (1900-2005)\textsuperscript{13}. It also exhibits equity premiums for the world equity index, which is a 16-country, common-currency (here taken as U.S. dollars) index with each country weighted by its beginning-of-period market capitalization or (in earlier years) its GDP\textsuperscript{14}.

\begin{table}[h]
\centering
\caption{Annualized Equity Premium for 17 Countries, 1900 - 2005}
\begin{tabular}{|l|c|c|c|c|c|c|c|c|c|}
\hline
\textbf{Country} & \textbf{Historical equity premium (percent) relative to bills} & \textbf{Historical equity premium (percent) relative to bonds} \\
& \textbf{Geometric mean} & \textbf{Arithmetic mean} & \textbf{Standard error} & \textbf{Standard deviation} & \textbf{Geometric mean} & \textbf{Arithmetic mean} & \textbf{Standard error} & \textbf{Standard deviation} \\
\hline
Australia & 7.08 & 8.49 & 1.65 & 17.00 & 6.22 & 7.81 & 1.83 & 18.80 \\
Belgium & 2.80 & 4.99 & 2.24 & 23.06 & 2.57 & 4.37 & 1.95 & 20.10 \\
Canada & 4.54 & 5.88 & 1.62 & 16.71 & 4.15 & 5.67 & 1.74 & 17.95 \\
Denmark & 2.87 & 4.51 & 1.93 & 19.83 & 2.07 & 3.27 & 1.57 & 16.18 \\
Finland & 6.79 & 9.27 & 2.35 & 24.19 & 3.86 & 6.03 & 2.16 & 22.30 \\
France & 3.83 & 9.07 & 3.28 & 33.49 & 5.28 & 8.53 & 2.69 & 27.41 \\
Germany & 4.09 & 5.98 & 1.97 & 20.23 & 3.62 & 5.18 & 1.78 & 18.37 \\
Ireland & 6.55 & 10.46 & 3.12 & 32.09 & 4.30 & 7.68 & 2.39 & 29.73 \\
Italy & 6.67 & 9.84 & 2.70 & 27.82 & 5.31 & 9.98 & 2.21 & 33.06 \\
Japan & 4.55 & 6.61 & 2.17 & 22.36 & 3.86 & 5.95 & 2.10 & 24.63 \\
Netherlands & 3.07 & 5.70 & 2.52 & 25.90 & 2.55 & 5.26 & 2.66 & 27.43 \\
Norway & 6.20 & 8.25 & 2.15 & 22.69 & 5.35 & 7.03 & 1.88 & 19.32 \\
South Africa & 3.40 & 5.46 & 2.08 & 21.45 & 2.32 & 4.21 & 1.96 & 20.20 \\
Spain & 5.73 & 7.98 & 2.13 & 22.08 & 5.21 & 7.31 & 2.17 & 22.34 \\
Sweden & 3.63 & 5.29 & 1.82 & 18.79 & 1.80 & 3.28 & 1.70 & 17.52 \\
Switzerland & 4.43 & 6.14 & 1.93 & 19.84 & 4.06 & 5.29 & 1.61 & 16.60 \\
U.K. & 5.51 & 7.41 & 1.91 & 19.64 & 4.52 & 6.49 & 1.86 & 20.16 \\
U.S. & 4.81 & 7.34 & 2.21 & 22.75 & 3.98 & 6.88 & 2.11 & 21.71 \\
World & 4.23 & 5.93 & 1.88 & 19.73 & 4.10 & 5.18 & 1.48 & 15.19 \\
\hline
\end{tabular}
\end{table}

\textbf{Source: Dimson et al. (2008)}

The left half of Table 2.1 shows premiums relative to bills, and the right half shows premiums relative to government bonds. Each half of Table 2.1 shows the annualized, or geometric mean, equity premium over 106 years, the arithmetic mean of the 106 one-year premiums, the standard error of the

\textsuperscript{13}“Over the entire period, the annualized world equity risk premium relative to bills was 4.74 percent, compared with 5.51 percent for the U.S. Part of this difference, however, reflects the strength of the dollar.” (Dimson et al. 2008).

\textsuperscript{14}Authors use market capitalization weights from 1968 onward and GDP (gross domestic product) weights before then due to the lack of reliable comprehensive data on country capitalizations prior to that date.
arithmetic mean, and the standard deviation of the 106 one-year premiums. Table 2.1 shows that the arithmetic mean annual premium relative to bills for the U.S. was 7.4% compared with 5.9% for the world excluding the U.S. market. According to the authors, this difference of 1.5% supports the notion that it is dangerous to extrapolate from the U.S. experience because of ex post-success bias.

Italy had the highest arithmetic equity premium at 10.5%, followed by Japan at 9.8%, France at 9.3%, and Germany at 9.1%. Part of the explanation for these rich premiums lies in the high historical volatilities (standard deviations) in these four markets, and part of this volatility is rooted in the first half of the 20th century when these countries were affected by the world wars. However, it is possible to observe that these countries still had above-average geometric equity premiums, despite their below-average equity market returns. This is due to the very poor historical bill and/or bond returns in these four countries.

Dimson et al. (2008), underlined the difference in two concepts which are sometimes confused: The historical risk premium and the expected risk premium. The first is the only one that can be measured and is called by some authors excess return. In contrast, the risk premium should denote the expected reward from equity investment.

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15 Something similar occurs in PEFs with the ex-post IRR and the ex-ante IRR, but this issue will be addressed in chapter 3.

16 Even over a 10-year period, the historical market risk premium was sometimes negative (between 1970s and 1980 for instance). It is obvious that Investors could not expect negative
Arnott and Bernstein emphasized the importance of differentiating between the observed excess returns and the prospective risk premium:

“These are two fundamental different concepts that unfortunately carry the same label – risk premium. If we distinguish between past excess returns and future expected risk premiums, the idea that future risk premiums should be different from past excess returns is not at all unreasonable.” Arnott and Bernstein (2002:64).

This difference is very important for the purpose of this thesis which is aimed at understanding the required risk premium and future expectations of PEFs. Arnott and Bernstein continued, stating:

“We strongly suggest that the investment community draw a distinction between past excess returns (observed returns from the past) and expected risk premiums (expected return differences in the future) to avoid continued confusion and to reduce the dangerous temptation to merely extrapolate past excess returns in shaping expectations for the risk premium. This habit is an important source of confusion that, quite literally, (mis)shapes decisions about the management of trillions in assets worldwide. We propose that the investment community begin applying the label “risk premium” only to expected future return differences and apply the label “excess returns” to observed historical return differences.” Arnott and Bernstein (2002:82).

returns or otherwise they should not have invested. Therefore, history (according to Dimson et al. 2003, even with a full century of data, market fluctuations can have an impact) can distort investors’ expectations.
In addition, Arnott and Bernstein (2002) made another important distinction: Expected returns and expected risk premiums are rooted in objective data and defensible expectations for portfolio returns, rather than in the returns that an investor might hope to earn.

“The distinction is subtle; both represent expectations, but one is objective and the other subjective.” Arnott and Bernstein (2002:65)

With these concepts in mind, Arnott and Bernstein (2002) tried to assess what investors might have objectively expected in 1926 when the Ibbotson series started. To achieve the target, they applied the following concepts: When referring to expected returns or expected risk premiums, they were referring to the estimated future returns and risk premiums that an objective evaluation-based on past rates of growth of the economy, past and prospective rates of inflation, current stock and bond yields, and so forth—might have supported at the time. They arrived at the conclusion that the risk premium that investors might objectively have expected was about 2.4 percent, half of what most investors expect.

In addition, Dimson et al., (2008) argued that since all the series shown in Table 2.1 refer to the past, and in order to use an estimate for the equity risk premium in discounting future cash flows, it is necessary to look at the expected future risk premium using current levels of volatilities\textsuperscript{17}. Therefore,

\textsuperscript{17} Volatility can be measured by the standard deviation and this is shown in Table 2.1. However, past standard deviation is a poor predictor of future volatility, especially since
Dimson et al., (2008) estimate the expected future arithmetic mean premium for each country, replacing the historical difference between the arithmetic and geometric means with a difference based on current risk estimates. With such adjustments, the authors propose a premium of 6.8% for the US and 5.6% for the world index.

But the adjustments do not stop here. Dimson et al. (2008) also observed that a comparison between the first and the second halves of the 102-year period make another important point to be considered. In fact, over the first half of the twentieth century, the arithmetic average world equity risk premium relative to bills was 4.1%, whereas over the period 1950-2005, it was 7.7%.

Dimson et al. (2008), and many other authors, suggested that the large risk premium achieved during the second half of the century is attributable to three main factors:

- First: Unexpected growth in productivity and efficiency, accelerating technological change, and enhancements to the quality of management and corporate governance. After the second world war, expectations for improvement were limited to what could be imagined at that time, and reality could easily have exceeded investors’ expectations (cash flows grew faster than investors anticipated). Some sources of extreme volatility (such as hyperinflation) are unlikely to recur (Dimson et al., 2003).
- Second: A fall in the required return due to diminished both business and investment risk. This was due to the following factors: increase in international trade flows, the end of the cold war, and increasing benefits because of diversification which allows investors to lower their risk exposure without detriment to expected returns.
- Third: transactions and monitoring costs are also lower now than a century ago.

Having these mentioned factors in mind, Dimson et al. (2008) tried to estimate them in order to convert the pure historical estimate of the risk premium into a forward-looking projection. Their estimations are shown in Figure 2.2.

**Figure 2.2 Inferring Expectations from the Historical Premium**

The first bar of the figure shows the historical risk premium. This includes the contribution from unanticipated growth in the cash flows and the gain from
falls in the required risk premium. The authors therefore explained the impact of these two factors as follows:\(^\text{18}\):

- The impact of unanticipated cash flows: This can be estimated by using fundamentals, as Fama and French (2002) did, that is, by calculating the past real dividend growth. In other words, the long-term real dividend growth rate is used to make projections of future growth.
- The impact of a fall in the required return: This can be assessed by using the price / dividend ratio (the reciprocal of the dividend yield). The authors assumed that the increase in the price/dividend ratio is attributable solely to a long-term fall in the required risk premium\(^\text{19}\).

Finally, these last adjustments (made by looking at past dividend growth and dividend yield) need to be converted by assessing them using current volatility. Using projected standard deviations Dimson \textit{et al.} (2008) arrive at the following conclusion:

\begin{center}
\begin{tabular}{|c|}
\hline
The prospective arithmetic risk premium for the US markets will be 5.3\% and 3.9\% for the world index. \\
\hline
\end{tabular}
\end{center}

Table 2.2 summarizes all the values for the equity premium seen in this section:

\(^{18}\) They used the same method proposed by Fama and French (2002) who achieved similar results.

\(^{19}\) The change is in part a reflection of expected future growth in real dividends. However, to keep things simpler, Dimson \textit{et al.} (2008) assumed that such changes reflect only the fall in required return.
Table 2.2 Values for the Equity Premium - Summary

<table>
<thead>
<tr>
<th>Author</th>
<th>Future EPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ibbotson Series</td>
<td>8.9%</td>
</tr>
<tr>
<td>Most Finance Textbooks</td>
<td>8.5%</td>
</tr>
<tr>
<td>Welch (2000) (survey 1998)</td>
<td>7.1%</td>
</tr>
<tr>
<td>Welch (2000) (survey 2001)</td>
<td>5.5%</td>
</tr>
<tr>
<td>Dimson et al., (2008) US premium</td>
<td>5.3%</td>
</tr>
<tr>
<td>Dimson et al., (2008) World index premium</td>
<td>3.9%</td>
</tr>
<tr>
<td>Mehra and Prescott (1985)</td>
<td>1% - 3%</td>
</tr>
<tr>
<td>Arnott and Bernstein (2002)</td>
<td>0% - 2%</td>
</tr>
</tbody>
</table>

These discrepancies in both the value of the premium and the methodologies to estimate it, lead one to question the main assumptions of the financial theory and as a consequence has led to a lengthening debate in academic finance about the major basic concepts which stand behind the assessment of the equity premium.

2.4 Criticism of the EMH and the Birth of the BFT

Although the studies of the 1960s and 1970s presented in section 2.2 might support the EMH, the numerous anomalies found in the last three decades have raised many issues that call into question the foundations of the financial theory, as to whether markets are efficient and arbitrage-free. This section will review the literature addressing this long-standing debate.
2.4.1 Theoretical Attacks on the EMH.

The argument against rationality started with a series of papers from Kahneman and Tversky (1972, 1973 and 1974). These authors stated that individuals, in making predictions under uncertainty, ignore prior information and use certain heuristics in making decisions. According to these authors, distortions should not be regarded as an exception or an expression of human stupidity, but rather the normality "generated" by the same cognitive constraints that Simon (1979) argued underlie the bounded rationality of human behaviour.

Kahneman and Riepe (1998) stated that investors do not look at the final level of wealth that can be achieved, instead they look at losses and profits in relation to some particular conditions which could vary from individual to individual. For instance: loss-aversion. Shiller argued that:

“investor sentiment behaves like epidemics and noise traders may behave socially and follow each other's mistakes by listening to rumours or imitating their neighbours.” Shiller (1984:457).

The EMH, therefore, should depend on the activities of arbitrageurs who should redirect the prices to their fundamental values. However, the central claim of the BFT, in contrast with that of traditional theory, is the assumption that the efficacy of arbitrage in the real world is limited because it depends on the presence of close substitutes for those securities which are under the influence of noise trading.
2.4.2 Empirical Attacks on the EMH

Here, it is important to identify two types of risk premium: The market risk premium intended as the premium of the whole market and an individual stock or portfolio risk premium. Attacks on the EMH have been mounted in both areas.

In the first case, empirical criticisms can be divided into the following main groups:

- **The Risk Market Premium Puzzle**: The fact that the apparent extreme high premiums in the late 20th century cannot be adequately explained is called by most authors “the premium puzzle”\(^{20}\). The stock market has historically earned a high excess rate of return: “our main message is that the unconditional expected equity premium of the last 50 years is probably far below the realized premium.” (Fama and French, 2002:658).

- **Volatility Puzzle**: Stock returns and price–dividend ratios are both highly variable and much higher than expected (Campbell 1999:1244).

In the second case, some anomalies associated to a specific type of firms were found. This concerns not the market premium as a whole but the

\(^{20}\) However, as the premium is inevitable an ever-changing magnitude, is this actually a puzzle? The answer should be “yes” when authors refer to the value of the past premium. In fact, no financial economists agree on the value of the past equity premium because there is no consensus on how it should be calculated (Welch, 2000:505).
premium on single stocks (for instance: small capital companies). In other words, the theoretical return is predicted by a market model, most commonly the Capital Asset Pricing Model (CAPM) model. The CAPM predicts the risk-adjusted return of single stocks.

However, if single stock returns are even higher than the risk-adjusted return, and persistently so, this is considered anomalous. This kind of excess of return is also called "positive alpha" or "abnormal returns". Investors are constantly seeking investments that have positive alpha. This concept will be more fully covered in section 2.6 which address the problems of the capital asset pricing models (CAPMs) when assessing single firms.

Many anomalies were found in the last three decades. One of the first important was found by Basu (1977) who showed that stocks with low P/E ratios earned a premium for investors during the period 1957-1971. Additionally, Banz (1981) observed a strong relation between company size and stock returns. Over long periods of time, small companies seem to provide a greater return than the market average returns without a corresponding increase in risk. This so called "size-effect" is shown in figure 2.3
Unless firm size is somehow related to measurement errors in beta, so that small firms actually have higher betas than those estimated using conventional procedures, there is no CAPM-consistent explanation for the firm size effect.

De Bondt and Thaler (1985, 1987) showed that stocks that have registered the lowest returns (the “losers”) over the previous three-five years (observation period) did better during the following three-five years (test period) than those that previously had the highest positive return (the “winners”). This so-called losers-and-winners effect yielded an abnormal market adjusted return of 24.6% for the arbitrage portfolio (losers minus winners).
These observations are consistent with the overreaction hypothesis, that is: the excessive investors’ reaction to current information which seems to characterize all the securities. To test such a hypothesis, De Bond and Thaler (1985) expected to observe the mean-reverting movements in stock returns. Furthermore, the most important part of the losers’ excess happened in January (January effect) which can be clearly seen in the figure in the five return jumps.

According to De Bondt and Thaler, the only alternative explanation for these observations is the presence of irrational behaviour in investors’ decisions by which returns on loser securities are under-estimated and returns on winner securities are over-estimated, producing an excessive reaction to stock prices “over-reaction”.

In the same way, evidence of an under-reaction came from Jagadeesh and Titman (1993) who showed that stocks with high short-term past returns (based on the previous 3 to 12 months portfolio formation periods) continue to perform better in the future than the stocks with low short-term past returns. Contrary to the over-reaction hypothesis where the long-term tendencies reverse (De Bondt and Thaler), in the under-reaction hypothesis, also called the momentum-effect, these short-term tendencies continue.

Among the more striking of the long-term anomalies is the study of IPOs (initial public offerings) and seasoned equity offerings (SEOs) (Loughran and Ritter 1995; Dechow, Hutton and Sloan, 2000; Chahine, 2001). In these
cases, analysts displayed over-optimistic forecasts concerning the potential growth of the offering firms.

Freeman (2004) argued that the equity premium puzzle arises due to entry barriers (both practical and psychological) which have traditionally impeded entry by individuals into the stock market, and that returns between stocks and bonds should stabilize as electronic resources open up to a greater number of traders.

Other researchers have concentrated on the study of the traditional proposition that stock prices do not react to “non-information”. In this arena, the most important finding is represented by the “crash of 1987”. On October 19th 1987, the Dow Jones industrial Average fell 22.6%, the biggest daily fall ever, without having had any apparent new information. Cutler et al. (1991) studied several movements like this and found that they did not derive from any relevant news.

The anomalies outlined can be summarized as follows: The January effect, the size-effect, the P/E ratio effect, the losers-winners effect or the over- and under-reaction to earnings announcements anomaly, the IPOs and SEOs anomaly, and the crash of 1987 anomaly. All of them attack the semi-strong form of EMH since they involve public information: The excess returns based on “stale information” is clearly in contrast with the semi-strong form.
In order to provide evidence against the weak form of the EMH, it should be demonstrated that stock prices do not reflect past returns. The EMH is based on the idea that prices are unpredictable or as stated by Brealey and Myers (1988:289) capital markets “have no memory”. The logic of this statement is the following: If prices were predictable, competition and arbitrage would assure the adjustment of prices to fundamentals, thus leaving random movements to non-anticipated events.

However, some earlier economists revealed that stock prices could differ from their fundamental values. Keynes (1936:153-154), in his “General Theory”, argued that “day-to-day fluctuations in the profits of existing investments tend to have an altogether excessive, and even absurd, influence on the market.” Graham (1949) recommended buying stocks whose prices seemed to be low in relation to their fundamental values. This “contrarian strategy” was based on the fact that prices stayed low only temporarily.

More recently, Poterba and Summers (1988) conducted an international study that concluded that the mean-reversion is more evident in less efficient equity markets. Additionally, Lakonishok, Shliefer, and Vishny (1994) and La Porta (1996) provided evidence that suggested that if investors generally do not understand regression to the mean, they are likely to overestimate a company’s “true greatness” and pay too much for the company’s stock, a decision they will regret when measures of the company’s greatness regress to the mean.
Those arguments are in line with the losers-and-winners effect of De Bondt and Thaler (1985 and 1987) in which the high book-to-market ratios could reflect the excessive market optimism regarding future returns. In fact, their results of negative serial correlation for 36 months might be inconsistent with the weak-form.

In addition, although Fama (1965) presented important evidence in favour of the random walk hypothesis, Fama and French (1988) showed that the dividend–price ratio is able to explain only 27% of the variation of cumulative stock returns over the subsequent four years. Therefore, Fama and French (1991) extended the concept of the weak-form to include predicting future returns with the use of accounting or macro-economic variables.

To reinforce the weak-form, many other studies conclude that stock returns can be predicted by means of publicly-available information, such as time series data on financial and macroeconomic variables. In contrast, other studies have argued that the equity premium is overstated and fundamentals alone cannot explain its value.

This on-going discussion implies that there is no clear evidence to reject the weak-form hypothesis. Nevertheless, the empirical evidence suggests that

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22 See also Blanchard (1993), Claus and Thomas (2001), Fama and French (2002), and Brown et al. (1995).
capital markets are not efficient, at least in the fully-strong-form. Through their trading behaviour, biased investors can cause prices to deviate significantly from fundamental value. These deviations create opportunities, and risks for sophisticated investors and therefore the so-called limits-to-arbitrage, as explained in the next section.

2.5 Introduction to Behavioural Finance Theory (BFT)

BFT helps traditional finance to explain some of the anomalies observed in the last section by incorporating some psychological concepts. "The limits of arbitrage create anomalies that the psychology of decision-making helps explain." (Mullainathan and Thaler 2000:1).

The key concepts addressed by the theory include: Loss aversion; Regret aversion; Mental accounting; Self-control; Over-confidence; Herding behaviour; Representativeness; Anchoring, Adjustment and Conservatism:

- **Loss aversion** is based on the idea that the mental penalty associated with a given loss is greater than the mental reward from a gain of the same size (Tversky and Kahneman, 1986, 1992).
- **Regret aversion** arises because of a person’s desire to avoid feeling the pain of regret resulting from a poor investment decision. This explains the investor’s tendency to hold on to losing stocks for too long and sell winning stocks too soon.
- **Mental accounting** refers to the implicit methods (aggregation rules) that individuals use to code and evaluate financial outcomes: transactions, investments, gambles, *etc*. Investors tend to treat each element of their investment portfolios separately. This can lead to inefficient decision-making.

- **Self-control**, as noted by Thaler and Shefrin (1981), investors are subject to temptation and they look for tools to improve self-control. By mentally separating their financial resources into capital and ‘available for expenditure’ pools, investors can control their urge to over-consume.

- **Over-confidence (Hubris):** For instance, entrepreneurs and investors in general may be over-optimistic about their firm’s prospects (Moskowitz and Jorgensen, 2000).

- **Herding behavior:** Investors tend to invest in ‘respected companies’ as these investments carry implicit insurance against regret (Koening 1999).

- **Representativeness:** This principle was introduced by Kahneman and Tversky (1972) and states that people can make judgments based on stereotypes. Under representativeness, investors will consider a series of positive company performances as representative of a continuous growth potential, and ignore the investors’ random behavior (see first paragraph of section 2.2.1). An important example of representativeness taken from the empirical evidence is the “losers-and-winner effect” or “over- and under-reaction effect”

- **Anchoring, Adjustment and Conservatism:** Investors tend to remain anchored to their original judgments regarding the company's
performance and will only slowly adjust to the new, positive information. The state of conservatism refers to the condition where investors subconsciously are reluctant to alter their beliefs in the face of new evidence (Edwards, 1968). This phenomenon might explain the “over- and under-reaction effect”. As representativeness explains the long-term over-reaction, conservatism explains the short-term under-reaction. After a series of good earnings announcements, though, representativeness causes people to overreact and push the price up too high.

Therefore, some behavioralists, in order to account for the under-reaction effect have recently developed the first behavioralist models. For instance: Barberis, Shleifer and Vishny (BSV (1998)), Daniel, Hirshleifer and Subrahmanyam (DHS (1998)) and Hong and Stein (HS (1998)). These models tried to integrate both over- and under-reaction.

Other behavioralists have as a main target to build a behavioural and predictive asset pricing model (BAPM) empirically testable. Many authors have tried to build such a model: Merton (1987), Blume and Easley (1992), Shrefrin and Statman (1994), Odean (1998), Daniel et al. (1998), Daniel et al. (2001)).

The anomalies found in the last decades and the new concepts developed by the behaviouralists seem to contradict the most basic hypothesis of financial economics like the EMH itself as well as the estimations for the value of the risk-premium. Is it possible to trust the Sharpe (1964), Lintner (1965a, 1965b)
Mossin (1966) CAPM (SLM-CAPM) to predict risk-adjusted return expectations? How can investors and in particular, for this thesis, private equity funds assess risk and return premium ex-ante? Is the SLM-CAPM a valid tool to estimate the premium for PEFs’ investments? It is not easy to answer these questions but they have to do with the objective of this thesis. The next sections will try to deal with some of them.

2.6 The SLM-CAPM and the Three-Factor CAPM.

The problem with behavioural finance is the fact that its models (predictive behavioural models that tried to replace the SLM-CAPM) are far from having been successfully tested and being widely recognized. In fact, Fama (1997) asserted that behavioural finance is more a collection of anomalies and concepts than a true theory of finance, and that these anomalies will eventually be priced out of the market or explained by appealing to minor adjustments in methodologies like the three-factor model.

Fama (1997) argued that long-term anomalies (like over- and under-reaction) are chance results. Additionally, EMH supporters argued that after the publication of the anomalies, investors should understand that their decisions were bad ones or irrational and they should make much better decisions for the future thus eliminating any non-random anomalies. In favour of these ideas, there is the fact that there is no clear evidence against the weak-form EMH.
Yet the discussion regarding the weak-form hypothesis is exacerbated by the joint hypothesis\textsuperscript{23} problem (methodology problem for testing)\textsuperscript{24}: In other words, is this a problem of biased cash flows or wrong discount rates calculated with SLM-CAPM? In this direction, Fama and French (2002) suggested that discount rates are under-estimated, thus causing the equity premium to be overestimated, suggesting that the problem is the SLM-CAPM not the EMH\textsuperscript{25} (at least in its weak form).

In fact, although Black, Jensen, and Scholes (1972) as well as Fama and MacBeth (1973) found that, as predicted by the SLM-CAPM, there is a positive simple relation between average stock returns and $\beta$ during the pre-1969 period, this is not true for the period 1963-1990. The relationship between $\beta$ and average return disappears during the most recent period (Fama and French, 1992).

Therefore, Fama and French (1993), proposed the three-factor CAPM to capture two of the most important anomalies: Size effect (Banz, 1981) and book-to-market value (Basu, 1983). They tried to capture the cross-sectional variation in past average returns associated with the market $\beta$, size, leverage, book-to-market equity, and earnings price ratios.

\footnotesize
\textsuperscript{23} Tests of market efficiency must be based on CAPM and since much evidence contradicts the EMH, it may be because the market is inefficient, or it may be that the model is incorrect.

\textsuperscript{24} “Market efficiency per se is not testable” Fama (1991). Hawawini and Keim (1998) concluded that finance has no tests strong enough to distinguish market inefficiency from bad asset-pricing models.

\textsuperscript{25} See also Fama and French (1992) and the failure of beta to reflect risk.
Fama and French (1993) found factors describing “value” and “size” to be the most significant factors, outside of market risk, for explaining the realized returns. They constructed two factors: SMB to address size risk and HML to address value risk. The formula known as the three-factor model of Fama and French is shown as follows:

$$E(R) = R_f + \beta * R_m + b_s * SMB + b_v * HML + \alpha$$

Where:

**E(R):** is the expected rate of return of a specific asset,

*Rf:* is the risk-free return rate,

*Rm:* is the return of the whole stock market,

**The SMB Factor:** which stands for Small minus Big, is designed to estimate the additional return investors have historically received by investing in companies with small market capitalizations (referred to the size premium). In practice, the SMB monthly factor is computed as the average return for the smallest 30% of stocks minus the average return of the largest 30% of stocks in that month. As a reference point, the historical average from July 1926 to July 2002 of the annual SMB factor has been approximately 3.3% (Womack and Zhang, 2003),

**The HML Factor,** which is short for High minus Low, has been constructed to estimate the so-called “value premium” provided to investors for investing in companies with high book-to-market (B/M) values. Similarly to the SMB, HML is computed as the average return for the 50% of stocks with the highest B/M ratio minus the average return of the 50% of stocks with the lowest B/M ratio each month. Over the time period from 1926 to 2003, this
premium for value stocks has averaged approximately 5.1% annually (Womack and Zhang, 2003),

The $\beta$: intends to measure the exposure that an asset has to market risk (although this beta will have a different value from the beta in a SLM-CAPM as a result of the added factors),

The $bs$: measures the level of exposure of the specific asset to size risk,

the $bv$: intends to measure the level of exposure of the specific asset to value risk.

These coefficients ($\beta$, $bs$ and $bv$) in this model have similar interpretations to beta in the SLM-CAPM. The $bs$ and $bv$ factors, like the market beta, are regression coefficients: the higher the value of $bs$, the smaller the capitalization. Similarly, the higher the value of $bv$, the larger the book/price ratio.

In addition, all these factors combined have the greatest predictive power that researchers have tested – often yielding an R-Squared\(^{26}\) value of approximately 0.95 (Bahl, 2006). However, the HML as a “risk factor” has spurred much discussion. In the case of SMB, which calculates “size risk”, small CAPS logically might be expected to be more susceptible to many risk factors due to their undiversified nature and their reduced capability to absorb negative financial events.

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\(^{26}\) Statistical measure of how well a regression line approximates real data points; an r-squared of 1.0 (100%) indicates a perfect fit. In finance, r-squared measures how well the Capital Asset Pricing Model predicts the actual performance of an investment or portfolio.
Conversely, the HML factor intuitively might suggest higher risk exposure for typical “value” stocks (high B/M) versus “growth” stocks (low B/M). This makes sense intuitively because companies need to reach a minimum size in order to execute an Initial Public Offering (IPO).

One of the central aspects about the three-factor CAPM devised by Fama and French (1992) is the fact that this model is based on rational behaviour. If assets are priced rationally, variables that are related to average returns, such as size and book-to-market equity, must proxy for sensitivity to common (shared and thus undiversifiable) risk factors in returns (Fama and French 1992).

The Fama and French three factor model (1993) partially captured the cross-sectional variation in past average returns (single type of firms’ anomalies). However, the scope of this thesis is to have a forward-looking perspective. In fact, the Fama and French (1993) three-factor model was not only developed to explain past anomalies and past performance (backward-looking) but also to predict future returns (forward-looking). Actually, the title of the Fama and French paper (1993) is “The Cross-section of Expected Returns.”

This issue of abnormal returns found in the cross-sectional studies was also studied by Jensen (1968) who developed a model, a pillar for this research project that will have to deal with single firms and small portfolios held by PEFs. Therefore, it is important to introduce an important concept known as the Jensen's alpha or Jensen's Performance Index, ex-post alpha and also known as abnormal returns. This is used to assess the performance of
individual stocks or portfolios. If such an asset's return is even higher than the risk-adjusted return, that asset is said to have "positive alpha" or "abnormal returns", which according to the EMH, should be eliminated quite rapidly as the market moves to equilibrium.

Jensen's alpha = Portfolio Return - [Risk Free Rate + Portfolio Beta * (Market Premium)]

\[ \alpha_J = R_i - [R_f + \beta_iM \cdot (R_M - R_f)] \]

This concept is particularly relevant for this thesis\textsuperscript{27}. In fact, PEFs need to know what is the future risk-reward trade-off for both their portfolios and their single deals.

Beyond the F&F three-factor CAPM other authors have recently proposed alternative rational-based asset pricing models. For instance: Ang et al. (2006), Adrian and Rosenberg (2008), Chen et al. (2010).

Chen et al. (2010) claimed that the Fama and French three-factor model cannot explain many anomalies, one of them being (the most important) the momentum or under-reaction to earnings surprises. They proposed a new three-factor model including: the market excess return (R mkt), the difference between the return of a portfolio of low-capital investment stocks and the return of a portfolio of high-capital investment stocks (R inv), and the

\textsuperscript{27} Recent academic papers in the PEFs arena (see chapter 3) found high levels of abnormal returns. Since the target of this thesis is to explain the determinants of the risk-premium, it will have to deal with these unexplained alphas.
difference between the return of a portfolio of stocks with high returns on assets (ROA) and the return of a portfolio of stocks with low returns on assets (R roa)

\[ E(R) = R_f + \beta (R_m) + (\beta \text{ inv} \times R \text{ inv}) + (\beta \text{ roa} \times R \text{ roa}) \]

These authors stated that ROA predicts returns because high expected ROA relative to low investment means high discount rates. The high discount rates are necessary to offset the high expected ROA to induce low net present values (NPV) of new capital and thereby low investment. If, instead, the discount rates are not high enough to offset the high expected ROA, firms would obtain high net present values of new capital and invest more. In the same way, low expected ROA relative to high investment (such as small-growth firms in the late 1990s) means low discount rates. If the discount rates are not low enough to offset the low expected ROA, these firms would obtain low NPV of new capital and invest less.

Another important innovation of Chen et al. (2010) (differing from Fama and French (1993 and 1996), who interpreted their SMB and HML concepts as risk factors) is the fact that they did not interpret ROA as a risk factor.

“Unlike size and book-to-market that directly involve market equity, which behavioralists often use as a proxy for mispricing (e.g. Daniel, Hirshleifer, and Subrahmanyam (2001)), the new factors are constructed on economic fundamentals that are less likely to be affected by mispricing, at least directly.” (Chen et al. 2010:26).
Moreover, these authors claimed that this theory is silent on investors’ behaviour, which can be rational or irrational. As such, they argued that their “tests do not aim to (and cannot) determine whether the anomalies are driven by rational or irrational forces.” (Chen et al. 2010:27).

Future studies should deepen the understanding of these new proposals and might eventually corroborate them as better tools to predict future return expectations and risk perceptions. Instead, what academia seems to have revealed is that the SLM-CAPM’s true predictive power is questionable (in particular in the period 1963-1990). For instance, recent research conducted by Bahl (2006) found, on the basis of the adjusted $R^2$, that the three-factor model is better able to capture the variations in the stock returns than the SLM-CAPM, the average adjusted $R^2$ being 87% for the former model and 76% for the latter model.

Past empirical evidence strongly suggested that rational-model predictions, although far from being perfect, are still the best approximations that we have overall. On this basis, this section concludes that although the anomalies might invalidate the strong form of the EMH (even the semi-strong form), the rational models cannot be invalidated, at least not yet. In particular, the three-factor CAPM of Fama and French seems to be the most widely tested and recognized predictive model. Therefore, this thesis will consider the concepts developed by the rational capital asset pricing models as important pillars to identify the determinants needed to assess risk perceptions and return expectations in the PEFs’ valuations.
2.7 The Value of Using a Market Premium in the Private-Market Sector

This section is about single firms in PHCs where anomalies and the concept of Jensen’s alpha introduced in section 2.6 are particularly important. In addition, it is important to underline that the justification for this thesis not deviating from the CAPM framework was underlined in the conclusion of Section 2.6. However, since PEFs have to deal with PHCs, this section will review the particular characteristics that must be considered when using the CAPM in these particular markets.

2.7.1 Characteristics of the Privately-Held Company Markets (PHCMs)

Although very different to organized markets, PHCMs might be approached by PEFs with the same models used by traditional finance theory (TFT), as developed for organized markets. All these models are based on adjusted versions from the Modern Portfolio Theory/CAPM, the Efficient Markets Hypothesis (EMH), the Rational Decision Making Hypothesis (RDMH), and agency theory.

Greater inefficiency in privately-held markets stems from the following issues:

1. The presence of higher transaction costs,
2. diseconomies of scale due to size limitations,
3. illiquidity,
4. information asymmetries,
5. family members being directly involved in the company management (decisions are influenced by a more sentimental approach due to the family attachment to the firm property),

6. family succession issues

7. higher exposure to the economic and political environment,

8. large non-pecuniary benefits.

Such conditions imply lack of information and bounded rationality\textsuperscript{28}. In order to reveal the determinants of the PEFs’ risk premium, this research has to consider the anomalies and the issues revealed in the previous sections. It is also necessary to analyse the adjusted models. In addition, the nature of PHCMs and PEFs might reveal new anomalies and non-rational behavior that needs to be considered.

Figure 2.4 illustrates both markets: Organized markets and privately-held markets. Assumptions and models of the first might influence the second. However, this second market arena might have its own phenomena and patterns.

\textsuperscript{28} That is: decisions are inconsistent with stated rational objectives. For instance: Cultural PHCMs factors, fashion and modes could be forcing PEFs to assess risk and value according to false risk drivers.
Figure 2.4 Is the PHCM Premium Driven only by Factors of the Organized Markets?

![Diagram showing relationships between PHCMs, New phenomena and PEFs Risk-return drivers, More Risk Adjustments?, New approaches?, the need to analyze them in the light of new phenomena?, More Risk Adjustments?, CAPM, EMH, Organized markets, Anomalies imply that Markets are not Efficient in the strong form, Behavioural Finance, New rational models, The three-factor CAPM.]

Source: Author's own work

Figure 2.4 shows that organized markets (the right quadrant of the figure) present anomalies and new theories like BFT and the thee-factor model were developed to understand those anomalies. On the left side, PHCMs are influenced by those approaches developed in organized markets. But are these factors enough to explain the PEFs' premium? This is one of the main questions this thesis intends to answer.

In fact, most authors\textsuperscript{29} have stated that the difference between valuations in organized and in PHCMs lies only in some specific risks and asymmetries

\textsuperscript{29} Bajaj \textit{et al} (2001) argue in favor of IRS approach (Issues of Restricted Stock); Mercer (2003) introduces the DLOM (Discount for Lack of Marketability); Margulis \textit{et al}. (2005) support the BSAF (Beta Size Adjusting Factor).
often bundled together under the phrase “liquidity risk” Other authors\textsuperscript{30} prefer to use multiples by observing other PHCMs’ transactions.

2.7.2 Adjusted Models to Assess PHCs’ Cost of Capital

There are currently several models for estimating a PHC’s cost of capital, all of which are adjusted versions of the classical CAPM. Recently, some authors have tried to apply the Fama and French three-factor model to PHCs to estimate the risk premium. For instance: Pastor and Stambaugh (2003), Feldman (2005), Liu (2006), Korteweg and Sorensen (2009), Franzoni \textit{et al.} (2010).

In general, these models add a new factor to the three-factor model: the liquidity risk factor.

The four-factor formula

\[
E(R) = R_f + \beta \times R_m + (\beta_s \times R_s) + (\beta_v \times R_v) + (\beta_{liq} \times R_{liq})
\]

Where the new factor added is the liquidity:

\[
(\beta_{liq} \times R_{liq})
\]

Some authors like Feldman (2005), added an additional factor called the FSRP factor: The additional return an investor requires for the non-systematic risk or specific risk like: business stability, business transparency, customer concentration, supplier reliance, reliance on key people, and intensity of competition (Feldman, 2005:81). In addition, according to Pintado \textsuperscript{30} Pratt (2002) and Tatum (2000) support private databases.

\textsuperscript{30}
et al. (2007), the stage of development of PHCs should be considered as a risk factor.

Fama and French (1995) found (for very small publicly-traded companies) the following estimations for the factor loadings (the betas) of their three-factor model: the market beta around 1.06, the size beta around 1.04, and the value beta around -0.31. Davis, Fama and French (2000) estimated the factor loadings (the betas) for publicly-traded companies. According to these authors, the size beta is between 1.22 and 1.39 (for very small companies) and the value beta between -0.14 and 0.23. Cochrane (2005) found a market beta between 0.7 and 0.9, a size beta between 1.3 and 1.8 and a value beta between 0.1 and 0.4.

Korteweg and Sorensen (2009), by observing individual PHCs and PEFs, estimated the market beta for PHCs ranging from 2.2 to 2.5, the size beta between 0.9 and 1.1 and the value beta between -2.0 and -1.7. They also calculated these factors over each stage of development (see Table 2.3).
Table 2.3 The premium for PHCs (Korteweg and Sorensen, 2009).

<table>
<thead>
<tr>
<th></th>
<th>CAPM</th>
<th>3F CAPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rm (market premium)</td>
<td>5,0%</td>
<td>5,0%</td>
</tr>
<tr>
<td>Rs (size premium)</td>
<td>1,5%</td>
<td></td>
</tr>
<tr>
<td>R (value premium)</td>
<td>3,5%</td>
<td></td>
</tr>
<tr>
<td>βm seed</td>
<td>-0,0011</td>
<td>0,2990</td>
</tr>
<tr>
<td>βm early</td>
<td>2,8120</td>
<td>2,1549</td>
</tr>
<tr>
<td>βm late</td>
<td>3,1700</td>
<td>2,0133</td>
</tr>
<tr>
<td>βs seed</td>
<td>-0,3445</td>
<td></td>
</tr>
<tr>
<td>βs early</td>
<td>1,2705</td>
<td></td>
</tr>
<tr>
<td>βs late</td>
<td>0,7819</td>
<td></td>
</tr>
<tr>
<td>βv seed</td>
<td>0,4564</td>
<td></td>
</tr>
<tr>
<td>βv early</td>
<td>-1,2211</td>
<td></td>
</tr>
<tr>
<td>βv late</td>
<td>-2,1263</td>
<td></td>
</tr>
<tr>
<td>Seed Premium</td>
<td>-0,01%</td>
<td>-0,6%</td>
</tr>
<tr>
<td>Early Premium</td>
<td>14,06%</td>
<td>8,4%</td>
</tr>
<tr>
<td>Late Premium</td>
<td>15,85%</td>
<td>3,8%</td>
</tr>
</tbody>
</table>

Source: Korteweg and Sorensen (2009) and the K. French Website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/)

In Table 2.3, the first column calculates the premium using the simple SLM-CAPM, and the second column uses the three-factor model. Table 2.3 shows that the seed premium is negative because (as Berk, Green and Naik, 2004 stated) entrepreneurial risks are idiosyncratic and technological risks (unsystematic risks). In addition, since these results are based on
Korteweg and Sorensen (2009) also found that the values of beta are very different for each industry, suggesting that estimates of risk and return to private equity investments performed using fund level returns may be sensitive to the industry composition of these funds.

Metrick (2007) estimated the liquidity risk (for private equity investments) at only 1%. However, Franzoni et al., (2010) stated that the liquidity risk in PEFs may be very significant. These authors found that that the liquidity risk premium ranges between 5% and 15%. Cumming et al. (2005) stated that liquidity risk is one reason why PEFs require higher returns on investments.

The target of this last section was to introduce the current methodology proposed by academia to calculate the premium for PHCMs (in particular from a PEF perspective). One of the features of these markets is the illiquidity risk. The particular phenomena behind this factor as well as any

31 Other articles include: Cumming et al. (2005), Chordia, Subrahmanyam, and Anshuman (2001), Baekert, Harvey, and Lundblad (2005), Watanabe and Watanabe (2008), Martinez, Nieto, Rubio, and Tapia (2005), Bandi, Moise, and Russel (2008), Fontaine and Garcia (2008), and Hasbrouck (2009). A number of papers provide theoretical arguments as to why investors want to be compensated for liquidity risk (e.g. Holmstrom and Tirole, 2001, Acharya and Pedersen, 2005, Lustig, 2009). The empirical literature was pioneered by Amihud and Mendelson (1986), and more recent work emphasizes the importance of systematic liquidity risk in public equity returns (e.g. Amihud, 2002, Pastor and Stambaugh, 2003, Acharya and Pedersen, 2005, Sadka, 2006). In particular, the determinants of the liquidity risk in PEFs will be further studied in the next chapter.
phenomena driving the PEFs' premium are the central issues of this thesis and will be studied in the coming chapters. The next chapter will deepen its focus on the models seen in this section to assess the risk premium but with another perspective, and in the light of the distinctive phenomena driving the PEF risk-premium (the true determinants of the PEF premium).

2.8 Conclusion

As stated in the introduction of this chapter, the scope of this thesis is to investigate the ex-ante risk-return characteristics of PEFs aiming to propose a model directed at estimating the required premium for their privately-held company (PHC) targets. Therefore, the main objective of this chapter was to review the academic knowledge directed at estimating the risk premium for PHCs.

However, in order to achieve this goal, it was necessary to discuss the traditional rational-based financial theory and the EMH, to review the current discussion regarding the value of the market premium for public companies, to outline some of the anomalies found and attacks made against the EMH and the TFT, and to make a brief introduction to the BFT.

It has also explained the difference the issues of the risk market premium (specially analyzed in section 2.2 and 2.3) and the anomalies revealed by cross-sectional studies (especially seen in section 2.4 and 2.6). Therefore section 2.6 has introduced the Fama and French three-factor model (1993) as an explanation for past sectional returns and as a predictive model for
single firms. Finally, section 2.7 was concentrated on single firms and undiversified portfolios held by PEFs in the PHCMs which are the subject of this thesis.

The large discrepancies found in both the value of the risk-premium, and the methodologies to assess it, might be forcing investors, firms, and PEFs to use approximations. Therefore, irrationality in organized markets might arise from the lack of consensus and this clearly might influence other markets like that of PEFs.

The conceptual differences between an ex-post perspective and ex-ante perspective underlined by Arnott and Bernstein (2002) are extremely important for the methodology to be chosen (see chapter 4) by this thesis which intends to take the latter perspective. In fact, Fama and French (2002), who opposed the use of past data on betas, used methodologies looking at past returns when using fundamentals. Similarly, Dimson et al., (2008) trust the ex-post premium to assess future expectations.

New theories like the BFT have not been able to prove the failure of the EMH (at least in its weak and semi-strong-forms) nor to develop recognized and tested models. Consequently, this thesis will rely on the factors contained in the CAPM as important determinants that might be driving the PEFs’ premium. That is the reason why, based on rational-based models, section 2.7 reviewed recent papers directed at assessing the risk premium in PHCs from a PEF perspective. These approaches showed that the illiquidity risk
might be an important new driver which has to be considered in these particular markets.

However, Section 2.7 also suggested that there might be new phenomena present in the nature of PHCMs and PEFs driving the illiquidity risk and other potential factors not yet understood and explained by traditional finance. In fact, the causes behind the illiquidity factor as well as the new phenomena which might drive the PEFs’ premium (its determinants), are the very core of this thesis and the literature studying such potential determinants will be reviewed in the next chapter.
3 LITERATURE REVIEW PART II – THE REQUIRED RETURN IN THE PRIVATE EQUITY FUNDS

3.1 Introduction

Chapter 2, by reviewing models based on theories developed by traditional finance for organized markets, has shown that the illiquidity risk appears to be one important factor to consider for PEFs when assessing investment in privately-held companies (PHCs). Since the target of this thesis is to reveal the whole range of determinants of the risk premium, the purpose of this chapter will be to show, according to the research of the last couple of decades, what kind of phenomena might be driving this premium. The illiquidity factor shown in chapter 2 might be only a blanket variable that hides other factors.

Therefore, the scope of this chapter will be to review current literature, pioneered by Lerner and Gompers (1997), regarding the study of the PEFs’ required return in order to understand its nature and drivers. The internal rate of return (IRR) is the most popular and widely-used tool to measure the performance of a private equity deal. It might have different meanings according to the time perspective. For instance, an ex-post IRR measures the PEF deal performance, and the ex-ante IRR measures the expected return.

Section 3.2 will review the most important papers that have studied the nature of the PEF required return revealing the new phenomena and drivers.
present in private equity deals. After classifying the research papers (section 3.2.1) into four different groups or “perspectives”, sections 3.2.2 and 3.2.3 will respectively review the private equity premium puzzle and the PEF required returns in an ex-post perspective.

Although section 3.2.3 will look at studies with an ex-post perspective (past performance), the phenomena they found might be also present in an ex-ante perspective. In other words, the factors driving past performance might be considered and priced by GPs’ assessments.

Thereafter, section 3.2.4 will deal with literature focused on an ex-ante perspective as well as with studies proposing models (ex-ante perspective) as this thesis intends to do. Section 3.2.5 will outline and discuss important gaps still uncovered by recent papers.

Section 3.3 will briefly examine the particular nature of PHCs which are the target of the PEFs. This section will show the special drivers that arise due to the unique type of interaction between both PHCs and PEFs. Finally, section 3.4 will summarize all the phenomena introduced in this chapter.

3.2 The Rate of Return in the Private Equity Funds (PEFs)

In comparison with other areas in finance, knowledge about the performance and risk–return drivers of the private equity sector is very limited. There are a few papers directed at assessing the risk-return nature of PEFs. Such studies reveal both contradictory conclusions and as yet unexplained phenomena:
what some authors call the “private equity premium puzzle” (e.g. Moskowitz and Jorgensen 2000).

3.2.1 Literature Review Classification

The literature can be divided into two sets of studies (see Table 3.1), both directed at studying risk and return. The first looks at the return expectations and risk perceptions of the PEFs (ex-ante). The second explores realized returns and risks (ex-post). Additionally, these sets of studies can be subdivided according to two different perspectives:

- The first documents the (gross-of-fees) performance of individual venture capital investments of General Partners (GPs)

- The second set focuses on the cash-flow stream from (to) the private equity funds to (from) limited partners (LPs). It includes fee payments and measures the net performance obtained by LPs that invest in private equity funds (Jenkinson, 2008).
As shown in Table 3.1, most of these studies look at ex-post realized returns and they are more concerned with past performance than with understanding return expectations and risk perception. In this framework of studies\(^{32}\), this thesis will make a contribution regarding the ex-ante analysis (in the south-west cell of Table 3.1)

### 3.2.2 The Private Equity Premium Puzzle

Solving the private equity premium puzzle might help to explain the public equity premium puzzle seen in chapter 2. In fact, Moskowitz and Jorgensen (2000) find that returns to private equity are surprisingly low given their risk

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and have named this phenomenon the “private equity premium puzzle”\textsuperscript{33}. The corresponding phenomenon was presented in chapter two and it is known as the equity premium puzzle\textsuperscript{34} (or the “public equity premium puzzle”) in which, given the returns and volatility of publicly-traded equity, investors seem to allocate too little wealth to it (see Mehra and Prescott 1985, Campbell and Cochrane, 1999 and Fama and French, 2002).

These authors suggest that the explanation for the “public puzzle” could be attributable to particular factors present in private equity markets: Investors both overestimated expectations and misperceived risk regarding private equity markets\textsuperscript{35}; and large additional pecuniary benefits like: stock options, bonuses, fees, incentive plans; large-non pecuniary benefits. Therefore, the question and the puzzle is: why are investors willing to allocate substantial amounts of wealth into a single private company with a much worse risk-return trade-off?

Moskowitz and Jorgensen (2000) suggest three main possible answers to that question: First, they consider the possibility that entrepreneurs cannot diversify their holdings because it is costly to sell private equity or because they are contractually forbidden to do so. However, this would not be completely true for PEFs which might hold diversified portfolios. Second, they

\textsuperscript{33} They refer to the whole universe of privately-held companies and not only the ones managed by private equity firms.

\textsuperscript{34} It questions why the equity premium has been so high in recent decades.

\textsuperscript{35} Since investors overestimate expected returns from private equity markets, financial resources fly irrationally from quoted companies to non-quoted companies. Such behavior may explain why the equity premium for public markets has been that low.
argued that entrepreneurs (who normally manage their own firms) have more risk tolerance than managers (who normally manage quoted firms)\textsuperscript{36}. However, this issue again might not be the right answer for PEFs which are normally managed by GPs\textsuperscript{37}.

Third, they tell us about the non-pecuniary benefits like the flexibility and autonomy that self-employment gives to entrepreneurs. Four, they propose an alternative theory in which entrepreneurs and insiders may behave in a manner that is not perfectly rational and therefore not explicable by using traditional finance theory. For instance, entrepreneurs may be over-optimistic (hubris / overconfidence) about their own firm’s prospects or they irrationally believe it is safer to invest in a family company.

Thus, misperception of both success and risk could explain why people start their own businesses and hold so much of their wealth in their firms. Heaton and Lucas (2000a) suggested that the additional risk of private investment and its low correlation with public equity market returns may explain why the public equity premium is so high. One should also add the fact that necessity is also the mother of invention. In fact, it has long been true that entrepreneurship rises when unemployment rises. Displaced employees often see self-employment as the only chance to replace lost income.

\textsuperscript{36} This addresses the problem of having different groups of people with different risk behavior.

\textsuperscript{37} They are not entrepreneurs in a strict sense - their risk aversion might be different from that of LPs or entrepreneurs outside the PEF arena.
3.2.3 Current Academic Debate – Past Performance and its Drivers.

The National Venture Capital Association announced that Thomson Reuters US Private Equity Performance (PEPI)$^{38}$: “*across all horizons outperformed public market indices, NASDAQ and the S&P500*” (the measure was taken for 20-year period ending in September 2008)$^{39}$ (Jegadeesh *et al.*, 2009). However, most papers contradict such reported results and find a wide range of abnormal returns (risk-adjusted returns) from -6% (Phalippou and Gottschalg 2009) to +32% (Cochrane 2005)$^{40}$.

Why is there such a wide range of recorded abnormal returns? First: all these papers use different sources of data. Second: all these fonts of data suffer from diverse types of selection bias. Third: the papers themselves have their own selection bias according to the criteria applied by each author. Fourth: they use different methods and factors to assess risk and beta.

For example, Kaplan and Shoar (2005) use Venture Economics (VE) data. These data are collected based on self-reported data provided only by large private equity funds, and excludes data from investors who choose not to report their investments to Venture Economics (VE). Additionally, most

$^{38}$ See [http://www.nvca.org/pdf/Q3_08_VC_Performance_Release.pdf](http://www.nvca.org/pdf/Q3_08_VC_Performance_Release.pdf). PEPI is computed based on quarterly statistics from Thomson Reuters Private Equity Database which analyses cash flows and returns for more than 1,900 US PEFs with a capitalization of US$ 828 billion.

$^{39}$ For instance: for the 20-year period ending in September 2008, PEPI earned an annualized return of 15.4 percent after fees, which is more than twice the return of 7.5 percent earned by the S&P500 (Jegadeesh *et al.* 2009).

$^{40}$ The estimates of beta range from about 0.5 in Quigley *et al.* (2005) to 4.66 in Peng (2001).
databases estimate performance depending on the valuation of non-exited investments at the end of the sample period (this is the case of the studies conducted by Kaplan and Schoar, (2005).

Phalippou and Gottschalg (2009) argued that it is more reasonable to write-off non-exited investments after a certain period of time and, in doing so, they find that PEFs underperform the market by three to six percent per year. Therefore, the diverse spectrum of databases, selection criteria and methodologies used might explain such a wide range of abnormal returns. These issues will be better explained in the next sections.

3.2.3.1 Studies with Positive alphas

Ex-post studies were pioneered by Gompers and Lerner (1997), who argued that private equity returns may not accurately reflect the true creation of value because they are based on subjective valuations rather than on objective market prices, and overestimate their value creation in order to keep and attract investors.

By proposing a “mark-to-market” revaluation methodology for each firm in the portfolio of a single PEF41, Gompers and Lerner (1997) find that this single PEF earns positive-adjusted returns of 8% per year considering this performance to be enough to pay any additional premium for lack of marketability. Unfortunately, the usefulness of this approach depends on how

41 According to market comparables acquired for every reporting period.
well the NASDAQ sub-index matches the companies in the portfolio (Woodward, 2004).42

However, due to accounting criteria disagreements in the valuation of residual investments, more recent papers have focused on studying funds which were largely liquidated. Although most of those researchers confirm the perplexing low risk-adjusted returns for PEFs, they differ significantly in methodologies and results.

For instance, authors located in the south-east cell like Ljungqvist and Richardson (2003), Jones and Rhodes-Kropf (2003) and Kaplan and Schoar (2005), reported that PEF returns, gross of fees, outperformed the S&P 500 (measured from 1995 to ensure the funds were largely liquidated to avoid accounting issues such as subjective company valuations made by GPs). Additionally, by looking at each fund’s investments in detail, assigning industry betas to the portfolio companies, they are able to estimate fund risk. They found that fund returns are still abnormally large even on a risk-adjusted basis, estimating betas of roughly 1.10.

42 Several approaches used data on comparable public companies obtaining a beta equal to one: Long and Nickles (1995); Chen, Baierle, and Kaplan (2002); Kerins, Kiholm Smith, and Smith (2003); Emery (2003); Lundqvist and Richardson (2003). These last studies depend on how well the comparable public companies match. Conversely, other authors used company-level deal data (private rounds of funding, IPOs, acquisitions, and shut downs): Cochrane (2002); Peng (2001); Quigley and Woodward (2002). These last authors also depended on how well comparables match. However, these comparables might be more accurate since the betas are not measured on public companies whose volatilities are lower than that of PHCs.
Their results are consistent with funds generating positive alphas over the estimated period. However, this conclusion is not entirely reliable, as all three studies suffer from a positive selection bias and all three may under-state systematic risk (they assumed betas equal to 1). In fact, authors located in the south-east cell intuitively believed that systematic risk for both LBO funds and VC funds should exceed 1 because of the high leverage present in the first case, and high risk present in the second43.

Among the authors occupying the north-east cell (according to the literature classification of Table 3.1), Woodward and Hall (2003) have built a private equity index that provides a measure of month-to-month market-wide movements in value and also allows traditional methods employed to analyse performance for traded securities to be applied to untraded venture-type investments44.

Thereafter, they computed their VC index and derived the correlation between this index and a public stock market index. They estimated that the average overall return is 20% per year, abnormal performance is 8.5% per year (alpha), and beta is 0.86. Such results45, according to these authors, suggested (“there is mild evidence”) that venture-type investments have higher returns, risk-adjusted, than does the Nasdaq index.

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43 Venture Capital investments resemble small, growth firms, which typically show high systematic risk.
44 They did not include leveraged buyouts and management buyouts.
45 These results did not include fees and carried interest like the other papers reviewed.
However, the main challenge faced by studies in the north-east cell\textsuperscript{46} like that of Woodward and Hall (2003) is that, in the majority of cases, they observe performance only when the investment was successful:

“\textit{Accounting for such selection bias is difficult as successful investments account for a mere quarter of the total number of observations}.” Phalippou and Zollo (2005:5).

Kaserer and Diller (2004), using a European dataset of 777 funds over a period between 1980 and 2003 (they use only liquidated PEFs) provided by Thomson Venture Economics (TVE), documented a cash flow-based IRR of 12.7\% and an average excess-IRR of 4.5\% relative to the MSCI Europe equity index (this implies positive abnormal returns).

\subsection*{3.2.3.2 Studies with Negative Alphas}

Phalippou and Zollo, 2005, 2006 (contrary to Ljungqvist and Richardson, 2003, Jones and Rhodes-Kropf, 2003 and Kaplan and Schoar, 2005), using the same data\textsuperscript{47}, found that the PEF gross-of-fees returns were lower than those of the S&P500 by as much as 3.3\% per annum. Phalippou and Zollo (2005) also found that if young funds are removed from the sample, PEFs still under-perform. Therefore, they raised the question as whether the

\begin{footnotesize}
\begin{enumerate}
\item Quigley and Woodward (2003) found gross real returns on VC investments of about 5\% per quarter, which is less than the S&P 500 and the Nasdaq over the same period, but found a beta close to 0.
\item Considering substantial adjustments for the sample selection.
\end{enumerate}
\end{footnotesize}

\textsuperscript{46} Quigley and Woodward (2003) found gross real returns on VC investments of about 5\% per quarter, which is less than the S&P 500 and the Nasdaq over the same period, but found a beta close to 0.

\textsuperscript{47} Considering substantial adjustments for the sample selection.
performance reflects a learning cost in the first years\textsuperscript{48} implying that such observations might differ in the future.

Phalippou and Gottschalg (2008) made an important correction to the dataset used by Ljungqvist and Richardson (2003), Jones and Rhodes-Kropf (2003), and Kaplan and Schoar (2005)\textsuperscript{49} which concerns performance weights.

“For Standard practice is to weight each fund by the total capital committed by the investors at inception. However, the present value of money invested differs from capital pre-committed as funds vary in both the speed at which they call capital and the fraction they actually call. If poorly-performing funds invest more slowly, then capital-committed-weighted performance is downward-biased and (vice versa). We thus weight fund performance by the present value of investments and find that this choice reduces the average PI\textsuperscript{50} by 2% compared to a standard capital-committed weighting. Therefore, our second finding is that standard aggregation choices bias performance estimates upward.” Phalippou and Gottschalg (2008:1748).

\textsuperscript{48} Consider that all these “post-liquidation studies” account for the years 1980 to 1995 which means the very beginning of the life of private equity markets.

\textsuperscript{49} One important difference in data selection is that Kaplan and Schoar (2005) considered some fund self-reported values of non-exited investments. On the contrary, Phalippou and Gottschalg (2009) argued that it is more reasonable to write-off non-exited investments after a certain period of time.

\textsuperscript{50} The profitability index (PI) is the present value of the cash flows received by investors divided by the present value of the capital paid by investors. The discount rate is the realized S&P500 rate of return; PI > 1 indicates outperformance.
In addition, by using a complementary dataset (from VentureXpert)\textsuperscript{51}, they argued that the assumption made by previous authors regarding a beta equal to 1, is likely to overstate relative performance. Therefore, using industry-size-matched costs of capital, they found a risk-adjusted PI of 0.75 for BO funds and 0.77 for VC funds. These corresponded to an alpha of about -6% per year in both cases.

Finally, they found an average net-of-fees fund performance of more than 3% per year below the S&P500\textsuperscript{52} (gross-of-fees is above 3%) which implies a 6% underperformance when risk-adjusted\textsuperscript{53}.

\textbf{3.2.3.3 Ex-Post Phenomena}

Kaplan and Schoar (2002, 2005) documented substantial persistence in the performance of funds. GPs whose funds outperform the industry, are likely to outperform the industry in the next fund they manage and vice versa. Phalippou and Gottschalg (2008) also observed that top quartile funds outperform the S&P500 and there is evidence of performance persistence.

Fund size and flows are positively correlated to past performance. Conversely, funds raised in boom times are less likely to raise follow-on

\textsuperscript{51} A commercially available dataset which contains information on investment exits. For these additional funds, performance is not available, but the authors observed their fraction of successfully exited investments (IPO or sale next to bankruptcy), a widely-used proxy for performance.

\textsuperscript{52} Which is in line with Phalippou and Zollo 2005 / 2006.

\textsuperscript{53} However, like the others, this paper still does not account for illiquidity risk. This suggested that risk-adjusted performance may still be worse.
funds suggesting that such funds perform poorly. As a consequence, better GPs may be able to invest in better investments and get better deal terms (lower valuations). They also concluded that competitive forces do not drive away persistence in the sample period.

Jones and Rhodes-Kropf (2003) proposed that in private equities, as well as in public companies, higher idiosyncratic risk or unsystematic risk should be associated with higher returns which means that higher industry specialization implies higher performance⁵⁴.

Ljungqvist and Richardson (2003) also relied on data as collected by VE. However, they focused on the determinants of the speed of the draw-downs and capital distribution and documented the following results: It takes six years for a private equity fund to invest 90% of its committed capital⁵⁵, and this has an enormous effect on performance; the IRR does not turn positive until the eighth year of the fund’s life⁵⁶; The IRR between 1981 and 1993 averages 19.81% (net of all fees) which implies an excess return close to six percent per annum (S&P500 was 14.1%)

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⁵⁴ Being focused allows GPs to work with more specialized teams in a high number of similar deals. Additionally, close contacts within a specific industry can be built thus improving the overall performance.

⁵⁵ They identified to key factors: time variation in the availability of investment opportunities and competition for deal flow with other private equity funds.

⁵⁶ This underlines the opportunity cost of the capital not invested and therefore the illiquidity of PEF investments. It also implies that “interim” IRRs computed before a fund reaches maturity are not very informative.
Phalippou and Zollo (2005) were the first to focus on how macroeconomic conditions influence performance and whether there is evidence of non-linear risk factors. They found that PEF performance is significantly pro-cyclical and increases with GDP growth rate, and decreases with the average level of interest rates (in particular corporate bond yields)\(^{57}\). Performance significantly increases with both the average return on the stock-market (CRSP-VW index) and the average return on the call options written on the S&P composite index. This showed, according to Phalippou and Zollo (2005), that like hedge funds, PEFs reveal tail risk, i.e. non-linear systematic risk (see also Aggarwal and Naik, 2004).

Phalippou and Gottschalg stated:

“the performance of Private Equity Funds as reported by industry associations and previous research is overstated. A large part of performance is driven by inflated accounting valuation of ongoing investments.” Phalippou and Gottschalg (2008:1787).

They found that: commonly-used datasets contain PEFs that perform better than average; poorly-performing funds invest more slowly and therefore capital-committed-weighted performance is downward biased and vice versa\(^{58}\) (opportunity cost).

\(^{57}\) When either credit spreads or corporate bond yields are low at the time investments are made, fund performance is higher. This is due in part to the fact that with low interest PEF target companies leverage more efficiently.

\(^{58}\) See also Lerner, Schoar and Wong (2007).
In addition, authors who found negative alphas (like Phalippou and Gottschalg, 2008) stated that certain investors might have mis-valued this asset class. Some potential explanations regarding the low performance found in PEFs are proposed. For instance, investor objectives may not only be to maximize returns but to establish commercial relationships with GPs in order to increase the likelihood that the funds will purchase LP’s services like consulting (M&A services)\(^{59}\). Additionally, pension fund managers and government-related agencies, invest in PEFs to stimulate local economies (see Lerner, Schoar, and Wong 2007). In sum, these are all non-pecuniary drivers. Furthermore, all these externalities in investor behaviours might partially explain the so-called “private equity premium puzzle”.

Lopez-de-Silanes and Phalippou (2008) focused the analysis on the economies of scale effects on performance. The study established a negative effect of scale on performance due to the following reasons:

- Size may penalize purchase prices. Firms may have a limited number of good ideas;

- Scale increases may imply diseconomies of scope\(^{60}\). Private equities investing in many different types of companies may lose specialization

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\(^{59}\) This may be corroborated by a recent study conducted by Hellmann, Lindsey, and Puri (2005).

\(^{60}\) They used two measures of “focus”: an industry Herfindhal index, and the number of different industries in which the firm invests. They found evidence of diseconomies of scope in addition to the scale effect.
as well as scope. These conclusions also conform to the Manigart et al. (2002) findings\textsuperscript{61};

- Communication costs and increasing workload.

Overall, "PEF performance suffers when the value-added capacity of a management team needs to be shared across more investments. The negative effects are minimized by experience, more homogeneous teams and flatter hierarchies." (Lopez-de-Silanes and Phalippou 2008:6)\textsuperscript{62}.

Gompers and Lerner (1999, 2000) argued that there is a limited number of favourable investments in the private equity industry that has to be matched with a fluctuation in capital supply. This issue gave birth to the so-called "money-chasing deals phenomenon" which states that there is a negative correlation between a fund’s performance and the amount of money directed toward the private equity industry\textsuperscript{63}.

Kaserer and Diller (2007) also confirmed the "money-chasing deals phenomenon" for the European markets\textsuperscript{64} by showing that, for a given

\textsuperscript{61} Other studies approaching the trade-off between larger/smaller portfolios and diversified/concentrated portfolios are: Kanniainen and Keuschnigg (2003); Bernile \textit{et al.} (2007); Cumming (2006); Fulghieri and Sevilir (2008); Jones and Rhodes-Kropf (2004); Dai and Cumming (2008); Gompers \textit{et al.} (2008).

\textsuperscript{62} Further studies for economies of scale / scope can be found in: Lang and Stulz (1994); Graham \textit{et al.} (2002); Campa and Kedia (2002); Villalonga (2004); Gompers \textit{et al.} (2006).

\textsuperscript{63} See also Inderst and Muller (2003) who warned about the value-reducing effects of increasing the supply of funds to the private equity industry when competition for good projects is high.

\textsuperscript{64} See also Fiet (1995); Forlani and Mullins (2000); Wright \textit{et al.} (2004); Kut \textit{et al.} (2006).
absolute funds inflow, an increase in the allocation of money towards a particular fund type has a significant negative impact on the performance of that particular fund type. They showed that private equity fund returns are driven by market sentiment, GPs’ skills and stand-alone investment risk\textsuperscript{65}.

In addition, Gompers and Lerner (2000) argued that PEF markets are imperfect due to the fact that this asset class is segmented from other asset classes. Since PEFs are not permitted to invest in other asset classes, GPs are not able to redirect newly-committed funds outside the asset class even in the case of industry over-valuation. Therefore, if an increase in capital inflow is not accompanied by an increase in the number of investment projects, then both competition and valuations increase\textsuperscript{66}. This effect might be amplified, if the asset class is illiquid as in the case of PEFs.

As seen during this section, all these studies were primarily concerned in the calculation of past performance using a diverse spectrum of methodologies. However, when the authors come to interpret and understand the different results, they infer the existence of interesting new phenomena which might drive the ex-ante PEF risk premium. These phenomena are not included as explicit factors in the asset pricing models seen in chapter 2. All these phenomena will be summarized in section 3.5.

\textsuperscript{65} The investment policy as defined by the investment focus in terms of the stages of portfolio companies.

\textsuperscript{66} However they admitted that there is not enough evidence to explain whether higher valuations due to better economic prospects cause higher inflows or whether higher inflows cause higher valuations. They suggested the second explanation, that is, the “money-chasing deals” phenomenon because of the performance of deals closed in “hot” periods, (periods with high inflows) is not better than the performance of deals closed during “cold” periods.
3.2.4 The PEF Risk Premium from an Ex-Ante Perspective

This section will review the existing literature focusing on an ex-ante perspective by first looking at the phenomena found in these papers and second by looking at some very recent models. The literature in this arena (the west cells of Table 3.1) is limited and very young.

3.2.4.1 Ex-Ante Phenomena

Manigart et al. (2002) were among the first authors to study performance in an ex-ante perspective. They initially introduced some particular issues present in PEFs and PHCMs which question the traditional valuation theory, their assumptions and models: First, the lack of information; second, PEF managers are actively involved in companies; third, the lack of marketability; fourth, difficulty in diversifying; fifth, the higher idiosyncratic risk.

Thereafter, PEFs were asked to give their required return (ex-ante) according to specific investment stages: early stage, expansion and acquisition/buy-out. In fact, Carter and Van Auken (1994) stated that stage of development is directly proportional to risk assessment and return potential. Manigart et al. (2002) used two theoretical perspectives: The resource-based theory (RBT)\textsuperscript{67} and the TFT.

\textsuperscript{67} TFT is based on the fact that investors can reduce risk and therefore add value by diversifying their portfolios. On the contrary, the RBT is based on the premise that economic value added (EVA) comes from the collection of distinctive internal resources and capabilities and therefore specialization (as opposed to diversification) reduces risk and adds value.
The RBT is an alternative theory outside TFT to describe PEFs’ behavior. In general, Manigart et al. (2002) found that higher required returns are associated with PEFs providing more intensity of monitoring (fees-effect), diversified portfolios (specialization-effect) and having shorter expected holding periods of investment.

They concluded their quantitative analysis by stating: First, diversification is not generally viewed by PEFs as a risk-reduction strategy as it should be according to traditional finance; Second, high levels of monitoring intensity are associated with high levels of IRR. This last finding implies that risk is not the only factor considered by PEFs to determine IRR as it should be for traditional finance.

Another interesting observation suggested that the greater the percentage of small-sized investments held by a PEF, the lower its required return. According to the authors, one possible explanation is that such PEFs use the number of investments as a hedge against performance variance. Perhaps PEFs without a good reputation are relegated to smaller deals, accepting less favourable returns.

They also found that required returns for independent PEFs are significantly higher than for captive and publicly-supported firms for early-stage and expansion-stage investments. However, they are not able to separate risk

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68 This observation seems to contradict the specialization effect. However, the specialization effect refers to industry sector diversification and not to the size and number of deals.
factors from cost factors (TFT factors from RBT factors) which is a vital gap regarding their research objectives and conclusions.

Manigart et al. (2002)'s paper also brought to light further research needs: first, the lack of information about industry or sectors which is essential to strengthen any assumption regarding specialization; second, any competition effect between PEFs which force them to adopt fashions when investing outside their arena distorting the obtained data regarding real perceived risk drivers; Third, a study regarding the difference between perceived and realized risk drivers (in this direction, this thesis intends to add a significant value).

Concerning the first issue, Sapienza and Gupta (1994) found that low goal congruence, early stage-of-venture development, and high levels of innovation, may increase the frequency of PEF-CEO interaction. This confirms that the sole classification of PEFs into investment stages (as proposed by Manigart et al. 2002) would not be enough to understand these drivers. Furthermore, Sapienza and Gupta (1994) raised the issue as to whether these factors really increased the risk of the investment or just the perceived risk of PEFs, a problem also mentioned in the third issue.

Regarding the second issue, market cultural factors like fashion could be forcing PEFs to assess risk and value according to false risk drivers. Therefore, there are further reasons to think that the study conducted by Manigart et al. (2002) could be distorted. Here again, these factors increase
the difference between risk perception and true risk drivers, leading us to put greater importance on the third issue.

Finally, in the third issue, it is important to learn how PEFs really calculate the exact return required for each case starting from the understanding of the perceived risk drivers which compose those final values (this is the core of this thesis). Here again, instead of inferring causations from incomplete and biased information, it might be more fruitful to explore perceived causations in the first place.

March and Shapira (1987) examined how perceived risk could differ from true risk. Specifically, they identified ways in which the conceptions of risk lead to orientations to risk that are far from what might be expected from the decision theory perspective.

Sitkin and Pablo (1992) identified two different concepts as a cause for behaviour under risk: risk propensity and risk perception. Future studies aimed at determining the PEFs’ required return (the core of this research project), should first capture the PEFs’ process of interpretation in order to identify both risk perception drivers and risk propensity. All these studies and concepts underlined the importance of an ex-ante perspective.
3.2.4.2 Ex-post-based Models

This section will deal with the literature which, like this thesis, is more concerned with calculating the risk premium and developing models in an ex-ante perspective. In studying the models in existence, this section expands section 2.7 of chapter 2.

Jegadeesh et al. (2009) were among the very few to study private equity investors’ expectations. These authors observed the market prices of the listed funds of funds (FoFs) and then compared these prices with the capital initially invested in the PEFs (any difference should show the expected return - E.IRR). In addition, like Korteweg and Sorensen (2009), Jegadeesh et al. (2009) tried to estimate the risk premium by using the four-factor model developed by Cahart (1997). Table 3.2 shows their attempt to assess the risk premium:

\[
E(R) = R_f + \beta \ast R_m + (\beta_s \ast R_s) + (\beta_v \ast R_v) + (\beta \ast R_{mom})
\]

Where:

(\beta \ast R_{mom}) refers to the momentum effect already seen in chapter 2.

---

69 Similar studies can only be found in: Martin and Petty (1983); Brophy and Guthner (1988); Bilo et al. (2005).

70 The relationship between market prices of these FoFs with the amount they invest in unlisted PEFs provides a measure of the value added expected by the underlying PEFs.

71 Refer to chapter 2.

72 The four-factor formula of Cahart (1997) uses the model of Fama and French (1993) and adds the momentum factor not captured by the former:
As shown in Table 3.2, the risk premium is between 5.9% and 7%. Through the difference between the E.IRR and the risk premium shown in the table, these authors suggested that investors in organized markets expect unlisted funds to earn abnormal returns of one to two percent, net of their fees, in the long run.

The problems in the methodologies used by these authors to calculate the expected IRR as well as the risk premium are twofold: First, these being calculations based on FoFs holding many different PEFs, the outputs refer to

Since $\beta_s$ is much greater than zero, the authors conclude that PEFs behave more like small firms than large firms. This is logical since many PEFs invest in firms that are smaller than those firms quoted in the organized markets. In addition, since $\beta_v$ is near zero, PEFs might be more sensitive to value firms than to growth firms. One possible explanation is that PEFs have significant investments in buyouts which are more likely to be value firms than growth firms.

Such results might contradict the common intuition of private equity investors having high expectations. For example: The Financial Times (September 26, 2005) reported that investors in the UK hoped to make an average annual net return of 12.8 percent from their private equity investments.

<table>
<thead>
<tr>
<th></th>
<th>Min Val</th>
<th>Max Val</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_m$ (beta market)</td>
<td>0.8</td>
<td>0.95</td>
</tr>
<tr>
<td>$\beta_s$ (beta size)</td>
<td>0.44</td>
<td>0.55</td>
</tr>
<tr>
<td>$\beta_v$ (beta value)</td>
<td>0.34</td>
<td>0.4</td>
</tr>
<tr>
<td>$\beta_m$ (beta momentum)</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>$R_m$ (market premium)</td>
<td>5.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>$R_s$ (size Premium)</td>
<td>1.5%</td>
<td>1.5%</td>
</tr>
<tr>
<td>$R_v$ (Value premium)</td>
<td>3.5%</td>
<td>3.5%</td>
</tr>
<tr>
<td>$R_mom$ (momentum premium)</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Risk Premium (yearly)</td>
<td>5.9%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Expected value</td>
<td>8.9%</td>
<td>10.0%</td>
</tr>
<tr>
<td>alpha</td>
<td>3.0%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
a portfolio of PEFs and not to a single PEF (each of them having different portfolios of investments and very different risks). Each single PEF might show specific risk characteristics depending on the portfolio of investments they hold and therefore a diversified value given by the FoFs might make little sense, when being used to estimate the expected premium; Second, the database is based on listed FoFs where the illiquidity risk present in their portfolio might not be reflected (this is probably the reason why the risk premium estimated in the study of Jegadeesh et al. (2009) is intuitively very low). Furthermore, most of the risk drivers generated by the nature of the PEFs might not be reflected in quoted FoFs.

Korteweg and Sorensen (2009) as well as Jegadeesh et al. (2009) were among the very first attempts to develop models for an ex-ante perspective. However, Franzoni et al. (2010) claimed to be the first to provide a study which estimated the cost of capital of PEFs in a large sample, and based their predictive model in the data of that sample. In fact, Korteweg and Sorensen (2009 and 2010), as shown in chapter 2, concentrated their sample only on venture capital investments (holding portfolios with investments at early stages).

Franzoni et al. (2010) used a unique dataset containing the detailed cash-flows generated by 4,403 liquidated private equity investments including both successful and unsuccessful investments75 avoiding any problem of selection bias.

---

75 Since this database covers liquidated investments, it contains both successful and unsuccessful investments (if fact, about 10% of the investments are bankrupt).
In addition, Franzoni *et al.* (2010) based their study on the recent literature regarding the illiquidity risk priced into the valuation of public equity (*e.g.* Pastor and Stambaugh (2003), Acharya and Pedersen (2005), Sadka (2006), and Bekaert *et al.* (2007). This means that stocks whose returns are more sensitive to aggregate liquidity have higher average returns. They argued that PEFs are exposed to three types of liquidity risk:

- First, Acharya and Pedersen (2005) stated that liquidity risk originates from uncertainty over transaction costs.
- Second, PEFs’ investors may have a higher tolerance for liquidity risk. As a result, PEFs are likely to load on liquidity risk more heavily.
- Third, PEFs’ investments are highly leveraged (LBOs) and often need to be re-financed. In times in which aggregate liquidity is low, creditors may choose to force PEFs’ investments into bankruptcy rather than providing new finance. In addition, PHCs have normally higher and more short-term leverage than public companies (*e.g.* Axelson *et al*., 2010). As a result, PHCs have more frequent re-financing needs.

Instead of the IRR, Franzoni *et al.* (2010) used the MIRR or modified IRR, which assumes that intermediate cash flows are re-invested by LPs at the S&P500 rate of return. This MIRR considers only the intermediate cash flows during the life of the deal (investments minus dividends minus disinvestments), and not during the life of the PEF, and therefore the speed effect seen in section 2.3.4 is not included in their model.

adding a new factor: The Pastor and Stambaugh (2003) (PS) liquidity factor. The results showed that the liquidity premium is 4.5% annually. The market risk premium is 7.5% annually. The HML and SMB premiums are 4.9% and 2.9% annually, respectively. Table 3.3 shows the results considering the calculations made with the SLM-CAPM (first column), the three-factor model of Fama and French without a liquidity factor (second column) and the four-factor model adding the PS liquidity factor (third column).

Table 3.3 The Risk Premium Estimated with Three Different CAPMs

<table>
<thead>
<tr>
<th>Panel B: Alpha, Risk Premium, and Cost of Capital</th>
<th>Market</th>
<th>FF</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Risk premium</td>
<td>7.705%</td>
<td>15.606%</td>
<td>17.970%</td>
</tr>
<tr>
<td>Risk premium components:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\beta_{iq} \times \mu_{iq}$</td>
<td>2.110%</td>
<td>(2.215)</td>
<td></td>
</tr>
<tr>
<td>$\beta_{bmk} \times \mu_{bmk}$</td>
<td>7.705%</td>
<td>(6.129)</td>
<td>11.759%</td>
</tr>
<tr>
<td>$\beta_{smb} \times \mu_{smb}$</td>
<td>2.043%</td>
<td>(1.511)</td>
<td>2.706%</td>
</tr>
<tr>
<td>$\beta_{ama} \times \mu_{ama}$</td>
<td>0.214%</td>
<td>(0.257)</td>
<td>0.101%</td>
</tr>
<tr>
<td>Risk free rate (in sample)</td>
<td>5.816%</td>
<td>5.816%</td>
<td>5.816%</td>
</tr>
<tr>
<td>Cost of Capital (in sample)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(16.735)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alpha</td>
<td>8.540%</td>
<td>2.391%</td>
<td>0.181%</td>
</tr>
<tr>
<td>(5.878)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Franzoni et al. (2010)

The risk premium with CAPM is the lowest at roughly 7.7% per year. This model leaves unexplained a high 8.5% annual alpha. In the second column, once the risk premiums on the book-to-market and size factors are taken into account, the alpha drops to about 2.3%. With the Fama & French model, the risk premium rises to around 15%. In the model with liquidity (third column of Table 3.3), the premiums on the four factors entirely account for average private equity returns. The alpha is virtually zero, while the risk premium is
about 18%. In this last model, the market risk premium is 10%. The book-to-market premium is 4.7%, while the size premium is negligible. Finally, the liquidity risk premium amounts to 3.1% per year. In sum, the four-factor model produces the highest risk premium and cost of capital.

Franzoni et al. (2010) also found that the returns of more mature PEFs are more sensitive to liquidity risk. This may be because older firms are more levered (James and Demiroglu (2010)), or because they have investors with deeper pockets and, hence, higher risk tolerance, or both. In addition, they observed that liquidity conditions are related to a number of macro-economic variables. For instance: Industrial production growth and the change in IPO volume are positively related to PEF returns; changes in default spread and changes in volatility are negatively related to returns. These results show that PEFs’ investments have superior returns when they are held during times of positive shocks to aggregate liquidity. The opposite is true for negative shocks.

These authors also mentioned for the first time in the literature the concepts of threshold IRR and hurdle IRR (H.IRR). In this sense, they found that their threshold IRR or cost of capital (24%) is in contrast to the widely-used hurdle rate of 8% by which GPs are compensated. This calls current compensation

76 According to Gervasoni and Sattin (2008) who are not only academics but also practitioners and GPs, the market premium (net of fees) oscillates between 10% and 15%.
77 To the knowledge of these researchers.
78 These concepts have been revealed by this research study during the data collection process in 2010 before the publication of this article. Both concepts will be introduced and explained in chapter 5.
practices into question. Fund managers (GPs) receive performance-based compensation if they achieve returns above the accepted 8% per annum, but this hurdle rate seems low in view of these last findings.

### 3.2.5 Commentary on the Literature Reviewed

In sum, Franzoni et al. (2010) seem to be the first to provide an ex-post-based model that could be used in an ex-ante perspective\(^\text{79}\). However, according to the author of this thesis, Franzoni et al. (2010)’s work presents some important limitations:

- First, they were not able to relate the risk premium to the new phenomena found in the PEFs in the literature of the last couple of decades (section 3.2.4.2). These new phenomena might be driving the risk premium in the PEFs. In particular, the illiquidity risk could be hiding other factors and drivers which were not mentioned in their paper;

- Second, they based their study on past information (ex-post realized returns) to calculate the future expected return and the risk premium.

- Third, they were not able to account for the opportunity cost (found by Ljungquist and Richardson, 2003 and Phalippou and Gottschlag, 2008) during the whole life of the PEF.

\(^{79}\) The paper of Franzoni et al., (2010) was written during the data collection process of this thesis when most of the concepts like the threshold IRR had been already found and the scope already defined.
- Fourth: They used the PC liquidity factor which is a risk priced in public markets. Instead, illiquidity conditions present in PEFs might be completely different and driven by other factors.

Indeed, as stated in chapter 2, the extrapolation of historical averages is widely criticized and presents many limitations. From an epistemological point of view, by using a past premium, researchers are assuming that investors’ expectations and their risk perceptions are only based on past realized returns.

In order to overcome the limitations of the study conducted by Franzoni et al. (2010), it is desirable to design a study with a completely different approach which implies a qualitative and quantitative survey aimed at assessing GPs’ perceptions and expectations in an ex-ante perspective. Such a survey might allow researchers not only to understand the drivers behind the risk premium but also to complement the ex-post-based models proposed by Franzoni et al. (2010) and other authors. This thesis is intended to apply this different approach. The details of the methodology are explained in chapter 4.

For the time being, it seems that the only paper with such an approach is that of Manigart et al. (2002). These are the only authors who have conducted a survey\textsuperscript{80} directed at capturing risk-drivers in an ex-ante perspective.\textsuperscript{81}

\textsuperscript{80} This paper develops hypotheses regarding the determinants of the return required by PEFs and tests them on a sample of over 200 PEFs located in five European countries. They try to understand the determinants of their required returns by using two theoretical perspectives: The Resource-Based Theory (RBT) and the Financial Theory (TFT).
However, they were not able to develop a model, and their study remains somewhat superficial without addressing “why?” and “how?” questions. As a consequence, like most researchers, they are also forced to infer causations rather than reveal them from deeper questions and facts.

The studies outlined in this section, like this thesis, were more concerned in calculating the risk premium and developing models in an ex-ante perspective. Like those papers seen in section 3.3.2 (the ex-post perspective), these papers also inferred the existence of interesting new phenomena which might drive the PEF risk premium. However, these phenomena were not included as explicit factors in the models. The next section will deal with some specific drivers present in the privately-held companies and their interaction with the PEFs.

3.3 PEFs and their PHCs Targets - (EMH and Agency Theory)

As seen in chapter 2, proponents of Behavioural Finance Theory (BFT) argued that psychological forces interfere with TFT and distort both human interactions (agency theory) and prevent decision-makers from acting in a rational manner (EMH). Since privately-held markets are more inefficient and irrational than public or organized markets, this section will briefly try to look at some of their particular features when assessed by PEFs (see chapter 2, section 2.7.1).

81 They developed hypotheses regarding the determinants of the IRR by PEFs and tested them on a sample of over 200 PEFs located in five European countries.
The issue of *transaction costs* can be traced back to Ronald Coase (1937) who studied the boundaries of firm size. The traditional economic theory suggested that, if the market is "efficient" (in accordance with the EMH) it should always be cheaper to contract out than to hire (because of the specialization of the suppliers). However, Coase underlined that *transaction costs* are present in the market. For instance: the cost of obtaining a good; search and information costs; keeping trade secrets; bargaining costs; *etc*.

Therefore, companies will arise when they can produce what they need internally avoiding those costs. On the other side, there is a natural limit to what can be produced internally. In fact, Coase observes "*decreasing returns to the entrepreneur function*", due to: increasing overhead costs and increasing propensity to make mistakes.

Consequently, Coase argued that the size of a firm is a result of finding an optimal balance between these competing forces. If a PEF scales up (hires more professionals in order to make more investments), the utilization of knowledge spreads out but the communication/hierarchy required increases (Bolton and Dewatripont, 1994; Stein, 2002; Vayanos, 2003). However, the issue might be a little different for non-organized markets.

Since PHCMs are farther away from organized markets in meeting the EMH conditions, the issue of economies of scale and scope in private equity funds presents new challenges for research. For instance, Gupta and Sapienza (1994) and Manigart *et al.* (2002) argued that PEFs manage risk through monitoring and involvement rather than through diversification. In other
words, industry specialization and monitoring intensity might be key risk drivers for private equity funds and not merely a means to gain economies of scale and scope.

Additionally, some of the concepts developed by the BFT to explain irrationalities in organized markets can also elucidate some phenomena explored in the last sections like the entrepreneurial or management overconfidence\textsuperscript{82}. In fact, investors’ overestimated cash flow expectations and mis-perceived risk in regarding private equity markets could be the explanation for the “public puzzle” as Moskowitz and Vissing-Jorgensen (2002) suggested.

In the same manner, the persistence found in fund performance (GPs whose funds outperform the industry in one funding round, are likely to outperform the industry in the next and \textit{vice versa}), can clearly be explained through the behavioural concept known as representativeness (Kahneman and Tversky 1972). Additionally, the “money-chasing deal phenomenon” could also have behavioral causes. For instance, the overshooting of capital investments in PEF may be due to herding behavior, where investment opportunities are systematically over- or under-estimated by investors.

\textsuperscript{82} Russo and Schoemaker (1992) find that managers are dramatically overconfident. Huberman (2001) and Benartzi (2001) document that investment portfolios are over-weighted toward familiar assets, the most familiar of which is being the employer’s stock.
If investors are rational - “A rational investor assesses a stock by its fundamental value” (Blanchard 2000) - , expectations should be influenced by past performances\(^8^3\). However, in quoted firms, this is not exactly the case since one of the well-known anomalies has to do with the post-announcements effect. Additionally, private equity firms' history being relatively short\(^8^4\), expectations could be influenced by survivorship bias of unexpected good results of the first years when competition was low and deals were more profitable.

Another important issue in the TFT for stock-quoted companies is the "principal-agent problem". The principal (investor) cannot control the agent (management) fully due to an asymmetry in information. Essentially, this implies that management (insiders) has more accurate information about the business than the outside investor and is able to acquire information at a lower transaction cost. In the case of the private equity funds, in which GPs act as insiders, the whole paradigm might change. In fact, through the managerial efficiency GPs, the use of properly-managed, integrated financial exchanges would radically lower transaction costs.

Additionally, agency theory proposes to solve the potential issues generated by the control-deficit through a hostile take-over. In fact, this is a consequence of the strong version of the EMH which states that: “a firm’s stock price accurately reflects its intrinsic value”. Considering this statement,

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\(^8^3\) Since, the future is unobservable, ex-post returns should be the only feasible way to estimate expected returns in a rational manner.

\(^8^4\) Consider that most studies are based on liquidated PEFs. That is PEFs between 1980 and 1995 which were the first experiences for private equity funds.
any opportunistic behaviors among the insiders will be reflected in the stock price (under-valued) and a potential bidding firm willing to create value by correcting the sub-optimal value. In other words, 

“Agency theory underscores and elaborates on this theory of mergers when it posits that agents tend to slack off and behave opportunistically.” (Bratton, 2008:8).

However, such a level of efficiency can only occur in ideal markets where the strong version of the EMH might operate. This is obviously not the case of privately-held markets in which inefficiencies and opportunistic behaviors are not reflected in market prices (simply because there are no market prices), and where it is much more difficult for an investor to exchange the shares (due to the lack of marketability of private shares and the high transaction costs involved).

Therefore, part of the success of the private equity firms comes from two main reasons. First, they are able to minimize transaction costs incurred by common private investors in buying and selling companies. For instance: they have the know-how, the contacts, and research tools to buy and sell companies. Second, acting as insiders and aligning the management of the target firms, they eliminate any potential opportunistic behavior and therefore can gain from the huge inefficiencies present in privately-held markets.

Such ideas were confirmed by a study conducted by Cable and Shane (1997) directed at demonstrating the nature of the relationship between
entrepreneurs and PEFs by introducing the Prisoner’s Dilemma Approach\textsuperscript{85} in contrast to the traditional Agency Theory Approach\textsuperscript{86}, Sapienza (1992) first suggested the long-term value of frequent interactions between entrepreneurs and PEFs. He found that PEFs with frequent, open communication with entrepreneurs were more successful. Still, many PEFs try to minimize their personal interaction with entrepreneurs in favour of low-contact and fast-payoff investments.

Therefore, it seems that as agency theory suggests, the private equity governance structure approaches the ideal:

\textquote{\textit{here at last we see capitalism allocating risk and return in respect of large operating companies in a high-incentive context, free of regulatory distortions.}} (Bratton, 2008:23)\textsuperscript{87}.

However, if private equity net performance is so low as many of the academic papers studied in the last sections claimed, the implication will be that the private equity firms take all the gain they create (in fees, carried interests and other imposed charges).

\textsuperscript{85} This approach is directed at enhancing the long-term benefits of mutual cooperation (Cable and Shane, 1997), necessary to add value in PEFs.

\textsuperscript{86} In this approach, both parties are economically rational and will always engage in short-term opportunistic behaviour.

\textsuperscript{87} Which can be translated into transaction costs: general freedom from the pressures and distractions generated by the stock market, the media and the stock exchange analyst. Free from these pressures they can pay more attention to the company’s operations and long term targets.
Most of the papers reviewed in the last sections inferred the existence of new phenomena which might be related to the nature of both PEFs and PHCMs. In particular, this last section has revealed some particular factors that operate in the interaction of these two worlds (PEFs and PHCs).

3.4 Summary of the Phenomena Introduced by the Existing Literature.

Overall, most papers examined in sections 2 and 3 rest on the observation of past information and infer the existence of several important phenomena. Whether GPs are conscious of their existence and price these factors in some way is not yet known to academia. These phenomena can be summarized as follows:

- **The “Money-chasing deal phenomenon”:** Gompers and Lerner (1999, 2000) argued that there is a limited number of favorable investments in the private equity industry that has to be matched with a fluctuating capital supply.

- **PEF segmentation:** Since PEFs are not permitted to invest in other asset classes, GPs are not able to redirect newly-committed funds outside the asset class in the event of industry over-valuation. Therefore, if an increase in capital inflow is not accompanied by an increase in the number of investment projects, then both competition and valuations increase (Gompers and Lerner, 2000).

- **Agency-theory factors:** In the traditional agency theory approach, the relationship between investor and management suffers from asymmetry. In the case of the private equity funds, in which GPs act
as insiders, the whole paradigm might change. In fact, through GPs, the use of properly-managed, integrated financial exchanges should radically lower transaction costs (Bratton, 2008).

- **Specialization-effect**: Being focused allows GPs to work with more specialized teams in a high number of similar deals. Additionally, close contacts within a specific industry can be built thus improving the performance (Manigart *et al.*, 2002).

- **Monitoring Intensity or Fees-effect**: PEFs might be more fees-oriented than expected performance-oriented. They might take all the value they create in fees, carried interests, stock options, and other imposed charges (Manigart *et al.*, 2002).

- **Investment speed-effect**: Funds vary in both the speed with which they call/invest capital and in the fraction they actually call/invest. Poorly-performing funds seem to invest more slowly (Phaliphou and Gottschalg, 2008).

- **Performance persistence**: GPs whose funds outperform the industry, are likely to outperform the industry in the next fund they manage and *vice versa*. As a consequence, better GPs may be able to invest in better investments and get better deal terms (lower valuations) (Kaplan and Schoar, 2005).

- **Learning cost effect**: Performance might reflect a learning cost in the first years (Phalippou and Zollo, 2005 and 2006).

- **Economies of scale and scope**: PEF performance suffers when the value-adding capacity of a management team needs to be shared across more investments (Lopez-de-Silanes and Phalippou, 2008).
- **Non-linear systematic risk:** PEF performance is significantly pro-cyclical and improves with GDP growth rate and deteriorates with the average level of interest rates (in particular corporate bond yields) (Phalippou and Zollo, 2005).

- **Investors’ (LPs) misperceived expectations due to valuation biases:** Phalippou and Gottschalg stated: “the performance of private equity funds as reported by industry associations and previous research is overstated. A large part of performance is driven by inflated accounting valuation of ongoing investments.” Phalippou and Gottschalg (2008:1747).

- **Over-confidence (Hubris):** For instance, entrepreneurs and PEF managers may be over-optimistic about their own investment decisions and perspectives (Moskowitz and Jorgensen, 2000).

- **Representativeness:** The persistence found in fund performance can clearly be explained through the behavioural concept known as representativeness (Kahneman and Tversky 1972).

- **Herding behavior:** The “money-chasing deals” phenomenon could also have behavioral causes. For instance, the overshooting of capital investments in PEF may be due to herding behavior, where investment opportunities are systematically over- or under-estimated by investors.

- **PEF non-pecuniary drivers:** For instance, investor objectives may be not only to maximize returns but to establish commercial relationships with GPs in order to increase the likelihood that the funds will purchase LPs’ services like consulting (M&A services). Additionally,
pension fund managers and government-related agencies, invest in
PEFs to stimulate local economies (Moskowitz and Jorgensen, 2000).

Table 3.4 summarizes and classifies each phenomenon according to the
author who inferred it and the perspective of his/her study.

Table 3.4: Summary of the Phenomena

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>Author</th>
<th>Perspective (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The “Money chasing deal phenomenon”</td>
<td>Gompers and Lerner, 1999</td>
<td>SE</td>
</tr>
<tr>
<td>PEF segmentation</td>
<td>Gompers and Lerner, 2000</td>
<td>SE</td>
</tr>
<tr>
<td>Agency-theory factors</td>
<td>Cable and Shane, 1997</td>
<td>SE</td>
</tr>
<tr>
<td>Specialization-effect</td>
<td>Manigart et al., 2002</td>
<td>SW</td>
</tr>
<tr>
<td>Monitoring Intensity or Fees-effect</td>
<td>Manigart et al., 2002</td>
<td>SW</td>
</tr>
<tr>
<td>Investment speed-effect</td>
<td>Phaliphou and Gottschlag, 2008</td>
<td>SE</td>
</tr>
<tr>
<td>Performance persistence</td>
<td>Kaplan and Schoar, 2005</td>
<td>NE</td>
</tr>
<tr>
<td>Learning cost effect</td>
<td>Phaliphou and Zollo, 2005</td>
<td>SE</td>
</tr>
<tr>
<td>Economies of scale and scope</td>
<td>Silanes and Phalippou, 2008</td>
<td>SE</td>
</tr>
<tr>
<td>Non-linear systematic risk:</td>
<td>Phaliphou and Zollo, 2005</td>
<td>SE</td>
</tr>
<tr>
<td>Over-confidence (Hubris)</td>
<td>Moskowitz and Jorgensen, 2000</td>
<td>SE</td>
</tr>
<tr>
<td>Representativeness</td>
<td>Kahneman and Tversky, 1972</td>
<td>SE</td>
</tr>
<tr>
<td>Herding behavior</td>
<td>Kahneman and Tversky, 1972</td>
<td>SE</td>
</tr>
<tr>
<td>PEF non-pecuniary drivers</td>
<td>Moskowitz and Jorgensen, 2000</td>
<td>SE</td>
</tr>
</tbody>
</table>

(*) SE = south east cell, SW = south west cell, NE = north east cell, NW = north west cell.
3.5 Conclusion

This chapter has explored the existing literature directed at assessing the PEFs’ risk premium from different perspectives (ex-ante, ex-post, gross and net of fees). In addition, it has shown the different methodologies that have been applied in the last 14 years of research (from Lerner and Gompers, 1997 to Franzoni et al., 2010) to assess the risk-return drivers in PEFs. Consequently, the current academic debate questions the value of both the past performance (ex-post) and the risk premium (ex-ante) proposing a wide range of possible values for each.

Overall, the papers explored in section 2 and 3 reveal both contradictory conclusions regarding the value of the PEFs’ risk-premium as well as new phenomena which might drive that premium. Therefore, part of the scope of this thesis will be to reveal if GPs consider such phenomena (price these factors) when assessing a deal (ex-ante) thus affecting both the T.IRR and the E-IRR.

Furthermore, Korteweg and Sorensen (2009) and Franzoni et al. (2010) lead the field in accounting for illiquidity risk and develop ex-post-based models which can be used in an ex-ante perspective. However, like many other studies, theirs are based on past performance and their models were not able to identify the phenomena (listed in section 3.4) nor to include them as single factors.
Overall, the literature reviewed in this chapter is purely quantitative and looks merely at statistical effects. Furthermore, the contradictory results and the need to reveal real causations instead of just inferring them through the observations of naked quantitative data are calling researchers to a new approach: The need is for complementary qualitative in-depth research methods (Wright and Robbie, 1998) to complement previous studies.

Similarly, it is necessary to have a new perspective (the ex-ante perspective). In order to determine the PEF risk premium, it is also necessary to distinguish return expectations (driven by risk perceptions) from realized returns or past performance, as underlined by Dimson et al. (2003). In this scenario, it is also important to understand if and how the latter influence the former.

In addition, the only way to capture expectations is to reveal the determinants of PEFs’ required return and this can be achieved by getting access to the PEFs and observing their perceptions, negotiations and interactions (ex-ante) with their target companies. In other words, in order to assess the relative importance of the PEFs’ phenomena revealed in this chapter and understand how they drive the PEFs’ risk premium, it is necessary to complement previous studies with a more qualitative approach. This thesis intends to proceed in this direction.
4 PHILOSOPHY AND METHODOLOGY

4.1 Introduction

In any research study, choices have to be made as to what kind of epistemological perspective is to be taken, and how the study should be conducted in order to add knowledge to both academia and practice. This chapter details both the ontological and the epistemological stance adopted as well as the chosen research method, and will discuss why those choices are the most suitable ways to approach the scope of this thesis.

Therefore, the first task is to define the object by asking the most basic ontological and epistemological questions: What is the object of this thesis? How can that object be approached? The first question can be answered by reminding the reader (refer to chapter 1) of the targets of this project, as listed below in the following two paragraphs:

- To understand the nature of the risk-return drivers applicable to PEFs by looking at GPs’ risk perceptions and return expectations when assessing deals.
- To reveal the determinants of the risk premium (having in mind the phenomena found in the last two decades of research), and to try to quantify some of those drivers thus being able to estimate the cost of a deal (the PEF deal premium) by using a modified and extended version of the Fama and French three-factor CAPM.
The second question (How can that object be approached?) will be the main topic of this chapter. It starts (section 4.2) by underlining the limitations in the epistemological approach of the research studies reviewed in chapters 2 and 3 (in general, they are considered to be too positivistic) thus showing the need for a different type of approach to complement them: Critical Realism. Section 4.3 will begin by outlining the merits of the case research study as the most suitable research method for this thesis, and consistent with an epistemological approach founded on realism. Both the epistemological stance (Critical Realism) and the research method (case study) together define the methodology of this thesis.

Section 4.3.2 will show the application of the case study research method to this research project. Section 4.3.3 will explain the important role of a structured questionnaire survey in the case study method. Subsequently, section 4.3.4 will outline some examples of business research that have used the case study method. Section 4.3.5 will explore the attributes of any credible case study research method (i.e. internal validity, external validity and reliability.

In addition, section 4.4 will describe in detail the whole data collection process followed during the project. It will start in section 4.4.1 by illustrating the sample selection process. Finally, section 4.5 will explain the methods applied to analyse the data collected.
4.2 Research Philosophy

The first task for any researcher is to establish the philosophy of the research, that is, to define an ontological and epistemological framework. Guba and Lincoln (1985) posit that epistemological orientations provide researchers with the guiding principles on which they may base their research methods.

However, before choosing the epistemological approach, it is important to review past research in this arena. In order to complement previous research, the researcher must identify gaps in the epistemology incorporated in the previous research, as reviewed in chapters 2 and 3.

4.2.1 Ontological & Epistemological Issues in Past Research

Frankfurter and McGoun (1999) claimed that financial economics is at present in a state of paradigm crisis, with ever more anomalies requiring ever more special case theories. Saunders (1994) urges that valuation theory needs “tests of neutral influences on asset prices that require no assumptions”. This author (who is perhaps asking too much) refers to the problem of the joint hypothesis discussed in chapter 2.

In fact, the capital asset pricing model is assuming that market players are rational (EMH), and most researchers reviewed in chapter 3 based their models that aimed to calculate the PEFs’ risk premium purely on capital
asset pricing models (For instance: Jegadeesh et al., 2009; Korteweg and Sorensen, 2009; Franzoni et al., 2010; etc). Therefore, new research should be less dependent on the factors contained in those rational-based models and be open to the existence of new drivers. This is one of the intentions of this thesis.

Much of valuation theory rests on inductive reasoning: Most authors infer causations and build models (generalizations) by looking at past statistical information: “if the market recorded a premium of x% in the past, it is expected to be so in the future”, “if the three-factor model can predict the risk premium for public markets, it is expected be so for the PEFs”. These statements cannot be tested because their reasoning is based on weak induction89.

It is therefore desirable to reinforce those statements with a research project based on stronger induction: Instead of inferring the determinants of the risk premium by looking at past performance, it is more promising to interview practitioners directly, to analyze PEF deals qualitatively thus revealing the determinants that are priced by PEFs. These determinants could be different from those observed in the past statistical information and could even lie

89 There is weak induction when the link between the premise and the conclusion is very weak. Example: “I always hang pictures on nails” therefore “All pictures hang from nails”. In this example, not only is it possible for the conclusion to be false given the premise, but it is even fairly likely that the conclusion is false. Not all pictures are hung from nails; moreover, not all pictures are hung. Thus we say that this argument is an instance of weak induction.
behind some of those factors included in the rational-based capital asset pricing models.

Inductive reasoning has been attacked by many philosophers like Sextus Empiricus and Karl Popper. However, it was David Hume (1748) who underlined the fact that our thinking depends on drawing uncertain conclusions from our relatively limited experiences rather than on deductively valid arguments (Greetham, 2001:134). For instance, we believe that olives will continue to grow because they have done so in the past. However, Hume argued inductive reasoning cannot be justified deductively, and so our only option is to justify it inductively. However, to justify induction inductively is circular.

Therefore, the problem with previous studies in the area of financial economics, including the papers studying PEFs, is the fact that almost all of them inferred phenomena and causations by looking at statistical data (they are based on past experience). The only exception seems to be Manigart et al. (2002) who conducted a survey.

However, the problem with the survey of Manigart et al. (2002) is its superficiality. These authors prepared a simple questionnaire (administered by telephone) where the only possible answers were dichotomous (“yes” or “no”) or requesting specific figures - they did not address questions like “why” or “how”. Consequently, they are not able to explain in depth the true drivers involved, and like many other authors, at the end, they had to infer phenomena from the statistical data collected.
In addition, traditional finance theory (TFT) and valuation theory rests on the view of the “homo-economicus” which refers to a greatly simplified model of human behaviour in an individual who is characterized by perfect self-interest, perfect rationality and free access to perfect information\textsuperscript{90}. On the grounds of simplicity, mathematical applicability and the deductive-empirical reasoning, human behaviour has been over-simplified.

For instance: What is “value” in valuation theory? Valuation theory rests on the following central \textit{a priori} proposition: “\textit{valuation is the mechanism by which investors trade cash today for future claims on cash flows.}” (Mauboussin, 2002:1). If we only considered this intuitive “truth”, the problem would be very simple. However, there are other complex realities which stand behind cash flows and risks that must be understood: Investors’ behaviors, their perceptions and expectations.

In addition, the existence of the anomalies found in the last few decades (refer to chapter 2) call into question the epistemological approach used which is currently criticized by some authors as being too positivistic (see figure 4.1).

\textsuperscript{90} Assumptions whose foundations are based on the principle of conditional probabilities as established in 1763 by the mathematician Thomas Bayes, and by Adam Smith and David Ricardo in the 17th and 18th century.
Too many assumptions: Saunders (1994) urges that valuation theory needs “tests of neutral influences on asset prices that require no assumptions and hypotheses”.

Too inductive: Much of valuation theory rests on inductive reasoning. It looks at past experience and statistical effects to establish laws and predict the future. Authors in TFT are over-pragmatic and devoted to empiricism. They trust “appearances” and past experience, sometimes forgetting what Kant said: “perceptions without conceptions are blind” (Greetham, 2001:120).

Circular: Models and theories are based on the only justification that “since it worked in the past, it will work in the future”. But this kind of inference would end in circular reasoning as Hume pointed out (Greetham, 2001:134). However, the many anomalies found are calling new researchers (based on Popper’s and Kuhn’s thinking) to develop new theories as well as ways of falsifying them through deductive reasoning or stronger inductive reasoning.
Not looking for causations nor explanations: at this level, events have a multiplicity of causes and mechanisms and the traditional approach concentrates its efforts on the quantification of the effects instead of on the understanding and explanation of the causes and mechanisms governing PEFs’ valuation. “we cannot directly infer a causal effect from a statistical effect.” (Marsh, 1988: 229).

Therefore, it is possible to conclude that finance research tends to be too positivistic. Conditional predictions based on observations are at the core of positivism.

4.2.2 Ontological & Epistemological Approach for This Thesis

When undertaking research, it is essential to consider different research paradigms of ontology and epistemology. Since these parameters describe assumptions, perceptions, beliefs, and the nature of reality and truth, they can influence the way in which the researcher interpret and undertakes the object of study.

Blaikie defines ontology as “the science or study of being’ and develops this description for the social sciences to encompass ‘claims about what exists, what it looks like, what units make it up and how these units interact with each other.” Blaikie (1993). Does the reality exist only through experience of it (subjectivism), or does it exist independently of those who live it (objectivism).
Blaikie (1993) also defines epistemology as “the theory or science of the method or grounds of knowledge.” In other words, epistemology studies the ways in which it is possible to gain knowledge of reality, how what exists may be known, what can be known, and what criteria must be satisfied in order to be described as knowledge.

Burrell and Morgan (1979) defined a framework to classify research approaches according to two dimensions (subjectivism and objectivism). Thereafter, the subjective-objective dimensions are along axes of ontology, epistemology, human nature, and research method. These four frameworks can understood and interpreted in the dimension of objectivism or in the dimension of subjectivism.

**Figure 4.2: Subjectivist-Objectivist Database within Social Science**

![Subjectivist-Objectivist Database within Social Science](source: Holden & Lynch (2004))
Figure 4.2 illustrates Morgan and Smircich’s (1980) continuum of six major philosophical perspectives. The red circles and ovals show the positioning of this study. The figure shows two extreme positions in order to illustrate how a researcher’s ontological stance influences the core assumptions concerning epistemology and human nature. The extreme subjectivist argues that reality does not exist outside oneself. Therefore, the relevant epistemological stance is that knowledge cannot be discovered, as it is subjectively acquired and everything is relative.

On the contrary, proponents of the other extreme position, objectivism, are realists. They argue that one must keep struggling in understanding the real object avoiding “the illusions of idealism in which only the mind – not the stubborn, finite, contingent facts of nature – had true existence” (Jaki, 1975:144). They contend that the world exists independently from the human mind.

Therefore, valid knowledge about a concrete reality can only be discovered through observation and measurement and any reference to the intangible or subjective is excluded as meaningless (Giddens, 1976; Morgan and Smircich, 1980).

Referring to the Burrell and Morgan (1979) spectrum as well as the Morgan and Smircich’s (1980) classification, this research project is positioned (as

91 For instance: Regarding human nature, moral relativism as “dictatorship that recognizes nothing as definitive” was particularly underlined by Joseph Ratzinger in a memorable passage from the homily he delivered at St. Peter's on the morning of April 18 2005.
shown by the red circles in the figure 4.2) in the objectivist approach, that is, realism regarding the ontological question and positivism regarding the epistemological question.

Regarding the assumption of human nature, as shown by the red circle in the figure 4.2, this thesis sees humans as responding mechanisms and, in some cases, as adaptive agents. In the first case, human beings are a product of the external forces in the environment to which they are exposed. Stimuli in their environment condition them to behave and respond to events in predictable and determinate ways. A network of causal relationship links all important aspects of behaviour to context. Though human perception may influence this process to some degree, people usually respond in ways that conform to scientific law.

However, as underlined by behavioralists (chapter 3), human beings might exist in an interactive relationship with the world. This is the second case in which humans influence, and are influenced by, the environment. Investors’ behaviour might not always be predictable and rational. Privately-held markets are not efficient. Therefore, contrary to previous papers and models aimed at assessing PEFs’ risk (reviewed in chapter 3), the normative model to be developed by this thesis might consider unpredictability and behavioural factors.

From an epistemological point of view, this thesis (as shown by the red circle of figure 4.2) intends to study the nature of relationships among the elements constituting the ontological structure. It also implies not only understanding
and mapping out the phenomena influencing the ontological structure, but also specifying the natures of drivers, patterns, and relationships among phenomena.

Furthermore, according to Kant’s thinking, researchers should try to understand markets and investors independently from experience. In this direction, an appropriate epistemological approach to complement the positivistic ontological background could be critical realism (Collier, 1994). Therefore, this research project will be grounded in the critical realism approach to scientific knowledge.

Critical realism is based on the assertion that there is a world that is independent of one’s knowledge about it and that this implies fewer a priori assumptions and theories. The purpose of science is therefore to describe and explain the observable but as yet unobserved aspects of this independent world.

In the case of this thesis, “more independent from a priori assumptions” implies being cautious about a priori assumptions like that of the illiquidity risk being the only explanation for the high PEFs\(^{92}\) required return. A more “independent approach” should reveal both behaviors and risk-drivers which are not observable by only looking at past databases. The issue of

\(^{92}\) This was the case of Franzoni et al. (2010) who developed a model (reviewed in chapter 3) where the only additional factor added to the three-factor model of Fama and French is the illiquidity factor.
depending on past data to assess future premiums was especially criticized by Arnott and Bernstein (2002).

Therefore, in order to be “more independent”, it is desirable to do what no previous study has done before (as least to the knowledge of this researcher), that is: To study GP’s assessments and interview them in depth in order to understand how they truly behave and why, considering different cases.

According to the critical realism perspective and Bhaskar’s transcendental arguments93 (Collier, 1994:42), the level of depth to reality can be established:

- Most of the authors reviewed in chapter 2 and chapter 3 (“rationalists”) belong to the “domain of empirical”. They draw conclusions and predictive models only through plain observations of ex-post data. At this level, events

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93 Transcendental realism establishes that the object under investigation has real, manipulable, internal mechanisms that can be actualized to produce specific outcomes. While empiricism locates causal relationships at the level of events, critical realism locates them at the level of the generative mechanism, arguing that causal relationships are irreducible to empirical constant conjunctions of David Hume's doctrine. This implies that science should be understood as an ongoing process in which scientists improve the concepts they use to understand the mechanisms studied. In contrast to the claim of empiricists, it should not be about the identification of a coincidence between a postulated independent variable and dependent variable. According to critical realism a mechanism will exist but either a) go unactivated, b) be activated, but not perceived, or c) be activated, but counteracted by other mechanisms, which results in it having unpredictable effects. Thus, non-realisation of a posited mechanism cannot (in contrast to the claim of positivists) be taken to signify its non-existence.
have a multiplicity of causes and mechanisms, and these authors concentrate their efforts in the quantification of the effects instead of in the understanding and explanation of the causes and mechanisms governing them. They infer causations and assume therefore the efficacy of this methodology, neither explaining causations nor identifying ways to test models; thus ignoring limitations.

- Instead, authors, like some behaviouralists reviewed in chapter 2, are located in the “domain of actual”. They observe and analyse markets and investors’ behaviours behind the transactions.

- However if one really wants to arrive to the “domain of real” in the understanding of PEFs’ behaviour in assessing the risk premium, courage is necessary to take a further step. If events are caused by the power of things\textsuperscript{94}, we need to recognize what are those things or structures and their “hidden” powers. In the case of this thesis, the word “power” refers to those hidden determinants that activate the “things” or factors which are driving the risk premium. Some of these determinants might be still unknown and some others were presented in chapter 3 as potentially hidden drivers. The illiquidity factor might be one of those “things” that needs to be unveiled in order to find the “power” or determinants ("the power of things") that activate it.

\textsuperscript{94} In this thesis, “things”, as intended by Bashkar’s conception, are the hidden determinants that drive the risk premium.
In the domain of real, it is also important to have in mind that investors are not rational computers whose behaviours can be determined only by establishing simple market laws and assumptions. On the contrary, according to Bhashkar’s anti-determinist arguments, “laws constrain but do not determine events” (Collier, 1994:130).

In sum, through the use of what Bashkar calls “transcendental arguments”, we must attempt to explain phenomena, causes and conditions operating in the markets. This is what he called “the third domain of knowledge” or “the domain of real”: If events are caused by the power of things, we need to recognize what those things are and their “hidden” powers (see figure 4.3).

**Figure 4.3 Characteristics of Critical Realism**

Source: Author’s own work

McKelvey (1997) holds that critical realism is appropriate for organizational studies and that since organizational science is at an early stage of development, it is more appropriate to use idealized models constructed without the assumptions of any idiosyncrasies. This work heads in this direction.
In addition, Miller (1983) provides some general criteria on how to evaluate what is a suitable model in social sciences so that it can be used to adequately explain the phenomenon under study without the model being too complex. For him, the first criterion is that the model should be able to identify a sufficient number of explanatory factors. Secondly, the explanatory factors must occur to bring about the phenomenon. Thirdly, the explanations need to reach sufficiently far back along the causal chain.

However, contrary to past research studies, this research approach will be completely different in terms of research method. In fact, similar research methods can belong to either an objective or subjective philosophical approach having a dual utilization. Positivism can be pursued by various research methods, including quantitative and qualitative ones (and mixed ones). However, because quantitative approaches can be quite superficial, a qualitative case-oriented approach is preferable in the light of previous research in this area.

In fact, according to Wright and Robbie (1998:563), more qualitative in-depth research methods are necessary. This implies direct interviews with GPs in order to reveal how they think and behave when assessing different deals. Questions like “why” and “how” in an ex-ante perspective might be able to reveal new phenomena thus complementing previous studies.

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95 For instance, Franzoni et al. (2010) and their illiquidity risk could be hiding other factors behind. In addition some of these factors behind might be those phenomena outlined in chapter 3.
Perceptions and expectations cannot be inferred by looking at past information. On the contrary, they need a kind of approach that allows researchers to interview investors and examine several cases in-depth in order to understand exactly how GPs behave, how they deal and why, and, most of all, what they price on their risk assessments.

Therefore, from a methodological point of view, the scope of this project is to complement the highly positivistic and quantitative studies with a more qualitative approach capable of finding causations\(^{96}\) and explanations without inferring them only from statistical effects. In this sense, a qualitative approach through personal interviews was adopted to reveal all risk-drivers in order to be able to eventually propose a coherent model.

Studying PEFs’ behaviour, would put evidence on their perceptions and expectations which would then be observed under a set of market conditions (different cases). In doing so, the researcher can look for definitive purposive explanations.

In fact, one of the innovations of this research project is that it looks at the ex-ante IRR through a qualitative research method (in-depth interviews) directed at revealing phenomena and through an explanatory approach able to reach sufficiently far back along the causal chain.

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\(^{96}\) The factors and the determinants of the required return
4.3 Research Method - Case Study: Compatibility with a Realistic Perspective.

Case study method (the research method chosen for this research project) involves in-depth interviews and it has frequently been regarded as a qualitative method alone. However, increasingly researchers relying on the case study method have quantified the answers in order to conduct statistical analysis of case-study results (in financial economics some examples can be found in Kaplan & Norton, 1993 and Barkham et al., 1996). The case study method is an ideal strategy when “how” or “why” questions are being posed.

“The distinctive need for case studies arises out of the desire to understand complex social phenomena.” (Yin, 2003:2).

4.3.1 Introduction to the Case Study Method

A case study allows in-depth understanding: It explores phenomena within their context to illuminate how behaviors influence, and are influenced, by that context especially when the boundaries between phenomenon and context are not evident. A survey designer, for instance, limits the number of variables to be analyzed by reducing the number of questions. (Yin, 2003).

The choice of which method to employ is dependent upon the nature of the research problem. Morgan and Smircich (1980) argued that the actual suitability of a research method derives from the nature of the social phenomena to be explored. According to these authors, there are two
methodological approaches in social science: Positivism and Post-positivism (phenomenology). With positivism, the researcher observes facts, collects data and then through quantitative and qualitative analysis builds up an explanation in a chain of causality (see Figure 4.4).

**Figure 4.4 Positivist Approach**

![Diagram of Positivist Approach]

Source: Author's own work

However, most of the studies and research papers seen in chapter 2 and chapter 3 use only statistical observations and quantitative analysis to infer causations. In contrast, post-positivism deals more with a reality which can be socially constructed rather than objectively determined. Hence, research projects dealing with social phenomena should not aim merely to gather facts and measure how often certain patterns occur, but to appreciate the different constructions and meanings that people place upon their experience (see figure 4.5).
Therefore, post-positivism which intends to explain the subjectivity of complex social phenomena, tends to involve a more qualitative approach. Since this research project is more concerned than previous research in the arena with the explanation of social phenomena: investors’ behavior and feelings when assessing investments, the use of a qualitative method is particularly important to complement past studies.

This does not mean that the positioning of this thesis in terms of ontological grounds is post-positivist. On the contrary, this project has a positivistic approach and the case study method can equally be used (as stated in the introduction of section 4.3) for both positivist and post-positivist studies.

In explaining qualitative research, Denzin and Lincoln (1994) state that, “qualitative” implies an emphasis on processes and meanings that are not rigorously examined, measured (if measured at all), in terms of quantity, amount, intensity, or frequency. Thus, there are instances, particularly in the social sciences, where researchers are interested in insight, discovery, and interpretation rather than hypothesis testing. This is also the case of this
thesis which intends to understand phenomena and find their determinants by using multiple case studies.

Furthermore, according to Yin (2003), the choosing of the most suitable research methods is based on two main conditions: The type of question being posed and the extent of control that an investigator has over actual behavioral events. The case study method can be:

- Explanatory: seeks answers to ‘how?’ or ‘why?’ questions;
- Exploratory: when a new area is being researched;
- Descriptive: when the researcher wants just to describe what is going on.

Therefore, this project will rest on the exploratory and eventually explanatory case method, since this is the recommended strategy (by Yin, 2003) when the questions focus on “how” or “why” and when the investigator has no control over behavioral events. The choice of this method is also related to the fact that this project is more focused on explaining rather than proving or predicting.

4.3.2 The Case Study Applied to this Research Project

Figure 4.6 exhibits the key steps in any case study. The research process of this thesis will be based on these steps.
Figure 4.6 Key Steps in the Case Study

A. Observation of literature review and gaps in previous research
B. Selection of cases and negotiation of access
C. Design data collection
D. Conduct the first case study using a variety of methods: observations, interviews, survey, internal documents, etc.
E. Conduct the remaining case studies (looking for replications)
F. Draw cross-case conclusions
G. Final theory

Flexibility
An advantage for unexpected results

Source: Yin (2003)

Figure 4.6 shows the process of a case study project (as adopted in this research project). Step A is based on the observation of past research in order to find gaps and potential areas of further research (such gaps were discussed in chapters 2 and 3).

Through the case study method and the design of three rounds of questionnaires addressed to 13 PEFs, this study revealed the existence of some of those phenomena (shown in chapter 3) and, in some cases, quantified them. These phenomena might imply the existence of new factors to be added to the asset-pricing models reviewed in chapter 2 and chapter 3. In other words, this research project analyzed the process of setting the discount rates for valuing the target companies of the PEFs.
Such a scope cannot be achieved by analyzing statistical data of past PEFs performance or superficial questionnaires addressed by telephone (like that of Manigart et al., 2002) as most previous studies do. This scope needs to:

- analyze PEFs’ internal processes,
- assess risk perceptions and value drivers with their causal chains,
- understand GPs’ thinking, intuitions, targets, incentives, external pressures, their relationships and covenants with LPs, etc.

To achieve this scope and obtain this kind of information, it is convenient to spend time in each PEF, addressing qualitative and quantitative in-depth interviews, and analyzing several deals. One of the reasons why this methodology has not been applied before in the PEFs’ field is probably due to the fact that the access to PEFs is very difficult because of the confidentiality of the information they manage. However, this researcher had the support of the Italian Private Equity Association (AIFI), and without it, such an approach would have been impossible.

The support of the AIFI is a unique opportunity that could not be declined and provides another reason why this type of approach, the explanatory case study, was chosen. Therefore, the purpose of this study is not only to measure statistical data but to understand how and why PEFs behave as they do. Such an approach can only be made through the in-depth explanatory case study method.

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97 In fact almost all the research papers reviewed in chapter 3 based their observations on external databases like held by specialized associations like the EVCA.
4.3.3 The Role of Structured Questionnaires in the Case Study Method.

Survey research involves the use of questionnaires to gather data about people and their thoughts and behaviors. This method was pioneered in the 1930s and 1940s by sociologist Paul Lazarsfeld. The survey research addresses a questionnaire to a selected representative sample of the population under study.

Through the use of surveys, it is possible to obtain a standard and uniform approach regarding both the questions asked and the mode in which subjects are addressed. This allows the researcher to compare and contrast answers by respondent groups and it also ensures higher reliability than most other techniques.

However, a survey can also raise some problems. For instance: A survey may suffer from a response error or bias because, the respondents might hide confidential information which could be important for the purpose of the research project. In other cases, respondents might wish to impress or please the researcher by providing the kind of responses that they believe the researcher is looking for in order to get rid of him quickly.

For the success of the survey, it is very important to motivate respondents and involve them in the project. Blau (1964)’s theory of social exchange argues that individual’s actions are often motivated by the “rewards” they are likely to receive from others. Therefore, in this thesis, one important target during the interviews was to motivate respondents and convince them of the
importance of having a model capable measuring the required return (T.IRR) for both the portfolio and the single deals.

There are some advantages in the use of surveys. First, surveys are a cost-effective way of investigating how people behave, think and feel. This is because surveys can use a random sampling technique to select cases which can be used to draw conclusions about the whole population. Therefore, by choosing a representative random sample, surveys can give internal and external validity, that is: A sample that represents the whole population thus being able to generate generalizations.

In this thesis, the researcher, together with the AIFI, made the sample selection to ensure the presence of a representative sample of the PEFs’ Italian population. 13 PEFs were chosen including: Big Italian funds (BIFs), Small regional funds (REFs), Pan-European funds (PAFs), and captive funds (CAPs). In addition, two deals per PEF were analyzed and here again, a representative sample containing different types of deals was selected: Table 4.1 shows the sample.

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98 Their representativeness is very dependent upon the accuracy of the sampling frame used. It is not always easy to identify an accurate and up-to-date sampling frame.
Table 4.1 Sample Selection

<table>
<thead>
<tr>
<th>Nr. of cases: Type of PEF / Deals</th>
<th>Pan-European Funds</th>
<th>Banks / Captive Funds</th>
<th>Early Stage Funds</th>
<th>Important and big Italian closed-end Funds</th>
<th>Small / regional funds</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MBO / LBO</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>4</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Expansion</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Turnaround</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Replacement</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

Source: Author’s own work

A second advantage of surveys is the fact that a wide range of approaches can be used: personal interviews, postal / E-questionnaires, telephone interviews, and archival research. In addition, surveys are also very flexible. Interviews and questions can be changed and reviewed since the first answers might generate doubts or unexpected outputs which enables the researcher to ask follow-up questions.

Due to the fact that this thesis intends to understand investors’ behavior in-depth, a very intimate approach was necessary (a telephone approach like that conducted by Manigart et al. (2002) would have been too superficial). Therefore, this thesis has worked through personal in-depth interviews to produce richer data (three 1-hour interviews) and e-mails as a complementary tool.

In addition, and as a third advantage, the case study method enables the researcher to gain a holistic view of the phenomena under analysis (or series of events) thus providing a cross picture due to the many sources of
evidence used. A case study can be also useful in capturing the dynamic perspective of an organization especially when it is changing very fast (as it is for Private Equity Funds and their markets).

Finally, the research method chosen for this research study did not employ experimental or quasi-experimental approaches. The avoidance of these experimental approaches will help respondents to be merely exposed to events that occur in the real world and would have taken place anyway. In fact, both experimental and quasi-experimental approaches would aim to observe how the subjects respond and react to different forms of hypothetical questions. This thesis does not want to simulate hypothetical situations but to reveal GPs’ behavior in the field.

4.3.4 Examples of Case Study Methods in Business Research

Some qualitative studies (case-study based) can be found in: Eriksson and Kovalainen, (2008); Lillis and Mundy, (2005); Kaplan, (1993); Lukka, (2005); Mäkinen, (1980); Näsi, (1981); Ryan, Scapens and Theobald, (2002). These studies seek to further the understanding of the functioning of accounting in action. Such studies have become quite popular in management accounting research, but are still relatively rare in other areas of accounting and finance. Kaplan (1993) claimed that applying traditional research methods, analytic

\[\text{99 An experiment would randomly assign subjects to different groups in order control all variables and observe the outcomes. On the contrary, in a quasi-experiment the subjects to be observed are not randomly assigned to different groups in order to measure outcomes, but grouped according to a characteristic that they already posses.}\]
modeling and statistical observations and analysis, to contemporary management accounting issues is not appropriate for exploring those issues.

Kaplan (1993) showed that there are many complex activities inside companies (he refers, in particular, to activities which affect the activity-based cost – ABC systems) that cannot be observed with traditional research methods. Consequently, Kaplan (1993) stated that the researcher should look more closely at internal company events (what academia calls field-research). In addition, many management accounting research studies conducted by Kaplan are based on field-research and case study method.

For instance, Kaplan and Norton (1993) used the case research method (three cases) to study how the balanced-scorecard combines management and measurement in different organizations. In addition, several other articles in the mid-1980s [Kaplan, 1983; 1986; Bruns and Kaplan, 1987] advocated that management accounting researchers make much more extensive use of field research to study management accounting phenomena.

Other examples of successful case study research can be found in Barkham et al. (1996) who used the survey approach to conduct a face-to-face in-depth analysis of the determinants of small firm growth, and, in particular, to explore the relationship between the growth of established small firms and the characteristics of their owner-managers in the UK. The subsequent data that was collected was used to construct a comprehensive model of small firm growth.
Kaplan (1993) also stated that the field research should be extended to other topics and areas where complex phenomena might not be well identified and understood by just observing statistical data. Following Kaplan’s advise, this thesis, based on case research method, aims to reveal all the determinants of the PEFs’ risk premium to develop an explanatory model. A model which should not be only based in the four-factor CAPM of Franzoni et al. (2010), but also on the complex phenomena outlined in chapter 3.

As shown in chapter 3, the failure (in past research papers) in measuring a widely-recognized value for the PEFs’ past performance, the incomplete understanding of the phenomena driving the risk premium (in some cases, opposing phenomena and contradictory conclusions), might suggest the need (as Kaplan, 1993, suggested and successfully applied for the management accounting field) to approach PEFs through field-research and face-to-face interviews. In this direction, the case study method seems to be the most suitable methodology to achieve that scope and to complement past research.

4.3.5 Research Design

After having described the research method as well as explaining why this is the most suitable choice for the scope of this project, this section will also outline the steps that must be taken. However, when describing the steps of this process, it is most important to establish the bases for high quality research design. There are four widely-used criteria to judge the quality of
research designs: Construct validity, internal validity, external validity, and reliability.

4.3.5.1 Construct Validity

This test means establishing correct operational measures for the concepts being studied (Yin, 2003:35). This project intends to measure the factors or determinants of the RR for which percentage proportions are used. To achieve this, the project will utilize multiple sources of evidence. For instance:

- By having direct interviews with those responsible for calculating the RR for each deal. A set of questions were prepared to capture the risk-drivers assessed by PEFs with their relative importance to account for the final RR.
- By looking at the Excel files and reports used for valuing different deals, it will be possible to observe the drivers and characteristics that have influenced the RR.
- By looking at internal procedures used to arrive at the final RR calculated for the deals.

4.3.5.2 Internal Validity

A case study involves an inference very time an event cannot be directly observed. Is this inference correct? (Yin, 2003:36). To assure that that inferences are correct, that is to achieve internal validity, this project has rested on analytical tactics like pattern-matching, explanation-building, and
rival explanations (Yin, 2003). By studying the sequence of actions, we can infer the different casual relationships between variables. Pattern-matching logic, for instance, compares an empirically-based pattern with a predicted one. If the patterns coincide, the results can help the researcher to strengthen the case’s internal validity. Additionally, by using both qualitative and quantitative analysis, it is possible to compare both results and see if they match.

4.3.5.3 External Validity

This test deals with the issue of knowing whether a study’s findings are generalizable beyond the immediate case study. Through the replication logic, a theory can be tested by replicating the findings in a second, or even third, case. That is why this research project will rely on the use of such replication logic in multiple-case studies\textsuperscript{100}.

Therefore, this project analyzes and explains several deals with different characteristics for each single PEF and deal. The scope of such multiple-case study is directed at obtaining replications and further support for the initial set of propositions.

At the same time, as shown in the second diagram of Table 4.1, the project will focus only on specific types of deals: management buyouts (MBOs), leveraged buyouts (LBOs), expansion deals, replacement deals. Such deals

\textsuperscript{100} The study has relied on information given by 13 PEFs and 26 deals where replications will be present.
were chosen not only to narrow the scope but also to allow concentration on mature and stable privately-held companies. In this way, the project will avoid turbulent operations like turnarounds and start-ups which have to deal with specific risk drivers which are beyond the scope of this thesis.

According to Yin (2003), the choice of the number of cases depends on:

- Differences in the context and uncertainty in the external conditions: In the case of this project, there might be important differences from PEF to PEF and from deal to deal.

- The existence of strong rival models: This does not apply here since this model is not contradicting existing ones (like that of Franzoni et al., 2010) but trying to complement them in order to be able to propose a more explanatory and detailed theory.

- The larger the number of cases or replications, the greater the supporting evidence for the stated conclusions.

Therefore, balancing these three aspects and looking at previous examples cited by Yin, it is considered that the choosing of 13 PEFs and 2 deals in each of them (26 cases), will be sufficient evidence for this research study.

Included in the 13 PEFs, there is a pilot case which has assisted the researcher to define and develop the relevant lines of questions as well as to provide some conceptual clarification for the research design.
4.3.5.4 Reliability

This last test serves to demonstrate that the operations of a study – such as the data collection procedures – can be repeated, with broadly the same results. To achieve reliability, the project will rely on the development of case study protocol which is essential for multiple case studies. The protocol is an important tool to increase the reliability of case study research and is intended to guide the researcher in carrying out the data collection process. An example for the protocol of this research project is shown in the figure 4.7.

**Figure 4.7 Protocol**

- **A**
  - Introduction to the project: theoretical framework → research question, hypothesis, propositions, relevant readings about the topic being investigated.

- **B**
  - Data collection procedures: PEFs visited, persons interviewed, calendar period for the visits, interviews and all research activities, documents consulted (see appendix 1)

- **C**
  - Outline for the case study report: outline, format for the data, use and presentation of the other documentation, and bibliographical information.

- **D**
  - Case study questions: The specific questions to keep in mind for the data collection and the potential sources of information for answering each question. Example for the questions (see appendix 1):
    - Describe the PEFs in detail with their characteristics and procedures,
    - Describe the deal in detail step by step,
    - Describe the drivers of the deal,
    - Describe the valuation process and the calculation of the RR in detail,
    - Discover who is responsible for the determination of the RR

*Source: Adapted from Yin, (2003)*
The heart of the protocol is the set of questions reflecting the line of inquiry. The process has considered different levels of questions in different times:

- **General orientation questions**: these are questions posed to the researcher that act as reminders regarding the information that needs to be collected and why. An example of such questions can be seen in the last figure (step D).

- **Level 1 and Level 2 questions**: These are specific questions posed to the interviewees about particular deals (for instance: What are the specific drivers priced in each particular deal to determine the RR) and are based on the general questions (see chapter 5). The questions will be prepared for the first set of interviews (see appendix 1 for the time schedule of the whole project) and are directed at revealing the basic information to proceed with the first data analysis.

- **Level 3 questions**: These are cross-case questions and cannot be addressed until the data from all the single cases were examined. Such questions will be prepared and designed after the examination of the information revealed through the questions of level 1 and level 2.

This section has addressed the application of the case study method as a key element to achieve the aims of this research project: Achieving these aims requires the adoption of a more realistic perspective in order to contrast with the arguably excessively positivistic traditional research approaches.
4.4 Description of the Data Collection Process

4.4.1 Sample Selection

With the help of the AIFI (Italian Private Equity Association) and other contacts, this study has been able to approach 13 PEFs in Italy. The project started with a pilot case, subsequently with 6 PEFs and finally with an additional 6 PEFs.

Initially, the AIFI introduced the project to 6 PEFs (these 6 PEFs are among the top 10 Italian PEFs in terms of size and reputation). The pilot case is a small regional PEF where the researcher worked as consultant during a deal assessment in 2009 (one year before the starting of the data collection process). The researcher went back to this PEF and started the interviews there.

Thereafter, the study proceeded with the 6 PEFs introduced by the AIFI and, in one sense, all this first group of six were also pilot cases in which many new concepts and phenomena came to light. Finally, with the help of the AIFI again, another 6 PEFs were contacted (some of them small regional funds to balance the initial big funds). The full support of the AIFI was partly due to the great interest shown in the project and its potential conclusions\(^{101}\).

\(^{101}\) The AIFI saw in the output of the project a potential article to be published in its magazine (the leading magazine in the Italian PEF sector).
As initially planned, the project analyzed the data of 26 deals: 6 deals approached by three Pan-European Funds, 4 deals approached by two captive funds, 8 deals approached by four big Italian funds, and 8 deals approached by four small regional funds. Regarding the type of deal, the research project has assessed: 13 LBO deals, 12 Expansion deals, and 1 Replacement deal\(^\text{102}\). In order to preserve the anonymity\(^\text{103}\) of the private equities and deals approached by the project, a masking-code is used as shown below:

```
CODE
BIF = Big Italian Fund
REF = Small regional Fund
PAF = Pan American Fund
CAP = Italian Bank Fund / Captive Funds
```

Using these codes, Table 4.2 exhibits the profile of the PEFs approached during this research project.

<table>
<thead>
<tr>
<th>Code</th>
<th>CC</th>
<th>Invested Amount 2010</th>
<th>Deal</th>
<th>Foundation Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BIF3</td>
<td>300</td>
<td>250 LBO / LBO</td>
<td>2007</td>
</tr>
<tr>
<td>2</td>
<td>REF4</td>
<td>35</td>
<td>- Expansion / Expansion</td>
<td>2010</td>
</tr>
<tr>
<td>3</td>
<td>BIF1</td>
<td>1.180</td>
<td>600 LBO / LBO</td>
<td>1993</td>
</tr>
<tr>
<td>4</td>
<td>CAP2</td>
<td>100</td>
<td>- Replacement / Expansion</td>
<td>2009</td>
</tr>
<tr>
<td>5</td>
<td>PAF3</td>
<td>200</td>
<td>70 Expansion / Expansion</td>
<td>1991</td>
</tr>
<tr>
<td>6</td>
<td>REF3</td>
<td>30</td>
<td>12 LBO / LBO</td>
<td>2006</td>
</tr>
<tr>
<td>7</td>
<td>BIF4</td>
<td>310</td>
<td>260 LBO / Expansion</td>
<td>2004</td>
</tr>
<tr>
<td>8</td>
<td>REF2</td>
<td>42</td>
<td>35 LBO / Expansion</td>
<td>2006</td>
</tr>
<tr>
<td>9</td>
<td>BIF2</td>
<td>500</td>
<td>450 Expansion / Expansion</td>
<td>2002</td>
</tr>
<tr>
<td>10</td>
<td>REF1</td>
<td>20</td>
<td>8 Expansion / Expansion</td>
<td>2007</td>
</tr>
<tr>
<td>11</td>
<td>PAF1</td>
<td>450</td>
<td>400 LBO / Expansion</td>
<td>2004</td>
</tr>
<tr>
<td>12</td>
<td>CAP1</td>
<td>352</td>
<td>320 LBO / LBO</td>
<td>2002</td>
</tr>
<tr>
<td>13</td>
<td>PAF2</td>
<td>675</td>
<td>193 MBO / Expansion</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.194</td>
<td>1.678</td>
<td>7.8%</td>
</tr>
<tr>
<td></td>
<td>Total 2010 (Source AIFI 2010)</td>
<td>21.500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^\text{102}\) Replacement deals allow existing non-private equity investors to buy back or redeem part, or all, of another investor’s shareholding.

\(^\text{103}\) A non-disclosure of information contract was signed between the author and some of the PEFs interviewed.
The columns “capital” and “Invested amount 2010” are measured in millions of euro.

The column labeled “capital” shows the amount of the funds raised at the foundation of the PEF, the column named “invested amount 2010” exhibits the amount which is still invested in the portfolio companies, the column named “funds” shows the number of funds managed by the PEFs. It is important to note that the total amount still invested in the portfolio companies of the PEFs approached in this project (€ 1,678 million) represents circa 7.8% of the total amount still invested of all the Italian PEFs in the year 2010 (€ 21.5 billion).

The total number of PEFs in Italy is around 272 (AIFI 2010). Since this work includes 13 PEFs, the size of the sample exceeds 5% of the Italian PEFs population. It is important to underline that there are no precedents in research covering such big samples in Italy by using qualitative methodologies (in particular, the case study method).

Case studies have been criticized by some (e.g. Bent Flyvbjerg, 2006) as having lack of scientific rigor and reliability and for not addressing the issues of generalization and external validity. This study responds to that weakness with a relatively wide sample (for this kind of approach) which captures almost 8% of the population (in terms of capital invested) and 5% of the population (in terms of number of PEFs).
4.4.2 Collecting Data

After having selected the sample, the data collection process started by addressing the pilot case where the past experience of the researcher as consultant of one of its deals was critical as a starting point.

After having addressed the pilot case, a first stage including the first two rounds of meetings / interviews with the first six PEFs was conducted: This first round was aimed at introducing the project, discussing general questions, and studying some concepts of the valuation process in general. The second round consisted of an interview directed at confirming the existence of the phenomena outlined in chapter 3 and analyzing in detail two deals per PEF.

The research started in March 2010 and, in July 2010, the author started to analyze the data collected. It was after that when the second stage, directed at approaching the six additional PEFs and at addressing the third round of questions to all the 13 PEFs (the pilot case included), started. This separation in two stages was very important for many reasons: It allowed the researcher to pause and reflect on the first findings, it helped the researcher to prepare the third round of questions considering not only the knowledge acquired during the first stage, but also accounting for the gaps and new questions raised by it.

Furthermore, it is also important to underline that at the beginning of the data collection process (during the first stage) it was very difficult to obtain
information. The first PEFs approached were very secretive, did not want to disclose any information, and showed little real interest in the project. Therefore, the beginning of the project was very difficult, stressing and frustrating.

However, all this changed during the second stage. In fact, the first conclusions developed by the researcher were shared with the PEFs and they started to see the utility of the thesis. Some PEFs began to show great interest and more involvement. Doors were finally opened and it was possible to deepen and discuss the preliminary findings during the third round of interviews. Therefore, the second stage was much more amicable and revealing.

The preliminary conclusions developed after the first two rounds (first stage) and a draft model were also presented to the AIFI, and to one of the PEFs interviewed (the pilot case). The aim of this presentation was to obtain feedback from specialized practitioners (the final conclusions and model are presented in chapter 7). They not only agreed on the development of such a model but also showed substantial interest in it. As a consequence, a third round aimed at both deepening the incomplete knowledge of the first interviews (the first two rounds) and being able to quantify some of the drivers revealed.
4.4.3 Summary of the Data Collection Process

To summarize, the research approach included three rounds, each including a 1-hour meeting with each PEF. The purposes of these three rounds are detailed as follows:

- First Round (March - April 2010): Introduction of the project, general questions, and analysis of the valuation process in general.

- Second Round (April – July 2010): Interview and presentation of a questionnaire with a number of questions (level 1 and level 2 questions) aimed at both revealing the nature of the ex-ante IRR and confirming the existence of the phenomena outlined in chapter 3. The first conclusions were drawn.

- Third Round (September – December 2010): The researcher introduced and tested the first conclusions and presented a new questionnaire (level 1, level 2, and level 3 questions) aiming at both deepening the first conclusions and quantifying some of the drivers found in the previous rounds.
Figure 4.8 summarizes how the whole process was planned:

**Figure 4.8 Summary of the Data Collection Process**

First stage: round 1 & 2 to 7 PEFs

- First contact with AIFI project presentation
- Pilot case & round 1 & 2
  - The researcher worked as consultant of one deal
- First 6 PEFs round 1 & 2
- Preliminary conclusions draft model
- Second contact AIFI presenting conclusions
- Pilot case testing conclusions with some PEFs
- Total approval and interest

Second stage: round 3 to all 13 PEFs

- Round 3 to 13 PEFs
- Final conclusions and model

Source: Author’s own work

Note: the researcher worked as consultant in the Pilot case one year before contacting the AIFI. However, the first two rounds of questions were assessed after the first meeting with the AIFI.
Figure 4.9 shows the process from a questionnaire point of view:

**Figure 4.9 Round of Interviews**

![Diagram of interview rounds](image)

Source: Author's own work

It is important to notice that the pilot case revealed new concepts like the threshold IRR (T.IRR)\(^{104}\). The finding of new concepts changed the direction of the research project whose first intention was to study the expected IRR (E.IRR) itself. On the contrary, it is the T.IRR that measures the perceived risk (or threshold required return) and the E.IRR that measures the expected return.

In addition, during the second round, one of the main targets of the researcher was to confirm, or otherwise, the existence of all the phenomena revealed in previous studies but from an ex-ante perspective.

An important point that could be seen as a weakness is the fact that most of the PEFs interviewed preferred to answer during the meetings directly to the researcher who had to take notes (a voice recorder was not allowed). However, the elimination of a voice recorder created a more relaxing and

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\(^{104}\) The paper of Franzoni et al. (June 2010) which was the first to mention these concepts was still to be published at the time of the data collection process (March 2010).
trustful atmosphere and facilitated the disclosure of the information (respondents were less inhibited).

Some PEFs asked the researcher to sign a non-disclosure agreement before the starting of the data collection process. Some of them also sent per e-mail the Excel files with the whole valuation of the deal and some of them even answered the questions in written form and sent them via e-mail. This is also important and helps to offset the limitations of a more formal method. Documentary evidence acts as a tool to cross-validate information gathered from interviews and observations.

In fact, previous research studies were addressed by telephonic questionnaires\(^\text{105}\) (this is an important weakness since sometimes what people say may differ from what people do). Additionally, documents provided the author with a guideline for further assistance during the interviews. The disclosure of different sources of information (personal interviews, e-mails, Excel files, and contracts in some cases), enhances the authenticity, validity and reliability of findings\(^\text{106}\).

In addition, the relatively large number of cases addressed assures the robustness and consistency of findings. In other words, it enhances the accuracy, validity and reliability of the results by capturing the holistic essence of the subjects studied.

\(^{105}\) This is the case of Manigart et al. (2002).

\(^{106}\) Although only some PEFs sent written material
4.5 Data analysis

Both quantitative and qualitative approaches were combined during the data analysis (in Chapter 6). Quantitative analysis of data collected during the third round of interviews (some of which was quantitative information) was used. This allowed the researcher to initially explore data through statistical analysis in order to find associations, cross-tabulations, correlations, key differences and patterns.

Qualitative data collected during the same three rounds of personal interviews were essential to understand causations of patterns and the correlations found through the statistical analysis. As stated in previous sections, this is the innovation of this thesis in terms of methodology as applied to this area.

For instance: Quantitative analysis was used to explore different values of T.IRR according to the type of deal and type of PEF. This might suggest if perceived risk depends on the size of the PEF or the size of the target company. However, how the PEFs calculate the T.IRR in each case, as well as which risks they perceive, cannot be assessed by looking at statistical data. Such information can only be collected and analyzed through a qualitative approach, that is: a deep explanation by respondents in each case.
Similarly, once such qualitative information was collected, arguments and methodologies explained by respondents were analyzed and compared. In fact, some of the propositions of the phenomenology approach state:

“Any attempt to understand social reality must be grounded in people’s experience of that social reality.” (Bryman, 1988:52).

According to this, phenomenology views human behavior (in this case risk perceptions and return expectations) as a product of how people interpret their world. The task of this thesis, therefore, was to capture this process of interpretation in order to grasp the meaning of PEFs' behavior and its drivers.

However, the study did not stop at capturing this process of interpretation. It has also identified the whole process of calculating the T.IRR, that is: the risk determinants perceived and priced by PEFs. By studying the sequence of actions, it was possible to find the different casual relationships between variables (a system of multiple causal paths).

In addition, the use of the grounded theory could be useful for the qualitative analysis of this thesis. In fact, the grounded theory aims to study several cases and classify them into categories. Characteristics and connections between these categories were examined as a guide to further theoretical reflection (Bryman, 1988:84). In this direction, and through the study of several cases with their possible connections and classifications, the final model was gradually elaborated into higher levels of abstraction and generalization.
4.6 Conclusion

This chapter has given the answer to the second question addressed in the introduction of this chapter: How can the object of this project be studied? First, it has shown, in section 4.2, that this thesis from an epistemological point of view is grounded on critical realism as the research philosophy. Second, section 4.3 showed that the case study method is the most suitable methodology for a realistic approach and when causation of complex phenomena needs to be investigated as is the case for this project. This kind of approach fits perfectly well for the explanatory purposes of the project and to complement past research studies.

Section 4.3.3 has explained the important role of a well-structured questionnaire survey and section 4.3.4 has exhibited some examples of case study in business research. In particular, it has been shown, as a further argument for the selection of this methodology, how those research examples have many similarities with the objective to be studied in this thesis where the complex phenomena might not be well identified and understood by merely observing statistical data.

Third, section 4.4 has described how the whole data collection process was planned and developed. Suitable attention was given to both the sample selection and the data collection procedures in order to reinforce the internal validity, the external validity and the reliability of the project. Finally, a brief introduction to the data analysis proposed for this project was given in...
section 4.5. The next chapter will exhibit all the data collected using the approach and the steps explained during this chapter.
5 DATA COLLECTION PROCESS

5.1 Introduction

This chapter will exhibit all the data collected using the approach and the steps explained in chapter 4. The violet rectangle of the Figure 5.1 includes all the stages that will be discussed herein thus limiting itself to showing the data collected. The analysis and/or conclusions of the data outlined in this chapter will be discussed in chapters 6 and 7.

Figure 5.1 Data Collection Process
The project started with an exploratory pilot case which was the first contact with any practitioners (GPs). A pilot case study held as a first step can be very helpful to ensure, as suggested before, that interview questions are suitable and effective in extracting the required information.

In fact, undertaking a pilot case study is a useful technique for refining the research question. Greenhalgh (1997) legitimises modifying the (theoretically designed) research questions after the study of the pilot case and adapting them in the light of more information about the environment.

The second step addressed the first two rounds of questions to the first 6 PEFs. As expected, this second step gave the author some preliminary “conclusions” but, at the same time, many gaps and new questions. In other words, and as planned (see in chapter 4), the research project could now be extended to a bigger sample of PEFs.

It is important to underline that accessing the PEFs’ archival information is very difficult because of the confidentiality issues. Revealing their methods, models, and experience in assessing deals is like revealing the secrets of an industrial product recipe for a pharmaceutical or food company. Without the support of the AIFI, this research project would have been impossible.

107 These first findings were shared with the AIFI which showed a great interest in the potential results of the project. The AIFI itself suggested a more extended sample including more small PEFs (since the first 6 PEFs, excluding the pilot case, were among the biggest PEFs in Italy)
This chapter is structured as follows: Section 5.2 will show the data collected during the first round, including the analysis of the valuation process, as well as the methods used by PEFs to assess their deals. Section 5.3 will describe some of the main characteristics and drivers revealed in the pilot case. Section 5.4 will detail the data collected during the second round aimed at confirming, with an ex-ante perspective, the existence of the phenomena observed in the last couple of decades of research and outlined in chapter 3. Section 5.5 will deal with the third round aimed at both deepening the knowledge acquired and quantifying some of the drivers found in the previous rounds.

5.2 First Round: Description of the Valuation Process

Some parts of the first questionnaire were directed at revealing some critical concepts connected with the valuation process necessary for understanding the nature of the risk-return drivers.

5.2.1 Investment Decision Process

The decision process depends on the type and the size of the PEF. Big PEFs assess target companies through a committee composed of some senior business analysts (between 3 and 8 members depending on each PEF). Small PEFs approach target companies through a single senior professional who analyzes the deal and presents it to the board of the PEF who finally decides on the investment. Some of the Pan-European PEFs instead, assess the deal locally, but the decision is centralized by a team of
executives in the central PEF. In this case, the decision process includes a centralized benchmarking that compares different proposed deals coming from different countries whereby the best deal is selected. Figure 5.2 shows the commonest decision-process types revealed during the interviews:

**Figure 5.2 Decision Process by type of PEF**

Source: Author’s own work based on PEFs answers

Figure 5.2 shows that greater size implies higher complexity in the decision process. Pan-European Funds have the highest complexity (centralization and bureaucracy) but, at the same time, the advantage of higher access to benchmarking (they can compare deals from different countries).
5.2.2 The Different Concepts of IRR in the Valuation Process

Prior to the data collection process, the only two concepts of IRR known to the researcher were the expected IRR (E.IRR) and the ex-post or realized IRR. The first intends to measure return expectations and perceived risks (an ex-ante point of view). The second measures the realized performance of the deals.

However, during the study of the pilot case, two new concepts of IRR were brought to light which were apparently unknown to academia since they are not identified in previous papers (see chapter 3). The first is the Threshold IRR (T.IRR) which in general should try to measure the minimum IRR necessary to compensate for the risk of a certain deal. The study of this concept is the core of this thesis: the value and the determinants of the equity premium required by PEFs when approaching their target deals.

The second is the Hurdle IRR (H.IRR) which is the minimum IRR that has to be achieved by GPs at the end of the PEF life in order to get part of the capital gain as bonus. The H.IRR is established (or legally enforced) by contract between GPs and LPs at the beginning of the PEF life and therefore it might be defined as the required return including the minimum premium by which LPs are pre-disposed to invest in a PEF. It seems that this H.IRR does not include a rational-based-method to estimate the premium to offset the

108 The author uses the term “should” because both the concept and the use of the T.IRR are not completely clear and homogeneous to the PEFs. In fact, they use different criteria to measure it and in a very behavioral way.
specific risks present in PEFs’ investments. In addition, ex-post IRR, E.IRR and T.IRR can be calculated with two different criteria:

- The Gross IRR: It is obtained by GPs when assessing a deal.
- The Net IRR: It is obtained by LPs after internal costs (fees, carried interests, etc).

Table 5.1 Definitions of the different concepts of IRR

<table>
<thead>
<tr>
<th>Type of IRR</th>
<th>Time Perspective</th>
<th>Investor Perspective</th>
<th>Concept</th>
<th>Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex-post IRR</td>
<td>Ex – post</td>
<td>Gross / Net</td>
<td>Realized return → end of PEF life</td>
<td>Ex-post</td>
</tr>
<tr>
<td>E.IRR (*)</td>
<td>Ex – ante</td>
<td>Gross / Net</td>
<td>1- Gross: Gross Expected IRR.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2- Net: LPs’ expected IRR at the end of PEFs’ life</td>
<td>Not written into any contract.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1. Only expectations resulting from a business plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2. LPs' expectations or GPs' targets.</td>
</tr>
<tr>
<td>T.IRR(1) (*)</td>
<td>Ex-ante</td>
<td>Net</td>
<td>Net LPs’ expected IRR at the end of the PEFs’ life and GPs target</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sometimes written in the contracts between GPs and LPs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Net LPs' E.IRR = Net GPs' T.IRR(*)</td>
</tr>
<tr>
<td>T.IRR</td>
<td>Ex – ante</td>
<td>Gross</td>
<td>Minimum IRR required by PEF to accept deals / Minimum IRR to offset perceived risk / Minimum IRR to meet LPs' expectations.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sometimes written in the contracts between GPs and LPs</td>
</tr>
<tr>
<td>H.IRR(2)</td>
<td>Ex – ante</td>
<td>Net</td>
<td>What LPs might earn in alternative investments → LPs' minimum required return by which LPs might be willing to invest in a PEF</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Always written in the contract between GPs and LPs</td>
</tr>
</tbody>
</table>

(*) the net LPs’ expectations (net LPs’ E.IRR) must be met by the GPs’ targets and therefore the net T.IRR (net GPs’ T.IRR → GPs’ target at the end of the PEFs’ life must be equal to the net LPs’ expectations (net LPs’ E.IRR).

109 In fact the value of the H.IRR (being a rate including a premium) has a range between 6% and 8%. Instead, the equity premium (seen in chapter 2) for quoted companies has a range between 2% and 8% being the last the most commonly used.
In this wide spectrum of concepts, it might be desirable to explain the difference between the Net T.IRR and H.IRR (in the table (1) & (2) respectively):

- **The H.IRR (2):** This is the minimum IRR required by LPs. If this target is achieved at the end of the PEF life, GPs have the right by contract to take 20% of the total capital gain achieved. This minimum value is very low (between 6% and 8% depending on each PEF). According to the GPs interviewed “this value represents what LPs lose to earn when investing in a PEF (their opportunity costs).” (stated by a GP of BIF2). Obviously, “the H.IRR is not including any extra premium for investing in a PEF.” (stated by a GP in BIF1).

- **The net T.IRR (1):** Instead, this value refers to LPs’ expectations and includes a premium for investing in a PEF. This value is between 10% and 20% depending on each PEF. According to most GPs interviewed this value is calculated according to past performance (what LPs earned in the past by investing in a PEF). This value is also defined in informal discussions between GPs and LPs regarding future expectations “We agreed with LPs about the future potential in terms of performance for the new founded fund.” (stated by a GP in REF2). However, contrary to the H.IRR, the net T.IRR is not written in any contract and remains an informal expected return for LPs and therefore a target for GPs. GPs are very motivated to achieve the minimum H.IRR in order to get their portion of the capital gain. However, GPs seek to achieve the net T.IRR in order to keep LPs happy and be able to subscribe new funding for a second fund.
In order to deepen these two types of IRR and the way in which LPs assess them, a questionnaire directed at studying LPs’ risk perceptions and return expectations is needed. This is not the scope of this thesis which focuses on GPs’ assessments alone. The study of LPs’ perceptions and expectations should require another thesis in itself. Therefore, this study will consider these two variables as given values.

These different concepts of the IRR were revealed by the pilot case. This confirms how important a pilot case might be to purge the pre-conceptions grounded only on theoretical background.

The core of this thesis is to understand the real meaning of all these three last types of IRR (E.IRR, T.IRR and H.IRR) and, hopefully, their drivers or determinants. Further sections and chapters will discuss the initial definitions given in Table 5.1 more deeply.

But why are all these different types of IRR not explicitly well distinguished by academia? In fact, all previous papers reviewed in chapter 3 talked about the IRR as a unique concept without identifying the T.IRR, H.IRR or even the difference between the E.IRR and the ex-post IRR.

According to the researcher, this is partly because almost all research papers concentrated their studies on ex-post IRR (where the E.IRR or the T.IRR which measure ex-ante perceived risks is no longer important) and this is due to three main reasons:
- First, the difficult access to approach PEFs directly forces most authors to get data from the public ex-post databases.
- Second: The influence of the positivistic approach which seeks to observe statistical data and derive conclusions based on them
- Third: the influence of the studies conducted in publicly-organized markets which also look at the ex-post information to predict the future premium.

Therefore, this work has started the first part of the data collection process by clarifying the function of the E.IRR and the T.IRR during the valuation process.

5.2.3 Introduction to the E.IRR and the T.IRR

The E.IRR is calculated as a consequence of:

1. Business plan (which considers operational risks)
2. Public market multiples (EBITDA / EV) adjusted by size and lack of marketability. Multiples are also adjusted in the case of early stages (start-ups) \(^{110}\). Operational risks and non-systematic risks can be considered for further discounts of the multiples.
3. Exit value considering different hypotheses for the exit multiple which could differ from the entry multiple (it is normally higher).

\(^{110}\) This is an important finding because until now there was no clear evidence of such level of discount for early stages. In fact Pintado et al. (2007) only suspected the existence of such a discount by studying statistical data.
In addition, the T.IRR is a fundamental tool for the PEFs’ investment decisions: if the expected ex-ante IRR (E.IRR) is superior to the T.IRR, the deal is expected to create value. In all cases, the T.IRR is estimated by GPs using intuition and past experience.

Table 5.2 illustrates (using an example) the calculation of the E.IRR in the valuation process.

### Table 5.2 Calculation of the E.IRR

<table>
<thead>
<tr>
<th>Main Data for Valuation</th>
<th>Entry Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Exit Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebitda</td>
<td>1,000</td>
<td>1,100</td>
<td>1,200</td>
<td>1,300</td>
</tr>
<tr>
<td>Market Multiple (quoted multiple)</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Size &amp; Liquidity discount (15%-30%)</td>
<td>22,5%</td>
<td>6,2</td>
<td>6,2</td>
<td>6,2</td>
</tr>
<tr>
<td>Dividend</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Interest+ Investments + WC</td>
<td>500</td>
<td>550</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Debt</td>
<td>4,000</td>
<td>3,700</td>
<td>3,350</td>
<td>2,950</td>
</tr>
<tr>
<td>Free Cash Flow</td>
<td>2,200</td>
<td>300</td>
<td>300</td>
<td>5,110</td>
</tr>
<tr>
<td>Deal Returns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money Multiple</td>
<td>2,3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.IRR</td>
<td>41%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.IRR</td>
<td>25%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excess Return</td>
<td>16%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Author’s own work based on PEFs’ answers

In this example, the E.IRR of the project (41%) is higher than the T.IRR (25%). In this example, the deal should be accepted. The E.IRR is calculated as the IRR of the free cash flows from the project (*i.e.* the deal) between the entry year and the exit year.

Finally, in the elaboration of the steps (from point 1 to point 3) applied to calculate the E-I RR, different hypotheses are used for both the business plan (operational risks) and multiples. For this reason, at the end of the valuation process, different potential results are presented and evaluated (worst case, average case, best case). See examples below:
Table 5.3 Valuation Example

<table>
<thead>
<tr>
<th>IRR expected</th>
<th>Multiple</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2%</td>
<td>36.6%</td>
<td></td>
<td></td>
<td></td>
<td>30.3%</td>
</tr>
<tr>
<td>5.7%</td>
<td>34.4%</td>
<td></td>
<td></td>
<td></td>
<td>25.8%</td>
</tr>
<tr>
<td>7.2%</td>
<td>32.2%</td>
<td></td>
<td></td>
<td></td>
<td>28.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multiple of investment</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.2x</td>
<td>1.6x</td>
<td>1.6x</td>
<td>2.1x</td>
<td>2.0x</td>
</tr>
<tr>
<td>6.7x</td>
<td>1.7x</td>
<td>2.0x</td>
<td>2.2x</td>
<td></td>
</tr>
<tr>
<td>7.2x</td>
<td>1.8x</td>
<td>2.1x</td>
<td>2.4x</td>
<td></td>
</tr>
</tbody>
</table>

Source: Excel file provided by one of the PEFs interviewed

The first part of Table 5.3 shows the E.IRR for six different scenarios. It combines three possible EBITDA multiples with three different years for the exit. It shows that the best year to exit the deal is 2006 (higher E.IRRs) and it shows the sensitivity of the E.IRR with different exit multiples.

It is very interesting to note that the maximum IRR is found in 2006 and the highest cash and cash multiple (C&C multiple) is in 2008. This is because the C&C multiple simply shows how many times the value of the investment has increased without considering the timing, thus distorting the true performance of the deal when compared with alternative investments.

Nevertheless, in some cases, this study found that both LPs and GPs adopt this method of measuring performance. One should ask why some PEFs use the C&C multiple? Is this a rational behavior? The study will try to deepen and answer these questions in further sections and in the next chapters.

Some of the PEFs interviewed use sensitivity analysis considering different levels of EBITDA with multiples:
Table 5.4 Sensibility Analysis

<table>
<thead>
<tr>
<th>Potential Exit 2007 - EV/EBITDA</th>
<th>3,0x</th>
<th>3,5x</th>
<th>4,0x</th>
<th>4,5x</th>
<th>NET DEBT 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBITDA 2007</td>
<td>14,8</td>
<td>23,20%</td>
<td>29,30%</td>
<td>34,70%</td>
<td>39,40%</td>
</tr>
<tr>
<td></td>
<td>15,9</td>
<td>28,40%</td>
<td>34,30%</td>
<td>39,50%</td>
<td>44,10%</td>
</tr>
<tr>
<td></td>
<td>17,1</td>
<td>34,30%</td>
<td>39,90%</td>
<td>44,90%</td>
<td>49,40%</td>
</tr>
<tr>
<td></td>
<td>17,9</td>
<td>36,10%</td>
<td>41,70%</td>
<td>46,70%</td>
<td>51,20%</td>
</tr>
</tbody>
</table>

Source: Excel file provided by one of the PEFs interviewed

The higher is the EBITDA at the exit year (2007), the higher the IRR. In addition, the higher is the exit multiple, the higher the IRR.

5.3 Main Characteristics and Drivers Revealed in the Pilot Case

In this thesis, the choosing of the pilot case was driven by the easy access to information as advised by Yin (2003). The PEF chosen as the subject of the pilot case is a small regional PEF where the researcher worked as consultant during a deal assessment.

5.3.1 Brief Description of the PEF and the Target Company

This fund (REF1) was established in 2007 (one year before the time of this case) and has a total committed capital of Euro 20 million. Its main objective was to acquire small privately-held companies in North-East Italy and add value by re-inforcing the management competences (partly provided by the fund) and the capital structure (equity and leverage) in order to promote growth and the internationalization of the business plans.
The target company was dedicated to the production and bottling of the first biological tomato puree and a wide range of pasta sauces based on tomatoes. The turnover increased exponentially from € 500,000 in 2004 to € 3.3 million in 2008. Its reports showed three main problems which were causing financial distress:

- First: The company was growing at a rate of 25% \( p.a \) (2008) and it was expected to grow by more than 50% in 2009. The entrepreneur could not afford to fund such required investments.
- Second: There was an abnormal level of inventories due to the lack of a healthy logistics system.
- Third: Because of these problems, the financial debt was unsustainable (Debt / Equity = 400%) and the banks wanted to exit the company. Furthermore, due to the lack of good financial reports, neither the entrepreneur nor the banks knew exactly what the problem was: Bad business or bad management?

There was only one possible solution to the problem: A capital increase. In addition, this case seemed to be a very attractive expansion deal for a small PEF. Appendix 5.1 shows all the figures of the target company as well as the valuation tables provided by REF1.

### 5.3.2 Main Drivers

**Entrepreneurial feelings:** The entrepreneur was quite reluctant to give the control of the company to a PEF due to the sentimental attachment to his business. Under these circumstances, it is very important to stress that the
entrepreneur would have never accepted to contact a PEF if he would have had any other choice to survive. “This company is my hurt, my baby I cannot sell it to someone who only wants a fast profit from it........but I do not find another alternative to save it.” (stated by the entrepreneur).

The impact of the contractual covenants: Covenants directed at reducing the risk of the deal. The PEF looked for protection, in case the business plan was not achieved. Therefore, part of the equity value of the company was subscribed as a loan (not capital increase) and was conditional on the accomplishment of certain objectives. With this policy, REF1 adopted an “outsider” position and waited to see what happened before converting the loan into equity. This mechanism is obviously directed at reducing the risk, thus reducing the initial T.IRR of 40% to 30%.

These “protection” covenants might influence the gross T.IRR (in that case the gross T.IRR was reduced from 40% to 30%). The main driver was the capital structure of the deal: That is the relationship between equity, loan and mezzanines. A deal in which a convertible loan instead of pure equity is structured reduces risks considerably according to the risk of the loan. The following figure exhibits some financial tools according to risk.
The low value of the EBITDA multiple: Considering that other similar privately-held transactions used a multiple between 7 and 9 (average of 8), and this case used 5.5, it means that there was a discount of circa 35% which, according to REF1, was based on the following drivers:

- The size of the company

- The situation of financial distress.

- Due to the urgent need of funds, the entrepreneur did not have time to search for other PEFs and therefore REF1 had no competition. In other words, the PEF took advantage of the stressful situation of the entrepreneur.

- The board of the PEF asked for a high IRR to offset the risk and the only way to do that was through a low entry multiple.
The calculation of the T.IRR:

The net T.IRR is the base to estimate the gross T.IRR:

\[
\text{Gross T.IRR} = \text{net T.IRR} + \text{Fees} + \text{Carried Interests} + \text{Other costs (1)} + \text{deal risk premium}
\]

Abort costs which are not included in the fees. For this case:

\[
\text{T.IRR} = 10\% + 2\% + 2\% + 1\% + 25\% = 40\%
\]

REF1 also stated that this 25% serves to set a high spread beyond what LPs usually expect in order to protect from unexpected events. The higher the risk perceived in the deal, the higher this spread. REF1 has no formula nor system to calculate this 25%, this is simply estimated using intuition and past experience. The main target of this thesis is to find the factors driving that 25% and to set them in a rational model.

**LPs behavioral profile in relationship with their expectations:** LPs are regional private investors from small towns. Some of them are part of the board of the PEF and some others are GPs’ friends. This type of LP is the typical regional investor that does not invest in such small funds as a result of a complex analysis of the fair risk-premium. On the contrary, they invest in this small fund out of friendship and trust.

The pilot case was the first experience with practitioners and revealed some new concepts not mentioned in the academic papers reviewed in chapter 3. This first contact with practitioners was the best way to compare theory with practice and to be able to design the definitive approach to the whole sample of PEFs.
5.4 Second Round: PEFs’ Value Drivers

This second interview with its questionnaire was aimed at assessing the existence of some of the phenomena analyzed in chapter 3. It intended to reveal if GPs perceive such drivers when evaluating a deal and how this influences their judgment in assessing the T.IRR.

The complete questionnaire is shown in appendix 5.2. Appendix 5.3 shows an example of one of those few PEFs which answered the questions by sending an e-mail. The following paragraphs will answer those questions, summarizing all the different outputs outlined by all the 13 PEFs interviewed (including the pilot case).

1. How does the LPs’ required return (net T.IRR) influence the gross T.IRR? Does the PEF’s size influence the T.IRR of the target companies? This refers to question 5 of appendix 5.2: Through this question, the researcher intended to study the performance persistence effect or a potential behavioral driver such as representativeness.

In presenting a new deal to the LPs, the expected return should at least match the target return of the whole fund. This means that

a. if a PEF offered a 15% target return to its LPs, it cannot present deals with lower returns.

b. The PEF also has to consider the internal fees and all costs retained by the PEF.
c. If the fund is performing below target, the target T.IRR for new investment will have to be higher in order to offset bad deals.
d. Big PEFs tend to buy target companies at higher multiples since they look for the best deals which can afford higher entry prices. High competition to obtain the best target companies also forces bigger PEFs to pay higher multiples. On the contrary, small PEFs tend to pay lower multiples and are forced to look for deals in which competition is low or does not exist at all. In other words, they get deals less interesting for the bigger players.

Therefore, the final IRR required should match both LPs’ expectations and PEF internal costs. LPs’ expectations and PEF internal costs might depend on the size of the PEF and the size of the PEF might depend on the GPs’ prestige.

2. How do cash flow fluctuations (LPs’ inflows) influence the T.IRR during the lifetime of the PEF? How does the number of deals available affect the T.IRR? This refers to question 6 of appendix 5.2: Money-chasing deal phenomenon.

The pressure to invest is the main factor influencing the way a fund puts its money at work. However, this pressure does not affect the targeted T.IRR directly but GPs’ risk perception. In other words, because of this pressure, GPs tend to underestimate risk. Business
plans and the expected cash flows tend to be too optimistic and therefore, the E.IRR is overestimated. The pressure to invest the capital committed as soon as possible pushes E.IRR levels closer to the threshold IRR. In contrast, PEFs tend to be more selective when the amount of money to invest is smaller. On the other side, not investing and waiting for better deals implies an important opportunity cost due to the capital which is still waiting to be invested (low returns). Therefore, it is important to balance both forces.

3. How do competitors influence the T.IRR? This refers to question 7 of appendix 5.2: Segmentation phenomenon and money-chasing deal phenomenon.

If a fund is performing below the average of comparable funds of the same vintage (i.e. its direct competitors), new deals will tend to be made with a higher expected return, in order for the fund to improve its competitive positioning and, therefore, gain better chances to get new money at the next fund-raising. Direct competitive pressure also obviously pushes fund managers to close deals with E.IRR levels closer to the T.IRR. According to one of the PEFs, this effect can be quantified between 0% and 10% (% increase in the EBITDA multiple) depending on the E.IRR and the T.IRR. Other PEFs showed a case in which that effect is observable.
4. Portfolio strategy: How does the strategy (diversification vs. specialization) affect the E.IRR and T.IRR? This refers to question 8 of appendix 5.2: Specialization effect.

Most of the PEFs argued that, advantages from diversification prevail over specialization. Except for add-on deals, usually smaller in size, synergies between portfolio companies are limited, while there is a serious risk from having portfolio investments concentrated in one sector. Other PEFs stated that both strategies (diversification and specialization) are equally used. All PEFs agreed on the fact that the T.IRR in its ex-ante perspective is not affected at all by the type of strategy chosen.

5. How does the time employed by PEF members in the target company affect the T.IRR? This refers to question 9 of the appendix 5.2: Fees-effect and monitoring intensity effect.

Most of the PEFs interviewed put a medium-to-high intensity in monitoring portfolio companies, depending on the specific need and investment strategy. Time employed also varies depending on the phase of the investment cycle: In cases in which problems in the portfolio performance arise, PEFs dedicate considerable efforts to monitoring. Time employed in the target company “active monitoring” (after the deal) does not affect T.IRR. On the contrary, high levels of monitoring planned during the elaboration of the company strategy
and the business plan might eventually increase the T.IRR or reduce the E.IRR. GPs’ fixed fees have a direct impact on the gross T.IRR.

6. How do other PEF internal costs like the carried interests influence the T.IRR? This refers to question 10 of the appendix 5.2: Fees-effect.

All 13 PEFs interviewed calculate their carried interest as follows: if the final consolidated ex-post net IRR (after fees and all costs) is superior to the hurdle rate H.IRR (the hurdle IRR is normally between 6% and 8% depending on the PEF), the GPs get 20% of the whole capital gain obtained. Carried interest and fees may condition exit strategies more than acquisitions. In order to assure the hurdle rate, GPs could exit the target company before the full potential is achieved thus avoiding unnecessary risks. GPs waiting for a minimum IRR to be achieved may accelerate the exit at a value that might not reflect full potential.

7. How does the investment speed influence the T.IRR? This refers to question 11 of appendix 5.2: Investment-speed effect.

The longer the time in finding good deals, the lower the final return for the LPs. This is a critical issue and depends on the ability of GPs in finding new deals, the number of available deals, and the intensity of the competition with other PEFs. Since the ex-post IRR is in some PEFs calculated after the draw-down date and not after the commitment date, apparently there might not be any pressure in
investing quickly to get a higher IRR. However, most PEFs recognized the existence of an opportunity cost afforded by LPs which depends on the speed in which GPs are able to invest their capital.

8. Does the calculation of the T.IRR change during the life of the PEF? If so why? This refers to question 12 of appendix 5.2: Learning cost effect.

The evolution of the calculation of the T.IRR during the life of the PEF depends on factors such as the need to invest all the capital committed. The T.IRR might tend to decrease at the end of the PEF life. This happens when there is still capital under commitment not invested. The same happens when the investing speed is too low because of the difficulty in finding suitable deals, GPs might decrease the T.IRR. However, all these factors will be explained in the next section (third round).

9. Does the number of deals affect the T.IRR? This refers to question 13 of appendix 5.2: Economies of scale and scope effect.

Three different phenomena were found:

i) Economies of Scale: Most PEFs agreed on the fact that bigger funds create more economies of scale (lower percentage of internal costs retained in the PEF) and therefore the target for the LPs is more achievable. This effect can be quantified.
ii) Diversification: more deals with smaller sizes imply higher diversification.

iii) Economies of scope: fewer deals with bigger size implies economies of scope and lower internal fees through greater efficiency.

Although these last two forces (ii and iii) oppose each other, and first intuition might suggest that there is no correlation between target size and fund performance, some of the PEFs’ managers interviewed tend to see the second one as stronger. In any case, these forces cannot be quantified. To answer this question, a study directed at comparing realized IRR of PEFs with different numbers of deals is needed.

The tables shown in appendix 5.4 summarize the results of the inquiry for each PEF interviewed.

As introduced in this section, the targets of the second round were: First, through a completely different approach (Inductive reasoning and case study method applied to an ex-ante perspective) to confirm the existence of the phenomena inferred by previous studies when observing statistical effects in an ex-post perspective. Second, to obtain an initial understanding of the factors driving both the E.IRR and the T.IRR. A third round was necessary not only to deepen the information gathered in the second round but also to assess if some of the drivers revealed in this second round could be quantified.
5.5 Third Round: Quantitative questions directed at measuring the T.IRR.

The complete new questionnaire is shown in appendix 5.5. The following paragraphs will answer those questions summarizing all the different outputs outlined by all the 13 PEFs interviewed.

5.5.1 The capital collected and under commitment

A contract between the LPs and the PEF is signed in which a certain amount of capital is under commitment and is given to the PEF only when it is necessary (that is when the deal is made). With this system, LPs can keep their money during the time in which GPs look for a deal.

However, executives from all the PEFs interviewed confirmed that an opportunity cost exists since the LPs must keep the committed capital relatively liquid (no long-term investment can be made) since the funds can be required at any time with very little time of warning in advance (only a few days in some cases). In all cases, the cash is returned to the LPs when the exit of each deal is made.

The country subsidiaries of the Pan-European Funds receive part of the capital from the mother PEF and, in this case, the capital is not under commitment but already subscribed. This means that, in such cases, the opportunity cost could be higher than those cases in which the whole capital is under commitment and therefore not received until one deal is closed. The other part of the capital is collected from LPs like any other local fund. In
addition, the Pan-European funds acquire debt from local banks. This is the only case found in which leverage is present in the fund itself.

5.5.2 The net T.IRR required by LPs

GPs’ targets and/or LPs’ expectations are not written in any contract and they are informal. However, the accomplishment of such targets is very important since it will allow the GPs to raise a new fund at the end of the life of the first fund. The higher is the final ex-post IRR (realized premium), the better the chances for the GPs to commit new capital for a new fund.

In one case (PAF1), the PEF’s target for its net T.IRR was 15% and the T.IRR for any deal was a C&C multiple of 2. This makes no sense and when the GPs were questioned about this issue they recognized that as quoted: “yes, it is true, if we want to achieve 15% net IRR for the LPs we need to double the investment in three years at the most”. Although they use a multiple, they are forced to think in terms of time and therefore an implicit IRR exists.

One PEF argued that they prefer to use C&C multiples because: GPs prefer to make a deal in 3 or 4 years with an IRR of 20% rather than a deal in one year with an IRR of 50%. Why? Because in this way, GPs keep the capital assured at a 20% IRR for four years. Otherwise, GPs have to give it back to the LPs making both the life of the PEF and the duration of fees shorter. In other words, what really matters to the GPs, is to arrive at the end of the
PEF’s life with a net ex-post IRR of 15%\textsuperscript{111} and to meet the LPs’ expectations for that period and be able to receive new capital for a new fund.

That is also why PEFs have cycles to collect new money (a new fund) each 4 or 5 years. GPs in this way follow the natural pace of deal duration target. Instead, if GPs invest in a deal with a 50% IRR for one year, for the other 3 years, they will show an IRR of zero: This means that they will not be able to meet the target and will remain without capital (and thus earn no fees).

5.5.3 Carried Interest and the Hurdle IRR (H.IRR)

The H.IRR is a minimum target established by LPs and GPs in a contract, by which, GPs can share part of the capital gain obtained at the end of the life of the fund, if they were able to achieve it. Such value is normally in a range between 6% and 8% (depending on each PEF) and GPs can get 20% of the total capital gain realized if they reach that percentage.

This is an important incentive for the GPs and this value differs significantly from the net T.IRR which is the GPs’ target to meet LPs’ expectations. This net T.IRR is in a range between 10% and 20% to LPs (depending on each PEF). But why is there such a difference between the net T.IRR and the H.IRR\textsuperscript{112}? 

\textsuperscript{111} This number depends on each PEF

\textsuperscript{112} Generally, the net T.IRR is an informal target (not written in any contract). Only in REF4, was the net T.IRR written in a contract.
The answer is simple: “The H.IRR is the minimum performance (agreed by contract) by which an investor is willing to invest in a PEF\(^\text{113}\). LPs perceive that over the hurdle rate they are earning at least what they should have earned in other investments\(^\text{114}\).” (stated by a GP of BIF2). “On the contrary, the net T.IRR is what LPs expect to earn\(^\text{115}\). It is perceived as a sufficient performance to pay for the additional risk incurred by investing in a PEF\(^\text{116}\).” (stated by a GP of BIF2). However, it is not clear for both academia and practitioners what the premium should be to offset additional risk.

In addition, the existence of the H.IRR can generate a particular behavior in GPs: the longer the time required to invest all the capital (speed effect), the more difficult it is to achieve the H.IRR forcing (in some cases) GPs to accept deals which are below the T.IRR. The same situation could also affect the timing for the deal exit: In some cases, GPs could accelerate the exit of the deal to assure an ex-post IRR superior to the H.IRR (even if it is below the net T.IRR) although the timing for the exit has not yet matured.

According to one of the PEFs interviewed (BIF3), the hurdle rate is calculated as follows:

---

\(^{113}\) The H.IRR might not include any PEF premium.

\(^{114}\) Through the H.IRR, the LPs are communicating to the GPs what they cease to earn when investing in a PEF.

\(^{115}\) LPs establish a minimum through the H.IRR but they expect to earn more than that.

\(^{116}\) The net T.IRR has more to do with risk perceptions.
According to most PEFs, both GPs and LPs base their expectations (whereby the T.IRR is estimated) on past experience and past performance. However, each type of LP has its own drivers. For instance: Private LPs normally invest in PEFs because the return is higher than that of other alternatives although they do not seem to assess the risk-return relationship in a rational way. Conversely, institutional LPs such as pension funds invest in PEFs because of a diversification plan aimed at achieving an expected long-term return target.

5.5.4 The GPs' Fees

In general, the fees for the GPs are in a range between 1.5% and 2.5% per year of the capital committed: "Big PEFs are able to ask for lower fees due to their economies of scale and this is a key issue for us small PEFs." (stated by a GP of REF2). GPs use these fees for their salaries and all the costs incurred by the PEF (e.g. monitoring, due diligences and consulting fees). If the capital committed increases, the number of executives does not increase proportionally and this creates economies of scale (GPs managing bigger PEFs can earn more than GPs in smaller PEFs).
In most cases, the fees are applied as follows: During the investment period of the fund (the first years), the percentage of fees is applied to the capital committed. Instead, at the end of the fund life, that percentage is applied to the capital still invested in deals (this is logical since at the end of the PEF life, costs are lower). However, each PEF has specific systems to calculate the fees and this affects both the T.IRR\textsuperscript{117} and the ex-post IRR.

Some PEFs apply the fee percentage to the capital invested and not to the capital committed. In such cases, capital is collected at the beginning of the PEF life (between 25\% and 35\% of the total capital under commitment) and this will be partly used to pay the PEF costs. In some other cases, the fee is applied to the capital invested and there is a transition clause for the first years in which no investments are made but fees must be paid equally.

In general, big PEFs can afford systems in which the average fee during the total life of the PEF is lower than that of the small PEF. This is due to the economies of scale which the first type enjoys. One system, for instance, implemented by the biggest PEF works as follows: They cash fees during the first 5 years and nothing during the last 5 years. This is possible only because after 5 years, they start a new fund and live out of the fees of the new fund. These PEFs leave 10\% reserves of the capital of the first fund in advance for the first 5 years fees of the second fund. This system is called: “automatic roll-off”. In this way, the impact of the fees in both the ex-post IRR and the T.IRR is much lower.

\textsuperscript{117}Since none of the PEFs interviewed applied any rational formula to assess the T.IRR, this effect is not explicitly considered.
The effect that the average percentage of fees (during the life of the PEFs) is lower for big PEFs was confirmed by most PEFs interviewed (both big and small). In addition, another phenomenon was revealed: BIF3 argued that the level of the fees also depends on the risk level of the deals and investments made by the PEF according to Table 5.5:

<table>
<thead>
<tr>
<th>Investment Type</th>
<th>Risk</th>
<th>Return</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>Higher</td>
<td>Higher</td>
<td>Between 1%-2% average over capital committed</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>Lower</td>
<td>Lower</td>
<td>Circa 0.5% over capital committed</td>
</tr>
</tbody>
</table>

**Table 5.5 Fees per Investment Type**

Source: Given by BIF3

BIF3 argued that this depends on the sector and not on the size of the companies in the portfolio: if PEFs invest in smaller companies, the risk increases, but this does not mean higher fees for GPs. BIF3 and other PEFs have a particular system to calculate the fees which is shown in Table 5.6:

**Table 5.6 Example for calculating the fees**

<table>
<thead>
<tr>
<th></th>
<th>Commitment</th>
<th>Invested value</th>
<th>Total</th>
<th>Fee (2%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>Year 2</td>
<td>80</td>
<td>25</td>
<td>105</td>
<td>2.1</td>
</tr>
<tr>
<td>Year 3</td>
<td>50</td>
<td>70</td>
<td>120</td>
<td>2.4</td>
</tr>
<tr>
<td>Year N</td>
<td>20</td>
<td>140</td>
<td>160</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Source: Given by BIF3

Table 5.6 shows that the fees percentage is applied to the sum of capital committed and capital invested. In the example of the table, the initial capital
committed is always 100 but the capital invested changes according to value created. In this way, GPs have an additional incentive to increase the value of the portfolio. Appendix 5.7 summarizes all the different systems applied to calculate the fees by each of the PEFs in the sample.

5.5.5 The Abort Costs

The abort costs include: The costs incurred in deals assessed but never closed (external advisors and due diligence). Some PEFs (specially the small ones) ask LPs to pay these costs as extra fees. This is because small PEFs cannot afford to pay all these costs from the basic fees. For a small PEF, the abort costs are very relevant due to the lack of economies of scale.

Both the T.IRR and the ex-post IRR are affected for those cases in which LPs have to fund the abort costs separately. This driver also depends on PEFs’ efficiency in closing a deal: The relationship between deal analyzed versus deals closed (Deals Analyzed / Deals closed): The higher is this figure, the lower the final ex-post IRR, and the higher should be the T.IRR\textsuperscript{118} to offset this effect. Inefficiency (high costs in both time and expenses) in closing deals directly affects the LPs’ returns.

In contrast, bigger PEFs can afford to pay these abort costs from the fees they receive and this implies no further costs for the LPs. In this case, inefficiency in closing deals affects the earnings of the GPs.

\textsuperscript{118} Idem reference 13.
5.5.6 The Cash Reserves

All PEFs keep reserves out of the capital committed. Such reserves are used to pay fees when all the capital has been invested and for unexpected events like: contingencies in the controlled deals (need for further capitalization). The reserves are calculated as a percentage over the capital committed and they vary from PEF to PEF (between 10% and 20%). Small PEFs tend to keep more reserves since they normally invest in smaller deals with more risk. “We use the reserves to pay our fees, other costs and especially in case of financial needs in our target companies.” (stated by a GP of BIF1)

“The level of reserves also depends on the risk of the portfolio. For instance: PEFs investing in start-up companies or turnarounds tend to keep higher levels of reserves. Clearly, the level of the reserves (capital not invested and therefore an opportunity cost for the LPs) affects both the T.IRR\textsuperscript{119} and the final IRR.” (stated by a GP of BIF4).

5.5.7 Write-Offs and Write-Downs – GPs’ Expectations

In some cases, the stakes acquired are lost due to the target company bankruptcy (write-off deals). In other cases, the expectations are simply not accomplished, and the value of the stakes held in the target companies is written down (“write-down deals”).

\textsuperscript{119} Idem reference 13.
Most PEFs agreed on the fact that, according to past experience, the write-off and write-down experience together is between 7% and 10% of deals (about 1 deal in every 10 or 15 has to be written off). This affects the T.IRR since, the higher the write-off expectations, the higher should be the T.IRR to offset such a loss. However, none of the PEFs interviewed consider this fact in calculating the T.IRR. Small PEFs seem to have more write-offs than big PEFs probably because they tend to accept riskier or inferior deals.

5.5.8 Opportunity Costs

A few years ago, all the capital raised by the PEFs would be transferred to them at the beginning of their lives, and kept in a bank account and invested as soon as they found a deal. This method implied an important opportunity cost during the time in which the capital was not invested. Nowadays, the capital is under commitment (as explained in section 5.5.1).

However, most PEFs argued that LPs are always calling and trying to know in advance if a new deal is near to be closed so their cash can be ready. However, GPs cannot give any answer in advance since the closing of one deal could be defined in three or four days. This issue forces LPs to keep the capital relatively ready to invest and this might generate an opportunity cost as well.

Another problem regarding the opportunity costs (which are the consequences of the speed effect) is the relationship between fees and final ex-post IRR (fees / ex-post IRR). For instance: if the PEF spends 5 years to
close its first deal instead of some months, the Fees / IRR will be bigger and this might imply an opportunity cost for the LPs. This problem affects the T.IRR and the E.IRR which should be higher to offset those effects. “Normally, a PEF spends between 2 and 5 years to invest all the capital committed. Since the life of a PEF is normally 10 years, the first 5 years are used to invest and the last 5 to disinvest.” (stated by a GP of PAF1).

In addition, in some PEFs, the ex-post IRR is calculated over the capital under commitment. In these cases, it will be very difficult to achieve the H.IRR if the PEF spends a long time in finding the first deals (this means a high opportunity cost and high pressure to invest fast).

In other cases, the final ex-post IRR is calculated based on the capital under commitment but on the capital invested in the deals (cash in and cash out). Therefore, in this case, GPs are less concerned in investing quickly (since this does not affect the ex-post IRR and the accomplishment of the H.IRR). However, pressure from the LPs exists due to the following reasons:

- During the time in which the capital is not invested, LPs have to pay the fees. The longer the “search for deals period”, the more expensive the GPs’ services.
- It is not clear if LPs calculate their net T.IRRs on the capital committed or on the capital invested. Since this is an informal (un-written) expectation, each investor might have its own point of view.
- LPs must keep the capital committed relatively liquid and ready to invest since a deal might be close in a few days time.

120 Idem reference 13.
These three situations might generate an opportunity cost while the capital is not invested and this situation presses GPs to invest as fast as possible in order to reduce this effect.

In any case, it is important to consider that each PEF has its own type of contract and they are evolving continuously. In the future, and due to the higher competition (among PEFs) and due to the current financial crisis, LPs might not want to pay fees during the time in which capital is not invested.

The new contracts might force GPs to finance the first years of the PEFs from their own pockets. Such a situation might change the speed effect considerably. From one side, the opportunity cost incurred by LPs will be lower and from the other side, the speed effect might be higher, since GPs will be forced to invest very fast in order to receive an income.

“The opportunity cost of the capital not invested is mitigated in the case of captive funds. Captive funds do not have private LPs, but banks. Banks might have more possibilities to invest in efficient portfolios (efficient risk-return portfolios) than do private investors.” (stated by CAP1).

One of the captive funds (CAP2) is specialized in only one industry and it claims to be faster to invest the capital because of such specialization. “Since we work in a niche, we possess a network of contacts and do not lose time searching for deals.” (stated by a GP of CAP2). They claim that due to this specialization, they are able to add know-how to the target companies and add more value out of the synergies they have. Furthermore, since they do
not buy the majority of the target company, this gives them access to a bigger spectrum of deals¹²¹. In addition, such specialized funds suffer less competition from other PEFs due to their own specialization, know-how, synergies, niche presence and relationship with entrepreneurs.

As stated in section 5.5.4, the opportunity cost of LPs might be the H.IRR because that is the return that LPs are able to obtain outside the PEF. Other PEFs instead argued that the opportunity cost should be measured using the net T.IRR or LPs’ expectations. In addition, there are some PEFs which stated that such an opportunity cost does not exist if the LPs’ portfolio is ideally well managed in terms of risk-return payoff.

Regarding the speed effect, one PEF answered that: “LPs want a high return (that is why they invest in PEFs), and not speed. High returns can be obtained through good deals made at the end of the PEF life although GPs spend a lot of time looking for high quality deals. In other words, good deals at the end could offset the delays at the beginning.” (stated by a GP of PAF2).

### 5.5.9 The T.IRR and its Calculation

Some PEFs have a general gross T.IRR and apply it to all deals equally. On the contrary, other PEFs assess the gross T.IRR for each deal according to

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¹²¹ Entrepreneurs do not like to lose the majority of their business. This is especially true in Italy where families are so attached to their fount of wealth and where companies are a part of their livings, feelings and traditions.
the risk of that single investment. Therefore, for these last PEFs, the gross T.IRR can be split into two further types:

1. The gross T.IRR for the whole PEF: this is the minimum GPs’ target for the PEF as a whole.
2. The gross T.IRR for the single deal: this is the minimum GPs’ target which considered the risk involved in each deal.

**Figure 5.4 Determinants of the Gross T.IRR**

As shown in Figure 5.3, the difference between (3) and (2) is only the internal PEFs’ costs. The difference between (1) and (2) is the portfolio diversification (for some PEFs) and the synergy effects due to specialization (for other PEFs).

Among those PEFs which argued in favor of diversification, one of them stated that: “Sector diversification is not the most important driver but the number of deals is the more relevant point.” (stated by BIF4). According to this PEF, capital concentration in a few deals increases the probability that
the total T.IRR might not be achieved. In concentrated portfolios, the failure of one deal might threaten the success of the entire fund. See Figure 5.4

**Figure 5.5 Downside Risk**

<table>
<thead>
<tr>
<th>Probability of Failure (Downside Risk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 deals</td>
</tr>
<tr>
<td>100 deals</td>
</tr>
</tbody>
</table>

*Source: Author’s own work based on PEFs’ answers*

In most cases, both the net T.IRR and the gross T.IRR are estimated according to experience and intuition. For instance, one of the GPs of BIF2 stated:

“We estimate a net T.IRR of 20% because in the past we have got 30% *(ex-post)* and therefore 20% is absolutely achievable and should be set as a target”.

Another interesting phenomenon revealed in the interviews is the fact that the T.IRR might tend to decrease at the end of the PEF’s life. This happens when there is still capital under commitment but not yet invested. There is always pressure from LPs to invest all the capital as fast as possible. In order to avoid such problems, PEFs tend to reduce the T.IRR (at the end of its life),
and accept deals which might not have been accepted at the beginning of the PEF’s life.

**Figure 5.6 The T.IRR evolution**

![Graph showing T.IRR evolution with T.IRR on the y-axis and Year 7, Year 10 on the x-axis, with T.IRR values 20% and 15%.]

Source: Author’s own work based on PEFs' answers

Figure 5.5 shows a case in which the effects appear in year 7 but the timing for this to happen depends on the liquidity left in the PEF. Sometimes, there are covenants (between LPs and GPs) regarding the T.IRR and therefore this variable cannot be reduced so easily. In such cases, PEFs prepare more optimistic business plans thus getting the same effect as if they have reduced the T.IRR.

However, one of the PEFs interviewed (BIF2), argued that it spent more than 5 years to invest 80% of the capital and the rest was not invested because they did not find the right deal. In this case, the PEF preferred to “sit on” the
capital instead of investing it. The same PEF said that they analyzed approximately 80 deals per year from which only 10 were closed (10/80)\(^{122}\).

This timing effect (shown in Figure 5.5) can work against the so-called speed effect. In the speed effect, the slower the PEF is to invest, the worse the performance. However, reducing the T.IRR to accelerate the investment process could mean bad deals and therefore low performance as well.

Captive PEFs tend to have lower T.IRRs (the net T.IRR is between 6% and 10% and the gross T.IRR between 9% and 12%). When asked why, they argued that “It has to do with the level of the Euribor + internal costs+ premium (which is estimated at 3%).” (stated by CAP1). According to the observations, some of the reasons might be:

- Banks do not have opportunity costs while the capital is not invested,
- Lower internal costs (lower fees and lower carried interest: one of them does not have carried interest),
- Lower management costs: they buy only minority shares,
- Lower risk deals with low leverage,
- More flexibility in terms of timing (holding period). They do not have to exit the deal in 3 or 4 years, and therefore they can concentrate their business plans on long-term value creation,
- Deals analyzed per deal closed is 1/5 compared to the 1/8 of some BIFs,

\(^{122}\) There might be two different rates to consider: Deals Closed / Deals analyzed in detail and Deals closed & deals proposed. For instance: REF 4 gave the following rates: The first is normally 1/5 and the second 1/25.
- No immobilized reserves (if there is an unexpected event, the bank itself will provide the funds required).

CAP2 is specialized in only one industry: The food industry. It claimed that the advantages of specialization are: less risk, more synergies, more information, deep network, and lower internal costs. All these drivers have a direct impact in the T.IRR. In fact, CAP2 argued that they have generalist PEFs in other countries and, in such cases, the T.IRR is much higher.

Most PEFs also stated that in past years, T.IRR has decreased (in 1990 it was about 30% and now is about 20%). Why is this happening? Is it because most analysts are saying that future premiums will be lower than the past premium (see chapter 2)? The answer to this question was unanimously: No!. This is happening for three main reasons:

1. Nowadays there are more funds and competition between them is higher.

2. There are less available deals.

3. LBOs are near extinction: The financial crisis and the lack of credit are affecting the type of deal. Furthermore, most target companies are already leveraged. This situation not only reduces the number of target companies but changes the type of approach PEFs used to have. They must look now for expansion deals, that is, companies with growth potential. Leverage was the main driver “to create” short term value (in 3 or 4 years). “Expansion deals instead, have long-term business plans (5 or 6 years), better management, higher risk, more know-how, and synergies.” (stated by a GP of BIF1).
However, other PEFs argued that there are other new drivers that might have an impact in the T.IRR. Some of them could even offset the drivers of the previous paragraphs:

4. PEFs are now enhancing their deals with lower sourcing and production costs using imports from China. They are able to offer these cost reductions to companies that produce in the EU at high costs.

5. In the past, funds were smaller thus approaching smaller deals with higher risk. Nowadays instead, funds are much bigger and can approach bigger companies with lower risk.

6. PEFs have more experience and are more selective than in the past.

The last three items might reduce the T.IRR. Regarding item 5, GPs have also an incentive to invest in a few bigger deals rather than in many small deals. This is due to the fact that by managing big deals, they can create economies of scale. They need fewer executives and therefore the fees are distributed to fewer executives. On the other side, they lose diversification, thus increasing risk and affecting the T.IRR negatively.

The tables shown in Appendix 5.6 summarize the main quantitative data of the sample.
5.6 Summary

This chapter has exhibited the data collected during the three rounds of interviews. It has limited itself to outlining the data collected as well as the opinions of the GPs interviewed, deferring any conclusion, analysis or researcher opinions. However, the approach used, as well as the information collected, are very revealing and, it is claimed, pioneering when compared with past research (see chapter 3).

The next chapter concentrates on the analysis, interpretation and comprehension of this data. As stated in chapter 4, this work uses both quantitative and qualitative analysis. Finally, chapter 7 will eventually present a model to assess the risk premium and, therefore, the T.IRR, in a more systematic way.
6 QUANTITATIVE ANALYSIS - FINDINGS

6.1 Introduction

The aim of chapter 5 was to exhibit some of the data collected. It has limited itself to outlining the opinions of the GPs interviewed, deferring any analysis of the information. In contrast, the aims of this chapter are to present the quantitative analysis and to exhibit the basic data in order to provide the foundations for a more detailed evaluation, discussion and interpretation which, in turn, will be deferred to chapter 7.

Quantitative analysis of data collected allows the researcher to initially explore data through statistical analysis in order to find associations, cross-tabulations, correlations, key differences and patterns.

However, and as stated in chapter 4, since “we cannot directly infer a causal effect from a statistical effect” (Marsh, 1988: 229), qualitative data collected will also be necessary to find causations of patterns and comprehend the correlations between variables found through the statistical analysis.

For instance: How PEFs calculate the T.IRR in each case, as well as which risks they perceive cannot be only assessed by looking at statistical data. Statistical data should be complemented with a qualitative approach, that is: a deep explanation of respondents in each case: “Any attempt to understand social reality must be grounded in people’s experience of that social reality”
(Bryman, 1988:52). This is one of the innovations of this thesis in terms of methodology.

Therefore, the chapter will start with the analysis of the identified phenomena (see chapter 3) and their impact on the T.IRR. They will be studied as potential determinants of the risk premium and, hence, of the T.IRR. But is it possible to trust this variable as assessed by GPs?

Section 6.3 will address this question: To start with section 6.3.1 lists the general drivers of the business plan and how they influence the T.IRR. Thereafter, section 6.3.2 will outline all the techniques used in this sample of PEFs to estimate the T.IRR. In addition, section 6.3.3 will analyze how the size of the funds and the deals affect the T.IRR. Subsequently, section 6.3.4 will explore how the net T.IRR is defined and how this influences the gross T.IRR. Finally, section 6.3.5 will exhibit the general determinants of the T.IRR as considered by GPs.

6.2 Analysis of the Phenomena

As seen in chapter 5, the first four phenomena (money-chasing deals, fees and speed effect, performance persistence), and some behavioral factors have been confirmed by all PEFs. Regarding the last two phenomena (specialization vs. diversification and monitoring intensity), there were contradictory opinions and, at the same time, very revealing answers that needed to be analyzed. Through the use of quantitative analysis, this section
will shed light on the existence of those phenomena thus confirming the opinions of the PEFs interviewed.

The tables in the Appendix 5.6 show the data for 13 PEFs and 26 deals. The size of this sample might be considered enough for a qualitative in-depth (case study method) analysis. However, for quantitative / statistical analysis, this is a small sample which might show some bias. For instance: the lack of a bigger number of specialist funds might result in incomplete conclusions.

The table in Appendix 5.7 exhibits the percentage of fees applied by each PEF. However, in order to calculate the true cost generated by the fees it is necessary to account for each method applied by the PEFs to assess the fees. Therefore, a new concept must be defined: The expected fees (EF). Appendix 6.1 exhibits and explains how to calculate the EF factor according to each method used by each PEF.

6.2.1 Money-Chasing Deals Phenomenon

Do bigger PEFs have access to better deals or, at least, can they afford to pay more for them? This refers to chapter 5, section 5.1, questions 1 and 3. The following analysis will try to answer this question.
Figure 6.1 shows the entry value that the PEFs can afford to pay. The boxplots\textsuperscript{123} illustrate the distribution of the market value discount\textsuperscript{124} for big\textsuperscript{125} and small PEFs. The variable entry discount refers to the market value\textsuperscript{126}. If the entry discount is below zero, the PEF has paid an EBITDA multiple superior to that of the market. Instead, if the entry discount value is positive, the market value has been discounted.

\textbf{Figure 6.1 Entry Discounts per PEFs' size}

![Boxplot showing entry discounts per PEFs' size](image)

\textbf{Source: Author's own work}

\textsuperscript{123} In descriptive statistics, a boxplot is a convenient way of graphically displaying differences between populations A boxplot may also indicate which observations, if any, might be considered outliers. The spacing between the different parts of the box help indicate the degree of dispersion (spread) and skewness in the data.

\textsuperscript{124} Market value discount refers to the multiple of the EBITDA.

\textsuperscript{125} The analysis has assumed that big PEFs are those whose capital under commitment (CC) is higher than € 100 million. In the sample under analysis, there are 8 big PEFs and 5 small PEFs. In Italy, PEFs with a CC higher than € 100 million are considered big. PEFs with lower amounts of CC are normally small regional funds.

\textsuperscript{126} The market value of the target companies is calculating using the EBITDA multiples from comparable companies in the organized public markets. These multiples are shown and their discounts are shown in the tables of the appendixes 5.6 and 5.7.
Figure 6.1 clearly shows that big PEFs tend to pay more for their target companies than the small ones. In addition, Figure 6.2 confirms a negative correlation (-0.75) between the two variables (the bigger the PEFs, the higher the price paid).

**Figure 6.2: Correlation – Entry Discount / PEF size (CC)**

In the figure 6.2 an x-axis and a y-axis were inserted because there are in both cases negative values that had to be shown in the diagram.

The Pearson correlation\(^{128}\) of the variables shown in Figure 6.1 has a value of -0.75 and is significant\(^{129}\) at the 0.01 level (2-tailed). Figure 6.2 also shows

\(^{127}\) Capital Committed (CC).

\(^{128}\) Capital Committed (CC).

\(^{129}\) Capital Committed (CC).
an outlier\textsuperscript{130} point: That is CAP2 which is a big and specialized captive fund that claims to buy into its target companies at low EBITDA multiples because of the specialization and the niche in which it operates. The know-how in its sector allows it to buy companies that other PEFs do not seek (no competition).

This analysis might answer the question: Do bigger PEFs have access to better deals or at least can they afford to pay more for them? This sample suggests the former! This might mean that they have access to higher expected cash flows and E.IRR to achieve a higher T.IRR. It could also mean that they have access to cash flows with lower operating risk.

\textsuperscript{128}The Pearson correlation coefficient is a measure of the correlation (linear dependence) between two variables, giving a value between +1 and −1 inclusive (the nearest the correlation to +1 or -1, the higher the correlation). It is very useful to measure the strength of linear dependence between two variables (Field 2005).

\textsuperscript{129}A result is called statistically significant if it is unlikely to have occurred by chance. Levels of significance of 10% (0.1), 5% (0.05), 1% (0.01), 0.5% (0.005), and 0.1% (0.001) are informally referred to as “statistically significant”. The lower is the significance level, the stronger the evidence. (Field, 2005)

\textsuperscript{130}Winsorising is the transformation of statistics by limiting extreme values to reduce the effect of possibly spurious outliers. The distribution of many statistics can be heavily influenced by outliers. A typical strategy is to set all outliers to a specified percentile of the data; for instance, a 90% Winsorisation would see all data below the 5th percentile set to the 5th percentile, and data above the 95th percentile set to the 95th percentile (Hastings \textit{et al.}, 1947).
6.2.2 Internal Fees, LPs’ Pressure and Speed Effect

Does the net T.IRR (LPs’ expectations which are equal to GPs’ targets) really influence the definition of the gross T.IRR (LPs’ pressure)? Are bigger PEFs able to have lower fees (economies of scale) thus increasing the net T.IRR and the relationship between this variable and the gross T.IRR? These questions are related to section 5.4 (questions 5, 7 and 9) and sections 5.5.2, 5.5.4, 5.5.8, and 5.5.9 of chapter 5.

The first question might be observed by looking at the correlation between the Gross T.IRR (GPs’ minimum target when assessing deals) and the net T.IRR (LPs’ expectations net of fees, carried interests, and other costs).

Figure 6.3 Correlation – Gross T.IRR / Net T.IRR

Source: Author’s own work
The correlation coefficient of the variables shown in Figure 6.3 has a value of 0.703 and is significant at the 0.01 level (2-tailed). This suggests that GPs use the net T.IRR as a base input (base cost of capital) to assess the gross T.IRR and the risk of their deals. Clearly, this does not explain how the speed effect works to offset the opportunity costs but it might confirm that GPs are pressured by LPs’ expectations (net T.IRR).

The correlation between speed (measured in expected years to invest) and gross T.IRR is analyzed in Figure 6.4.

**Figure 6.4: Correlation – Speed.Y / Gross T.IRR**

The correlation coefficient between the variables shown in Figure 6.4 has a value of 0.66 and is significant at the 0.05 level (2-tailed). This might imply
that GPs consciously seek the right balance between the speed and the gross T.IRR. In fact, if the gross T.IRR is too high, it would be difficult to close deals and investment speed might be too slow, thus implying a high opportunity cost. On the contrary, if gross T.IRR is low, the investment process might be fast but with higher probabilities of acquiring bad deals. A low gross T.IRR might make it difficult to achieve the net T.IRR.

However, it is important to consider what the “the speed years” refers to: In how many years the GPs are expected to invest\textsuperscript{131}. Therefore, these are only vague expectations that the GPs had at the beginning of the fund’s life and these results should be taken with caution. In other words, the last correlation might not be enough to conclude that GPs were rational in defining the gross T.IRR in relation to the expected investment speed.

Another important variable to analyze is the expected fees by PEF size and type. Do bigger PEFs create economies of scale in terms of fees? Do bigger PEFs convert these economies of scale into better returns for the LPs?

\textsuperscript{131} The figure 6.4 shows again that CAP2 is an outlier (expected investment speed = 6 years). In fact, this PEF does not consider investment time as variable. As a captive fund, it does not have LPs behind pressuring and it can concentrate on a long-term oriented policy.
Figures 6.5 might answer the second question. In fact, these figures show that there are significant differences in the expected fees (as percentages of fees) between big and small PEFs and this might confirm that bigger PEFs are able to have lower expected fees (EFs) thus improving LPs’ returns. The first question might be answered through Figure 6.6:

Figure 6.6 clearly shows that big PEFs create economies of scale (higher fees per executive). Therefore, big PEFs are able to have lower expected fees (EF) percentages which imply higher returns of the LPs. At the same time, big PEFs (even if they have lower fees in terms of EF percentage) create internal economies of scale which allow them to have higher salaries.
and more cash to face internal costs (consultants, due diligence and other costs).

6.2.3 Performance Persistence

Do bigger PEFs expect to give bigger returns to the LPs than small PEFs, thus becoming more attractive to LPs? This question refers to chapter 5, section 5.4 (questions 1,2,3,6, and 8) and sections 5.5.2 and 5.5.9 and could be answered by investigating whether bigger PEFs have higher targets in term of net T.IRR and H.IRR than do smaller PEFs (see Figure 6.7).

![Figure 6.7 H.IRR by Type of PEF](image)

Source: Author's own work

Figure 6.7 suggests that Big Italian Funds (BIFs) and Pan-European Funds (PAFs) (both types include big funds) have higher H.IRRs than Small Regional Funds (REFs). Captive funds (CAPs) have the lowest H.IRRs because they do not have single LPs as investors but their parents are banks. In fact, CAPs claimed, during the interviews, to have lower risk than the other types of funds.
Figure 6.8 suggests again that BIF and PAF funds (both types include big funds) have higher net T.IRRs than REF funds (small regional funds). CAP2 shows a very low net T.IRR (6%) and, this again, might confirm the low risk they perceive by working in a specialized niche. Conversely, CAP1 being a generalist exhibits a high net T.IRR of 20% which is in line with that of big PEFs.

But is this due to the fact that big PEFs have access to better deals (as shown when analyzing the money-chasing deals phenomenon)? Is it due to the fact that big PEFs can accept lower fees thus increasing the LPs’ return (as shown in section 2.2)? Or is it because of both things?

Do big PEFs have access to better deals? Figure 6.9 investigates if they have better expectations (higher E.IRR average which is based on their business plans).
The plot figure on the left shows that, the E.IRR averages of small and big PEFs are the same. The figure on the right exhibits a higher E.IRR for the BIFs. It is important to consider that big PEFs have access to bigger deals which imply lower risk due to size. Figure 6.10 shows the correlation between capital committed and E.IRR.
Figure 6.10 shows that the correlation between these two variables is weak (0.47). However, if only one PEF (the outlier circled in red) is taken out from the sample (REF1)\textsuperscript{132}, one obtains a correlation of 0.629 (level of significance of 0.05 2-tailed) which might imply that bigger PEFs have access to better deals\textsuperscript{133}.

\textsuperscript{132} REF1 was the pilot case studied in chapter 5. Since the GPs had no prior experience, their business plans might have been overestimated. In addition, since the owner was forced to make the deal (due to the financial distress situations), the price paid was very low thus increasing the E.IRR.

\textsuperscript{133} The reason why this conclusion can be suggested is the following: Deals with bigger E.IRRs might imply companies with higher potential to add value. The correlation shows that bigger PEFs have deals with higher E.IRRs and, therefore, one might conclude that bigger PEFs have access to better deals.
At first sight, it might seem too heroic to conclude with such a statement. Since the E.IRR depends on expectations based on cash flows which express the way that different GPs working in different PEFs perceive the future of those businesses, it is not possible to know whether high E.IRRs are due to optimistic GPs, good deals, or both. Conversely, it is logical to think that bigger PEFs with more experienced professionals are able to elaborate more realistic business plans than small PEFs. Therefore, considering this last assumption, the statement of the previous paragraph becomes stronger.

Using another point of view, it is also possible to study the reason why bigger PEFs expect to deliver higher performance to their LPs. Table 6.1 might also offer an explanation:

<table>
<thead>
<tr>
<th>Size</th>
<th>.(1) E.IRR</th>
<th>.(2) gross T.IRR</th>
<th>.(3) net T.IRR</th>
<th>Size</th>
<th>.(1) E.IRR</th>
<th>.(2) gross T.IRR</th>
<th>.(3) net T.IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIF2</td>
<td>26,1%</td>
<td>30,0%</td>
<td>22,5%</td>
<td>REF1</td>
<td>38,5%</td>
<td>32,5%</td>
<td>10,0%</td>
</tr>
<tr>
<td>BIF1</td>
<td>43,0%</td>
<td>20,0%</td>
<td>15,0%</td>
<td>REF3</td>
<td>25,0%</td>
<td>20,0%</td>
<td>15,0%</td>
</tr>
<tr>
<td>CAP1</td>
<td>42,0%</td>
<td>25,0%</td>
<td>20,0%</td>
<td>REF2</td>
<td>30,0%</td>
<td>17,5%</td>
<td>10,0%</td>
</tr>
<tr>
<td>PAF1</td>
<td>26,4%</td>
<td>15,0%</td>
<td>16,0%</td>
<td>REF4</td>
<td>19,0%</td>
<td>18,0%</td>
<td>15,0%</td>
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<tr>
<td>BIF4</td>
<td>23,5%</td>
<td>19,9%</td>
<td>14,5%</td>
<td>Average</td>
<td>28,1%</td>
<td>22,0%</td>
<td>12,5%</td>
</tr>
<tr>
<td>PAF2</td>
<td>37,5%</td>
<td>30,0%</td>
<td>25,0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>BIF3</td>
<td>23,0%</td>
<td>20,0%</td>
<td>15,0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAF3</td>
<td>29,0%</td>
<td>24,0%</td>
<td>15,0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>31,3%</td>
<td>23,0%</td>
<td>17,9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Source: Author’s own work**

Table 6.1 shows how a higher E.IRR of big PEFs might be translated into higher gross T.IRR and net T.IRR. The difference between the gross T.IRR and the net T.IRR should be the fees and other internal costs. Since the
difference between big PEFs and small PEFs regarding the gross T.IRR and the net T.IRR is much higher than the difference between the E.IRR and the Gross T.IRR, this could imply that big PEFs expect, or are able, to give better returns to their LPs (net T.IRR) by building on both better deals and lower fees.

As seen in chapter 5, some PEFs also claimed that the T.IRR has decreased in the last years (see chapter 5, section 5.4.1 question 8). In order to investigate this phenomenon, Figure 6.11 shows the old PEFs (older than 10 years)\textsuperscript{134} and the young PEFs with the T.IRR distribution.

\textbf{Figure 6.11 Old vs. Young PEFs}

\begin{figure}
\centering
\includegraphics[width=0.45\textwidth]{figure611}
\caption{Old vs. Young PEFs}
\end{figure}

\textbf{Source: Author’s own work}

Figure 6.11 might suggest that old PEFs tend to maintain a higher T.IRR. Conversely, new entrants tend to have lower T.IRRs. But who are the old PEFs? The answer seems to be obvious. The old PEFs are the biggest whose GPs have a long experience, and prestige. By analyzing this figure, it

\textsuperscript{134} Why 10 years? The oldest fund in this sample dates from 1991 and the newest from 2010. Under these circumstances, it seems logical to compare both decades (the 1990s and the 2000s).
is not possible to conclude that the T.IRR has decreased in the last few years\textsuperscript{135}, but it is possible to infer that the performance persistence exists since the old PEFs are able to maintain a higher T.IRR.

### 6.2.4 Specialization vs. Diversification

The interviews revealed that there is not a unique strategy but both specialization and diversification can work and add value. In fact, there are two types of funds in this sense: The generalist and the specialist. Unfortunately, this sample provides only one specialist fund (CAP2). This fund is a captive fund specialized in the food industry with the lowest T.IRR in the sample: Net T.IRR of 6%; Gross T.IRR of 12\%\textsuperscript{136}. In addition, this PEF argued that the bank also holds generalist funds whose T.IRR is higher than that of the specialist (approximately 10\% for the net T.IRR and 16\% for the gross T.IRR).

But how can that be so? At first glance, this might seem to contradict traditional finance and its portfolio theory\textsuperscript{137} in favor of the resource-based theory as Manigart et al. (2002) suggested. Obviously, there is another question to address before expressing a position regarding these issues: Is

\textsuperscript{135} To arrive at such a conclusion, it would be necessary to study the evolution of the T.IRR during the last two decades. Since this project does not have such information, it must trust in the answers, experience and memory of the people in the GPs interviewed.

\textsuperscript{136} These values are at least half the average which is circa 25\% for the gross T.IRR.

\textsuperscript{137} According to portfolio theory (Markowitz, 1952, 1959) an investor can reduce portfolio risk simply by holding combinations of instruments (diversification) which are not perfectly positively correlated.
the T.IRR so low because this is a captive fund or because of the specialization forces, as CAP2 claims?

The answers to these questions seem to be very simple and related to the nature and the determinants of the T.IRR itself (the core of this thesis). The net T.IRR measures only risk (risk perceived by LPs), but the gross T.IRR measures both risk and costs\(^{138}\) (the PEF internal costs: opportunity costs, fees, reserves, carried interest, etc).

Therefore, the gross T.IRR is driven by both forces: the resource-based theory (RBT) for the internal costs and the portfolio theory (PT) for the systematic risk. In other words, the gross T.IRR has a risk component and a cost component. The first answers to the PT, as finance theory would predict, and the second to the RBT. That is why, both strategies are used and PEFs might obtain a profit from both depending on the circumstances. But in order to assess which strategy is stronger, it is necessary to calculate the importance of the cost component in comparison with the gains from diversification.

\(^{138}\) As seen in previous sections, captive funds (CAPs) tend to have lower internal costs. This might explain the low difference between the net T.IRR and the gross T.IRR (Net T.IRR = 6\% and Gross T.IRR = 12\% which makes a difference of only 6\% next to a median of 7,5\%). However, the net T.IRR (which might imply risk net of costs) is also the lowest net T.IRR in the sample. Since, CAP2 argued that the bank also holds generalist funds which T.IRR is higher than that of the specialist (\textit{circa} 9\% for the net T.IRR and 16\% for the gross T.IRR), it is possible to assume that both forces are working here: Lower risk perception due to the specialization (because the low value of the net T.IRR), and lower internal costs due to both specialization and the nature of a captive fund.
If the net T.IRR expresses the risk perception of the PEF portfolio, and the gross T.IRR is equal to the net T.IRR plus internal costs, then the difference between the gross T.IRR and the net T.IRR might be equal to internal costs (or, at least what GPs, estimate as internal costs). However, this statement might not be completely true for those PEFs which assess the risk of each single deal as seen in the previous section. In these cases, the gross T.IRR might also include a risk component related to the deal. Therefore, it is necessary to estimate the PEFs' internal costs independently from the gross T.IRR. Table 6.2 shows these estimations.

Table 6.2 Gross T.IRR

<table>
<thead>
<tr>
<th>Type of PEF</th>
<th>Carried Interest</th>
<th>Net Consol T.IRR</th>
<th>Int Costs - without write-off &amp; opp.c (1)</th>
<th>Net T.IRR - gross T.IRR (2)</th>
<th>(1) - (2)</th>
<th>Deal 1</th>
<th>Gross single deal T.IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIF2</td>
<td>8%</td>
<td>22,5%</td>
<td>1,06%</td>
<td>7,50%</td>
<td>7,56%</td>
<td>-7,14%</td>
<td>Deal 1 30,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 30,0%</td>
</tr>
<tr>
<td>BIF1</td>
<td>8%</td>
<td>15,0%</td>
<td>0,94%</td>
<td>4,94%</td>
<td>5,00%</td>
<td>-1,17%</td>
<td>Deal 1 20,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 20,0%</td>
</tr>
<tr>
<td>CAP1</td>
<td>5%</td>
<td>20,0%</td>
<td>1,26%</td>
<td>6,26%</td>
<td>5,00%</td>
<td>20,06%</td>
<td>Deal 1 25,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 25,0%</td>
</tr>
<tr>
<td>PAF1</td>
<td>7%</td>
<td>16,0%</td>
<td>1,16%</td>
<td>6,16%</td>
<td>9,00%</td>
<td>-46,05%</td>
<td>Deal 1 25,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 25,0%</td>
</tr>
<tr>
<td>REF1</td>
<td>8%</td>
<td>10,0%</td>
<td>1,41%</td>
<td>7,91%</td>
<td>22,50%</td>
<td>-184,39%</td>
<td>Deal 1 40,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 25,0%</td>
</tr>
<tr>
<td>REF3</td>
<td>6%</td>
<td>20,0%</td>
<td>1,53%</td>
<td>4,53%</td>
<td>-5,00%</td>
<td>210,50%</td>
<td>Deal 1 15,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 15,0%</td>
</tr>
<tr>
<td>BIF4</td>
<td>7%</td>
<td>25,0%</td>
<td>1,23%</td>
<td>9,13%</td>
<td>14,50%</td>
<td>-58,80%</td>
<td>Deal 1 44,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 25,0%</td>
</tr>
<tr>
<td>REF2</td>
<td>6%</td>
<td>10,0%</td>
<td>1,97%</td>
<td>5,47%</td>
<td>7,50%</td>
<td>-37,06%</td>
<td>Deal 1 17,5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 17,5%</td>
</tr>
<tr>
<td>PAF2</td>
<td>8%</td>
<td>25,0%</td>
<td>1,00%</td>
<td>7,00%</td>
<td>5,00%</td>
<td>28,57%</td>
<td>Deal 1 30,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 30,0%</td>
</tr>
<tr>
<td>BIF3</td>
<td>8%</td>
<td>15,0%</td>
<td>1,51%</td>
<td>5,91%</td>
<td>5,00%</td>
<td>15,40%</td>
<td>Deal 1 20,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 20,0%</td>
</tr>
<tr>
<td>REF4</td>
<td>8%</td>
<td>15,0%</td>
<td>1,48%</td>
<td>5,08%</td>
<td>3,00%</td>
<td>40,94%</td>
<td>Deal 1 18,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 18,0%</td>
</tr>
<tr>
<td>PAF3</td>
<td>8%</td>
<td>15,0%</td>
<td>1,00%</td>
<td>5,80%</td>
<td>9,00%</td>
<td>-55,17%</td>
<td>Deal 1 23,0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 23,0%</td>
</tr>
<tr>
<td>CAP2</td>
<td>0%</td>
<td>6%</td>
<td>0,71%</td>
<td>3,21%</td>
<td>6,50%</td>
<td>-102,49%</td>
<td>Deal 1 10,0%</td>
</tr>
<tr>
<td></td>
<td>no carried interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Deal 2 15,0%</td>
</tr>
</tbody>
</table>

Source: Author’s own work

Table 6.2 estimates the value of the internal costs without accounting for the opportunity costs and write-off costs. These last costs have been excluded.
from the calculations because PEFs do not consider them when estimating the T.IRR.

\[
\text{Internal Costs (1) = [ CG.GP x Gross T.IRR] + [Expected Fees (EF)]}
\]

Where:

CG.GP: is the capital gain acquired by GPs if the final IRR (ex-post IRR) is achieved. This value is 20% for the non-captive funds and 0% for captive funds.

[CG.GP x Gross T.IRR]: are the carried interests or the expected capital gain. That is the portion of the gross T.IRR which will go to GPs in case of success and must be accounted as internal cost.

Some PEFs in the sample stated that internal costs are between 5% and 10% as obtained with this last formula. Table 6.2 also includes the difference between the Net T.IRR and the Gross T.IRR (2) or “internal premium”\(^{139}\). The value \([ (1) - (2) ] / (1) \) or “deal risk coefficient”\(^{140}\) intends to capture how great is the difference between net T.IRR and gross T.IRR with the internal cost estimated with the formula.

\(^{139}\) The “internal premium” is a name given by the researcher to the difference between the gross T.IRR and the net T.IRR. In fact, this difference could be understood as the premium which remains inside the PEF in the form of fees, carried interest, and the gain on the specific risks acquired in the deals.

\(^{140}\) The “deal risk coefficient” is a name given by the researcher and refers to the difference between the internal costs and the internal premium. In fact, such a difference should be assigned to the single extra no-premium obtained by investing in deals where single risks are involved. This variable should be present only in those PEFs which calculate the gross T.IRR for each single deal.
The average of this value is -12% which means that, on average the internal costs are 12% lower than the difference between the gross T.IRR and the net T.IRR. In addition, there are many cases in which the internal costs and the internal premium are almost equal. However, there are some important considerations regarding the sample that need to be made:

1. As expected, the most important differences between the internal costs and the internal premium were found in those PEFs which estimate the gross T.IRR for each deal thus considering an extra-premium according to the risk involved in the deal. Those PEFs are: REF1 (its difference or deal risk coefficient is 214%), CAP2 (its risk deal coefficient is 90%), BIF4 (its risk deal coefficient is 51%) and PAF3 (its risk deal coefficient is 41%).

2. There is one small PEF (REF3) that does not estimate the gross T.IRR and the net T.IRR. In fact, (when asked to estimate these values) it gave a gross T.IRR inferior to the net T.IRR which makes no sense at all\textsuperscript{141}. This case presents a positive risk deal coefficient of 204% (it should be negative).

Item 1 might confirm the fact that those PEFs which estimate a general gross T.IRR for all deals might be mainly taking into account the internal costs. In contrast, for those PEFs which claimed to estimate a single gross T.IRR for each deal, these results might confirm that they add something else (an extra premium) to the internal costs. For these last PEFs, the average risk deal

\textsuperscript{141} However, the researcher leaves this particular PEF in the sample to show a case in which the irrational behavior is extreme.
coefficient is -87% which means that the internal premium is 87% higher than the internal costs.

But which force prevails (diversification or specialization)? Is there a way to calculate which force is more important in each case? The answer to the question is simple: The more important the internal costs relative to the gain on diversification, the more suitable is a specialization strategy and vice versa. However, the final conclusion and the answer to these questions will be addressed in chapter 7.

There might also be a behavior difficult to explain. It has been shown how in CAP2 the net T.IRR for specialist funds is 6% and for generalist funds is 9%. If the net T.IRR reflects only the risk perception of the portfolio without internal costs, why is there this difference? Do banks (captive LPs) perceive a specialization strategy to have lower risk than a diversification one? If the answer is “yes”, this might contradict traditional finance.

6.2.5 Monitoring Intensity.

Does the number of executives involved in one deal affect the gross T.IRR? To answer this question, it is necessary to account for a new variable: the number of executives in a PEF per number of deals managed. Table 6.3 shows this information which was collected and exhibited in chapter 5 (section 5.5).
Table 6.3 Necessary data to assess Monitoring Intensity

<table>
<thead>
<tr>
<th>Type of PEF</th>
<th>CC</th>
<th>No of Firms</th>
<th>Expected Deals (ED)</th>
<th>ED x N of Executives</th>
<th>N of Executives</th>
<th>Investment per deal (xED)</th>
<th>Gross single deal IRR</th>
<th>Gross T.IRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIF2</td>
<td>500</td>
<td>8</td>
<td>10</td>
<td>1,43</td>
<td>7</td>
<td>40</td>
<td>30,0%</td>
<td></td>
</tr>
<tr>
<td>BIF1</td>
<td>1180</td>
<td>13</td>
<td>15</td>
<td>1,25</td>
<td>12</td>
<td>66</td>
<td>20,0%</td>
<td></td>
</tr>
<tr>
<td>CAP1</td>
<td>352</td>
<td>23</td>
<td>25</td>
<td>6,25</td>
<td>4</td>
<td>12</td>
<td>25,0%</td>
<td></td>
</tr>
<tr>
<td>PAF1</td>
<td>450</td>
<td>18</td>
<td>17</td>
<td>1,31</td>
<td>13</td>
<td>21</td>
<td>25,0%</td>
<td></td>
</tr>
<tr>
<td>REF1</td>
<td>20</td>
<td>1</td>
<td>4</td>
<td>2,00</td>
<td>2</td>
<td>5</td>
<td>40,0%</td>
<td></td>
</tr>
<tr>
<td>REF3</td>
<td>30</td>
<td>7</td>
<td>7</td>
<td>1,00</td>
<td>7</td>
<td>4</td>
<td>15,0%</td>
<td></td>
</tr>
<tr>
<td>BIF4</td>
<td>310</td>
<td>6</td>
<td>8</td>
<td>1,33</td>
<td>6</td>
<td>35</td>
<td>44,0%</td>
<td></td>
</tr>
<tr>
<td>REF2</td>
<td>35</td>
<td>6</td>
<td>5</td>
<td>0,83</td>
<td>6</td>
<td>6</td>
<td>17,5%</td>
<td></td>
</tr>
<tr>
<td>PAF2</td>
<td>675</td>
<td>12</td>
<td>12</td>
<td>2,00</td>
<td>6</td>
<td>47</td>
<td>30,0%</td>
<td></td>
</tr>
<tr>
<td>BIF3</td>
<td>300</td>
<td>10</td>
<td>12</td>
<td>1,50</td>
<td>8</td>
<td>20</td>
<td>20,0%</td>
<td></td>
</tr>
<tr>
<td>REF4</td>
<td>35</td>
<td>0</td>
<td>5</td>
<td>1,67</td>
<td>3</td>
<td>5</td>
<td>18,0%</td>
<td></td>
</tr>
<tr>
<td>PAF3</td>
<td>200</td>
<td>3</td>
<td>5</td>
<td>1,00</td>
<td>5</td>
<td>36</td>
<td>25,0%</td>
<td></td>
</tr>
<tr>
<td>CAP2</td>
<td>100</td>
<td>0</td>
<td>5</td>
<td>1,67</td>
<td>3</td>
<td>20</td>
<td>10,0%</td>
<td></td>
</tr>
</tbody>
</table>

Source: Author's own work

Where:

1 – CC: Capital Committed
3 - N of firms: Number of companies held at the time of the interviews.
3 - Expected Deals (ED): Number of firms expected to be held by the PEF
4 - Number of executives: Number of executives working in each PEF
5 - Expected deals per number of executives: (2) / (3).
6 – Investment per deal: Capital committed (CC) divided by (2).

With this information, it is first possible to calculate the correlation between the gross T.IRR and the variable (Deals per Executive) which is shown in the next figure.
Figure 6.12 Gross T.IRR / (Deal x Executive)

Source: Author's own work

The outputs of Figure 6.12 show a very low correlation (0.25 without considering the outlier CAP1) between these two variables. Consequently, it might be possible to state that the number of executives per deal does not affect the T.IRR. This seems to be true\(^\text{142}\) and it confirms the answers of the interviewees. However, there could be an indirect influence as stated by some PEFs during the interviews: That is the case when a particular deal needs special attention and follow-up from the executives of the PEF, for instance a turnaround operation which not only needs intensive monitoring but also has higher risk than other types of deals. There is one turnaround deal in the sample of this project whose gross T.IRR is 45% (one of the highest).

\(^{142}\) At least in a direct way, that is, the direct relationship between the professionals working in the PEFs and the number of deals managed.
Therefore, it is important to distinguish between two concepts of monitoring intensity:

1. Direct: This is simply the relationship between the number of executives working for the PEF and the number of firms managed shown in the previous figure. This relationship or rate cannot help to answer the question as to whether riskier firms need further monitoring.

2. Indirect: This refers to the extra-executives specially hired for specific deals that need more attention.

In fact, regarding this second type of monitoring, respondents argued that it depends on the type of deal and the risk of the deal. Higher risk implies more indirect monitoring intensity as well as more attention from the internal PEFs’ executives. Respondents claimed that the riskier operations needing more attention are: first, the turnarounds and start-up; second, the expansion deals, and third, the LBOs and replacement deals. The following figure (applied to the 26 deals of the sample) might confirm those statements.

Figure 6.13 Gross T.IRR / Type of Deal

Source: Author’s own work
Figure 6.13 shows the gross T.IRR per type of deal: that is how GPs perceive both the risk and the costs involved in the operation. However, this last analysis is not enough to reveal if the higher gross T.IRR is due to the higher risk, or due to the monitoring intensity, or both.

6.2.6 The PEF portfolio – Big Deals and Small Deals

The other important variable that should be analyzed is the size of the deal. During the interviews, there were a lot of contradictions. There were those who perceived small capital firms (“small caps”) as riskier and preferred to buy bigger companies. These GPs argued that a few big deals create economies of scale. There were those, instead, who argued in favor of small capital firms (“small caps”). This group preferred to acquire a lot of small companies because in this way they were “feeling” or perceiving that they were diversifying, thus reducing risk. Figure 6.14 will try to address this issue.

![Figure 6.14 Gross T.IRR / Size per Deal](source)

**Source:** Author’s own work
Figure 6.14 shows the gross T.IRR per deal size. The researcher has assumed that small deals are those with an amount invested lower than €15 million and big deals are those whose capital committed is higher. There are no significant differences between small and big PEFs regarding the gross T.IRR. In addition, the question as to whether PEFs holding more small-sized deals perceive lower risk has not been answered. This question can be explored by looking at the correlation between the gross T.IRR and a coefficient (Invest.x.Deal):

\[
\text{Invest.x.Deal} = \frac{\text{Total Capital committed}}{\text{Expected Number of Deals}}
\]

Figure 6.15: Gross T.IRR / (Invest.x.Deal)

Source: Author’s own work

143 This assumption was based on the size average of the deals of this sample.
Figure 6.15 shows a very low correlation of 0.24. However, if REF1, BIF4, CAP2 and BIF1 are taken away from the sample, the correlation increases to 0.60 (still low). Only 70% of the PEFs (they are shown by the green oval) show a pattern: the higher the capital committed per deal, the higher the gross T.IRR. Is being involved in fewer big deals perceived as incurring higher risks?

![Figure 6.16 Gross T.IRR / (CC.x.Deal)](image)

Source: Author's own work

REF1 calculates the gross T.IRR for each deal. Since their deals are very risky (small size), the T.IRR is very high. Conversely, the other PEFs estimate a general T.IRR which might assess the portfolio and not the single deals. Since in this case, the analysis is aiming at assessing the whole portfolio (small deals vs. big deals), those PEFs (like REF1) that estimate the T.IRR for each deal should be taken away from the sample.

Like REF1, BIF4 has an extraordinarily high T.IRR due to a major turnaround deal.

The particular case of CAP2 has been already explained in previous sections.

BIF1 is the biggest fund in terms of capital commitment (It doubles the size of the second fund in place. For this fund investing in bigger deals might not mean to lose diversification.)
In the figure 6.16 an x-axis and a y-axis were inserted because there are in both cases negative values that had to be shown in the diagram.

Figure 6.16 shows (T.IRR vs. investment made in the two deals analyzed per PEF) a very low correlation of 0.115. Again, if REF1, BIF4 are taken away from the sample, the correlation increases to 0.47 (still low). Only 70% of the deals (they are shown by the green oval) show a pattern: the higher is the capital invested per deal, the higher the T.IRR.

The problem is that the results shown in the last two figures might mix a diverse spectrum of phenomena. For instance: In section 2.3 (performance persistence), bigger PEFs that have access to bigger deals tend to have higher net T.IRRs and this might influence the value of the gross T.IRR. In other words, big PEFs define higher threshold targets due to a better past performance. Therefore, it is not possible to conclude that the size of the target companies and the number of deals is an important issue when assessing the risk of the portfolio.

Until now, the analysis made in this first part of the chapter trusted the T.IRR (gross or net) as a reliable variable by which GPs measure risk and internal costs. It was considered as a finance driver where GPs reflect their perceptions in a rational and systematic way. But is that so? This will be the main topic of the next section.
6.3 The Gross Threshold IRR and the Behavioral Factors

Is it possible to trust this variable for what it purports to be? The answer seems to be “no”, since as shown in chapter 5, no PEF uses a rational and systematic way to calculate the T.IRR. All of them use intuition and past experience: For instance, one of the GPs of BIF2 stated: “we estimate a net T.IRR of 20% because in the past we have got 30% (ex-post) and therefore 20% is absolutely achievable and should be set as a target”.

6.3.1 The Business Plan and its influence on the T.IRR

All PEFs assess the risk of the deal considering the following drivers:

- The external factors: the extrinsic potential of the company: That is, its strategic position in the market, the market trend, the analysis of the sector (e.g. using Porter’s five forces analysis), the deal exit and its timing.

- The internal factors: The intrinsic potential of the company to improve the efficiency in its operation: Growth; historic performance; brand potential; leverage; synergies with other deals already held in the portfolio: economies of scale, know-how, distribution channels, fixed costs; quality of management; how cyclic is the business (periodic cycles); product issues: Quality; technology issues, new products, etc.

---

148 Is the gross T.IRR really reflecting risk and all the costs?
149 Specially, bigger PEFs which have more possibilities to analyze more deals.
Both external and internal drivers are reflected in the business plan and therefore, in the E.IRR. Conversely, the T.IRR should not directly be affected by these drivers but be defined according to their potential volatility. However, practitioners base the final value of the T.IRR (whether the T.IRR is 20% or 25%) on their intuition and past experience.

6.3.2 Techniques to Estimate Performance with an ex-ante Perspective

All the types of techniques seen in chapter 5 to measure the T.IRR can be classified into three different methods:

1. **A gross T.IRR depending on each deal:** Few PEFs consider a T.IRR for each deal because each deal has its own risk. Therefore, they estimate a value using intuition and experience to measure T.IRR. In this case, to estimate the value of the T.IRR, they consider: the PEF’s internal costs, LPs’ expectations, and the specific risk of a deal.

2. **A general gross T.IRR used for all cases equally:** Most PEFs have a uniform T.IRR that they apply to any deal. In such case, they do not consider the risk involved in the deals. They estimate this general T.IRR only according to internal costs and LPs’ expectations. They also use intuition and experience. For instance: Some PEFs argued that if the T.IRR is 30%, they normally get less (20%) as ex-post IRR. Therefore, in establishing a T.IRR they add a buffer to be covered from unexpected events. Other PEFs argued that they estimate the value of the T.IRR according to what is achievable (what is possible). In the same way, these PEFs estimate the gross T.IRR adding to the
net T.IRR the internal costs (estimated): fees and abort costs. Some PEFs argued that the difference between gross T.IRR and net T.IRR is about 10%.

3. **A threshold cash & cash (C&C) multiple (as seen in chapter 5):** Some PEFs measure the threshold performance as a multiple of the initial capital invested. Such a multiple does not consider the time factor as the IRR does, thus distorting the true performance of the deal when compared with alternative investments. In some cases, both LPs and GPs accept this system of measuring performance and this might imply a very behavioral (not rational) way of assessing deals ex-ante.

In all these three cases, the PEFs have in mind the LPs’ expectations (net T.IRR for the first two cases, and net C&C multiple for the third case) as a base input to estimate the threshold when assessing new investments.

Figure 6.17 shows the 13 PEFs interviewed according to their use of these three methods of calculating the T.IRR.
Figure 6.17 PEFs’ Methodology to Assess the T.IRR

Figure 6.17 shows that PEFs near to the top appear to be more rational\textsuperscript{150}. In contrast, PEFs near to the base appear to be more behavioral. No PEFs use a rational formula (top of the pyramid) to assess T.IRR. Table 6.4 exhibits the method used to assess T.IRR according to type of PEF.

Table 6.4 How PEFs use the T.IRR

<table>
<thead>
<tr>
<th></th>
<th>BIF</th>
<th>REF</th>
<th>PAF</th>
<th>CAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.IRR formula</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>T.IRR per deal</td>
<td>–</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>T.IRR general</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>T.Multiple</td>
<td>1</td>
<td>–</td>
<td>1</td>
<td>–</td>
</tr>
</tbody>
</table>

Source: Author’s own work based on PEFs’ answers

\textsuperscript{150} They tend to use a systematic model or formula at the very top.
The last paragraphs and tables seem to confirm that the gross T.IRR is generally assessed in a very behavioral way (using intuition) and therefore cannot be completely trusted for what it intends to represent: A rational required return to offset the risk of the deal. Although all PEFs interviewed do not use a rational formula to measure T.IRR for each deal, most of them agreed that a more rational way to assess the gross T.IRR would have to consider:

**LPs’ expectations or net E.IRR + PEF internal costs + risk of the deal**

The following sub-section will study different aspects in the assessment of the gross T.IRR.

### 6.3.3 The gross T.IRR – Big Funds vs. Small Funds

Figure 6.18 clearly shows that big PEFs tend to have higher gross T.IRRs than the small PEFs.

![Figure 6.18 Gross T.IRR / PEF size](image)

*Source: Author's own work*
To reinforce the finding of Figure 6.18, Figure 6.19 shows the correlation between capital committed (CC) and gross T.IRR.

![Graph showing the correlation between capital committed (CC) and gross T.IRR.](image)

*Source: Author’s own work*

The correlation of Figure 6.19 is only 0.30 (very low). However, if the two outliers, REF1 and BIF1 are taken away from the sample, the correlation is 0.83 (very high). It has been already explained in the previous section the problem with REF1 (the case is not representative and ideally should be taken away from the sample). Instead, BIF1 shows a case in which the gross T.IRR was particularly low due to a deal with advantageous covenants and other positive aspects of the business plan.
The correlations found in this section contradict traditional financial theory in which small PEFs and smaller and riskier deals should have higher required returns. Why do big PEFs have higher gross T.IRR than small PEFs? Is it because big PEFs have access to better deals (as suggested in section 2.2 and section 2.3)? Or is it due to the fact that big PEFs create more economies of scale in terms of fees (as shown in section 2.2)? What are the drivers behind these results? Is it possible to trust the T.IRR as assessed nowadays? These are not easy questions to answer but chapters 7 and 8 will try to address them.

6.3.4 The definition of the net T.IRR

If the net T.IRR is defined according to history and experience as most GPs claimed, it is important to look at past performance (ex-post IRR). In this sense, chapter 2 stated that the most commonly used method to estimate the equity premium in organized markets is an extrapolation of the historically realized equity premium into the future. However, chapter 2 also showed that historical averages might be inadequate to predict future returns. The same issues should be considered for the PEFs.

However, according to the information collected and outlined in chapter 5, there might be two ways in which the T.IRR is estimated:

1 – Through past experience, GPs estimate first the gross T.IRR (what is possible) and thereafter they estimate the net T.IRR (net of fees and costs).
2. Recurrent LPs’ investors will expect to receive a net T.IRR in line with their past experience. In this case, the net T.IRR is used as a basis to define the gross T.IRR.

**Figure 6.20 The net IRR**

Figure 6.20 shows how both GPs and LPs converge to a similar estimated value of the Net IRR. The GPs, by looking at the past performance of their deal, assess what can be done in terms of gross T.IRR. On the contrary, the LPs by looking at the past performance of their past investments, they assess what can be obtained in terms of net T.IRR

### 6.3.5 The gross T.IRR and its drivers

There are several behavioral approaches influencing the assessment of the gross T.IRR
6.3.5.1 The gross T.IRR acts as a Buffer

For instance: some PEFs interviewed argued that when the E.IRR for one deal is expected to be 30%, the ex-post IRR will be 25% or less. Therefore, they increase the T.IRR by approximately 5% as a kind of buffer.

6.3.5.2 The gross T.IRR defined with multiples

It was already seen in chapter 5, and in section 6.3.2 of this chapter, the problem of using the cash and cash multiple (C&C) instead of the IRR to measure expected return. Such a multiple does not consider time as the IRR does, distorting the real performance of the deal when compared with alternative investments. PEFs that use this method argued that their target is to double the investment and it is the same if they do it in three years (in which case the IRR would be 25%) or in five years (in which case the IRR would be 15%).

When BIF4 was asked why they do this, the answer was the following:

“We prefer to use multiples because of the following reason: GPs prefer to make a deal in 3 or 4 years with an IRR of 20% rather than a deal in one year with an IRR of 50%.”

But why should this be?
“Because in this way GPs keep the capital assured at an 20% IRR for four years. Otherwise, GPs have to give it back to the LPs making both the life of the PEF and the duration of fees shorter.”

It seems obvious that this kind of behavior can generate an agency issue between LPs and GPs. This problem will be discussed in the next chapter.

6.3.5.3 When the risk of the single deals is assessed

Figure 6.21 shows the basic components of the gross T.IRR. As shown, the main determinants are:

- For those PEFs that do not assess the risk of the single deal: gross T.IRR = net T.IRR + fees + carried interests + other internal costs + buffers (eventually in some cases)
- For those PEFs which assess the risk of the single deal: the gross T.IRR = the net T.IRR + fees + carried interests + other internal costs + buffers (eventually in some cases) + the risk of the deal.

Figure 6.21 exhibits the second case which is more comprehensive and detailed than the first.
1- The net T. IRR: Recent papers (reviewed in chapter 3) have tried to assess not only the value of the market premium for the PEFs but also if such a premium offsets their risk. Conclusions are still contradictory and it is not clear what the premium should be. Italian private equities (in this sample) assess the net T.IRR by looking at their own past history and experience.

2- Internal Costs comprise mainly fees and carried interest.

3- Risk of the Deal: For those PEFs which assess risk for each single deal, an extra premium is estimated. This is also made in a very behavioral way: These PEFs use intuition, the expected volatility of some of the drivers included in the business plan, and the covenants agreed with the entrepreneur.

This last section tried to exhibit the different criteria as how GPs currently assess the gross T.IRR. Some determinants seem to be rational and some others more behavioral. Overall, these determinants are not quantified by the

PEFs: there is not a systematic model to estimate the T.IRR and, therefore, the risk-premium of the deals.

### 6.4 Conclusion

The aim of this chapter was to analyze the data by using both quantitative and qualitative approaches. The analysis made in section 2 suggests not only the existence (in an ex-ante perspective) of the phenomena found in the last couple of decades of research, but also the presence of new drivers that might be influencing the T.IRR.

Section 3 has studied how the T.IRR is estimated and which are the drivers considered by GPs. But what are the true determinants of the T.IRR? In this sense, some new drivers affecting the T.IRR and not considered by the GPs have also been suggested by the output given by the qualitative analyses of the interviews and the numerical data.

The way in which the T.IRR is incompletely and imprecisely estimated needs to be discussed and ultimately enriched by a new and more precise calculation method based on all the findings revealed during this research project. All the true determinants (and not only those considered by GPs) must be included in a new theory able to explain the phenomena and ultimately, how they drive the T.IRR.

Traditional finance alone does not seem to be enough to explain some of the drivers behind the T.IRR. This does not mean that the new drivers are not
rational, some of them might be in fact very rational and some others might not. Overall, the determinants of the T.IRR are a mix of: traditional finance drivers, rational drivers which do not belong to traditional finance, and behavioral or non-rational drivers. These determinants will be discussed in detail in the next chapter. Therefore, the challenge of the next chapter (chapter 7) will be develop a qualitative model (chapter 8 will develop a quantitative model) able to explain the T.IRR with all its determinants.
7 EXPLANATORY MODEL – PEFs’ RISK PREMIUM DRIVERS

7.1 Introduction

This chapter, based on the findings of chapter 5, and on the analysis of chapter 6, is aimed at explaining in detail how the T.IRR drivers really work and at proposing an explanatory model. It has been already stated that traditional finance alone cannot explain all the factors driving the T.IRR. That is why previous papers (Franzoni et al., 2010 or Korteweg & Sorensen, 2009) that based their models only on the three-factor-model do not offer sufficient insight to allow the understand of PEFs and the nature of their risk premium.

In addition, many of the factors affecting the risk-premium and the T.IRR also depend on GPs’ strategic decisions and vice versa (such as: diversification vs. specialization, big deals vs. small deals, type of deal, etc). Consequently, this chapter is also about GPs’ strategy and decision theory on which the T.IRR depends. As stated in chapter 3, GPs work in a sector where information is bounded and the EMH just does not apply (for instance:

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151 Decision theory is concerned with identifying the best decision to take. An ideal decision maker is fully informed and fully rational. Most of decision theory is prescriptive or normative (Hansson, 2005): The practical application of this prescriptive approach is called decision analysis, and aimed at finding tools, methodologies and software to help people make better decisions. However, since people usually do not behave in ways consistent with axiomatic rules, there is a related area of study called a positive or descriptive discipline, attempting to describe what people will actually do. See Akerlof & Yelen (1987), Anand (1993), Berger (1985), Clemen (1996), and Bernardo & Smith (1994).
diversification is limited to a number of deals). Therefore, this chapter will not only describe how they behave but also will propose a model as how they should behave.

Consequently, section 7.2 will explain how the phenomena, as revealed in chapters 5 and 6, work in affecting the T.IRR. This section will construct a driver-flow for each phenomenon and will explain how some factors as well as GPs’ strategic decisions affect the T.IRR and vice versa. Section 7.3 will describe GPs’ strategic decisions regarding their portfolio selection. Finally, section 7.4 will show how the determinants of the T.IRR are assessed by both GPs and LPs and will propose a model to show how they might be assessed. The quantification of the factors included in this model will be addressed in chapter 8.

7.2 How the Phenomena are Driven

As seen in chapter 6, the first four phenomena (money-chasing deals, fees and speed effect, performance persistence, monitoring intensity, diversification vs. specialization, big vs. small PEFs) were analyzed in the light of the qualitative answers given by GPs and of the statistical analysis of the quantitative information collected during the interviews. The analysis suggested the existence of such phenomena and this section will discuss and eventually interpret how they work.
7.2.1 Money-Chasing deals phenomenon (MCD)

In chapter 6, section 6.2.1\textsuperscript{152}, the different statistical analyses assessed suggested the following drivers: Big PEFs tend to pay more for their target companies (higher multiples), and this implies that big PEFs have access to better deals where more competition among PEFs is present. This fact was confirmed by all the GPs interviewed:

“We cannot compete with other PEFs since we have to acquire stakes at very low values, therefore we need to look for deals not interesting for other PEFs especially for the big ones which can afford higher prices.” (Stated by one General Partner of REF2).

In addition, the drivers behind the MCD phenomenon were also explained and confirmed by all GPs. Based on these findings, the researcher has proposed a drivers-flow model for this phenomenon. The following figure summarizes the drivers of the MCD phenomenon.

\textsuperscript{152} See also chapter 6, section 3.3 for the analysis of big vs. small PEFs.
Figure 7.1 MCD Drivers

Source: Author’s own work

Figure 7.1 shows how the size of the PEF affects the skill of the GPs (bigger and older PEFs might have more experienced and skilled GPs partly because they can afford to pay higher fees per GP). Both drivers affect the access to better deals. The access to better deals implies high E.IRR and low T.IRR. On the other side, the number of potential deals and the intensity of the competition are also important drivers. A high number of potential deals increases the probability of finding a good deal and this implies a higher E.IRR and lower T.IRR. In contrast, a high number of competitors (other PEFs) decreases the probability of finding a good deal. The PEF has to pay more for a deal and that implies lower E.IRR and higher T.IRR. Figure 7.2 explains the phenomenon with two examples: one on the left and one on the right.
The left-hand side shows an old and big PEF with experienced GPs in a market with few competitors and a high number of potential deals (violet arrows: pointing up signifies high, and pointing down signifies low). Such situations imply deals with high potential or high E.IRR and low risk or low T.IRR (the best deals). An important difference between the E.IRR and the T.IRR means a high expected value creation. Conversely, the right-hand side shows the contrary situation. In other words, both E.IRR and T.IRR are driven by the size of the PEF and by GPs’ experience.
7.2.2 Internal Fees, LPs’ pressure & Speed Effect

In chapter 6, section 6.2.2, the different statistical analyses assessed suggested the following drivers:

- GPs are influenced by the net T.IRR to define the gross T.IRR,
- GPs might be pressured by LPs (through the net T.IRR) to seek the appropriate combination between investment speed and gross T.IRR (a trade-off between the two forces):

<table>
<thead>
<tr>
<th>High gross T.IRR</th>
<th>slow speed</th>
<th>high opportunity costs</th>
<th>final IRR &lt; net T.IRR.</th>
</tr>
</thead>
</table>

Explanation: A high gross T.IRR will make it more difficult to find an appropriate deal (a deal with such a high performance potential). Therefore, the investment speed will tend to be slow. In addition, a long investment period creates high opportunity costs thus decreasing the final IRR. As a consequence, such a situation might imply a final IRR inferior to the LP’s expectations (net T.IRR)

<table>
<thead>
<tr>
<th>Low gross T.IRR</th>
<th>fast speed</th>
<th>riskier deals</th>
<th>final IRR &lt; net T.IRR</th>
</tr>
</thead>
</table>

Explanation: a low gross T.IRR will make it easier to find a deal. But in this case, low barriers in terms of T.IRR might imply accepting high risk deals. As a consequence, the final IRR might not meet the expectations.

- Bigger PEFs are able to exploit economies of scale in terms of total amount of fees.
- Bigger PEFs also have a lower percentage of expected fees (EF).

Lower EF implies higher net T.IRR.

153 See also chapter 6, section 3.3 for the analysis of big vs. small PEFs.
Opportunity costs are generated by two factors: First, LPs pay fees even during the time in which the capital is not invested (this is true for all the methods revealed in this sample to calculate fees); Second, even if in most cases, the final ex-post IRR is calculated over the capital invested (after capital draw-downs or capital calls), LPs would like to achieve the highest performance possible during the whole life of the PEFs (that is: starting when the capital was first committed). This is because LPs do not want to have their money relatively liquid waiting for the draw-downs since this creates a hidden cost for the LPs\textsuperscript{155}, thus pressuring GPs to invest fast:

“\textit{We have not been able to find more deals to invest in and LPs are very angry and upset.}” (stated by one GP in REF4);

“\textit{We receive calls from our LPs every day to see how far we are from the next draw-down of capital.”} (stated by one GP in BIF1).

For those PEFs in which the ex-post IRR is calculated based on capital committed, this effect might be critical. Instead, for those PEFs in which the ex-post IRR is calculated over capital invested (most of them), this effect is mitigated since the only direct costs are the fees paid during the time in which capital is not invested. Although each PEF has its own legal agreements in terms of fees and IRR and, as seen in chapter 5, they are constantly evolving. This thesis proposes a generalization as a base which

\begin{itemize}
\item \textsuperscript{154} Expected by both LPs and GPs
\item \textsuperscript{155} They cannot manage their portfolio as they wish and this forces them to earn low rates of return during the waiting time.
\end{itemize}
can be modified according to each particular case and contract between LPs and GPs. Figure 7.3 shows the base model:

**Figure: 7.3 Speed Effect and the Opportunity Costs**

![Figure 7.3 Speed Effect and the Opportunity Costs](image-url)

**Source: Author's own work**

Figure 7.3 shows how LPs’ expectations through the net T.IRR presses GPs to define gross T.IRR high enough to achieve such a goal. The level of the gross T.IRR will affect the investment speed and the opportunity costs of the capital not invested. If the speed is too low, the opportunity costs incurred by LPs will be too high and the final net IRR might not be achieved. That is why the opportunity costs as well as the speed effect also drive back the T.IRR to meet the appropriate balance.
Figure 7.4 shows how interrelated these variables are. The MCD phenomenon seen in the previous section affects directly both the gross T.IRR and the speed effect. A favorable MCD situation decreases the gross T.IRR (low risk deals) and increases the investment speed of the fund. A lower gross T.IRR makes it even easier for a PEF to close a deal and this increases the speed further. High investment speed also reduces the opportunity costs of the capital committed and not invested. In contrast, an unfavorable MCD situation increases the T.IRR (difficult access to deals implies bad deals left or deals with higher risk) and decreases the investment speed. In addition, high T.IRR makes it even more difficult to close a deal and this decreases the speed further. Low investment speed also increases the opportunity costs and finally, high opportunity costs increases the T.IRR further on. High opportunity costs increases the T.IRR\textsuperscript{156} because GPs need

\textsuperscript{156} As stated in section 7.2.1, most PEFs calculate the ex-post IRR using capital draw-downs and not capital committed. Therefore, one might assume that the opportunity cost does not
to offset these costs with higher returns (higher T.IRR) to achieve the final target (the net T.IRR).

**Figure 7.5 Economies of Scale**

![Diagram showing economies of scale](image)

**Source: Author’s own work**

Figure 7.5 shows the effect of the economies of scale generated by big PEFs (violet arrows: pointing up signifies high and pointing down signifies low): Economies of scale allow big PEFs to afford lower fees (as a percentage) and still have higher fees per executive. Therefore, bigger PEFs might have more capabilities to give better returns to their LPs (higher ex-post IRR). With a history of high ex-post IRRs, LPs will require a higher net T.IRR for a second fund managed by the same GPs and that implies higher gross T.IRR.

However, whether the profits generated by these economies of scale are kept by GPs or are given to LPs (as ex-post IRR) is quite another matter. This matter has more to do with the performance persistence phenomenon to be addressed in the next section.

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influence the final IRR. However, the researcher (based on the findings of chapter 5) has assumed that LPs’ expectations (which are reflected in the net T.IRR) account for these hidden costs (hidden to the GPs) when assessing the final performance or ex-post IRR
7.2.3 Performance Persistence Phenomenon

The analyses shown in chapter 6 section 6.2.3, suggest that bigger PEFs seek both a higher H.IRR and net T.IRR. However, the question was: Is this due to the fact that big PEFs have access to better deals (as shown in section 7.2.1 dealing with the MCD phenomenon)? Is it due to the fact that big PEFs create more economies of scale in terms of fees (as shown in the section 7.2.2)? Or is it because of both factors? To answer these questions, chapter 6, section 6.2.3 has shown that bigger PEFs have access to better deals in terms of E.IRR.

Based on those conclusions, it is possible to conclude that performance persistence exists: bigger PEFs have access to better deals and therefore can afford to give better returns to their LPs (H.IRR and net I.IRR). Consequently, LPs investing in bigger PEFs (based on a more successful past experience) have higher expectations.

In any case, this phenomenon of the performance persistence contradicts the traditional financial theory by which riskier deals should have better returns. In fact, if this statement is considered, small PEFs should have higher T.IRRs than big PEFs because of the following reasons:

157 See also chapter 6, section 3.3 for the analysis of big vs. small PEFs.
158 If GPs were optimistic and were over-estimating future performance, such behavior should be distributed randomly among all PEFs and not only among the big PEFs.
159 It is important to remember that big PEFs are normally older and have both experienced GPs and LPs that have worked together in previous funds. The same LPs might trust their money to the same GPs.
- Small PEFs have higher risk due to the smaller companies present in their portfolios.
- GPs are normally less well-known and with a less successful background. LPs should thus require higher performance.
- They have higher risk due to the higher risk profile of the companies they hold.

Despite these reasons, the evidence collected from this sample, seems to suggest the opposite: Bigger PEFs have higher T.IRRs than the smaller ones. Furthermore, this statement confirms what was expressed in interviews by most GPs (in both small and big PEFs) regarding this issue: “Bigger PEFs are able to get better deals with higher potential and lower risk. In addition, due to their past high performance, they have higher targets in terms of T.IRR.” (stated by a GP in REF2).

In addition, some other drivers like the learning cost effect might influence these results. For instance: Old PEFs with high experience and know-how would be able to achieve better performance. Instead, new funds with less experience might be satisfied with less ambitious targets.

But why do all LPs not invest in big PEFs? Or why do some LPs invest in small regional PEFs? The answers to these questions seem to be very simple and were confirmed by all PEFs interviewed. It has to do with the segmentation of this sector which can be explained by considering the following reasons:
- Big PEFs collect high amounts per LP. It is not easy for small investors to enter a big PEF.
- The information is not open, public and instantaneously available as in the organised markets and, therefore, these markets are not efficient (see in chapter 2 the definitions for the EMH).
- Small regional LPs like to trust their money to people they know (friends) and in their own region. In Italy, accent, culture, and dialect (there are hundreds of dialects) are important factors in business transactions. Investors feel safer when trusting their money to someone who speaks the same language.

Therefore, the relationship between LPs and GPs is not completely driven by rational factors. The EMH does not apply in these markets, and some behavioural factors need to be considered, for instance: The behavioural concept known as representativeness (Kahneman and Tversky 1972) seen in chapter 3. Through this behavioural phenomenon, old successful PEFs will be able to collect more capital than the new entrants.

To summarize: First, the net T.IRR is higher for big PEFs partly because they have access to better deals (the higher E.IRRs are in line with the higher net T.IRRs); Second, as outlined in chapter 6 section 6.2.3, big PEFs also expect to give better returns (net T.IRR) to their LPs due to a lower annualized percentage of expected fees. Third, the internal economies of scale (higher fees per executive) allows big PEFs to have more money to analyze more deals, pay better consultants and attract better professionals through higher
salaries. Figure 7.6 summarizes the drivers for the performance persistence phenomenon.

**Figure 7.6 Performance Persistence Phenomenon and its Drivers**

Figure 7.6 shows on the left-hand side, the drivers of the Performance Persistence phenomenon (using as an example big and old PEFs) in the private equity sector and how they increase the T.IRR (green arrow inside the yellow hexagon). On the left side, the figure shows, in contrast the drivers for young and small PEFs and how they decrease the T.IRR (pink arrow inside the yellow hexagon). The violet quadrant shows the forces of traditional finance which oppose those of performance persistence present among PEFs.
7.2.4 Monitoring Intensity

Chapter 6, section 6.2.5 showed how the level of gross T.IRR depends on the type of deal. Higher risk deals (like turnaround deals) not only have higher T.IRR because of the risk itself but also because of the increasing direct and indirect monitoring intensity (according to the GPs interviewed), as explained in chapter 6. It is possible, therefore, to assess the drivers-flow for the monitoring intensity effect as follows:

Figure: 7.7 Monitoring Intensity - Drivers

Figure 7.7 shows how the risk of the deal also depends on the type of deal. For instance, turnarounds or start-up deals might require an extra premium in comparison with LBOs, MBOs, expansion, and replacement deals. According to the interviewees, start-up and turnaround deals might increase the T.IRR by between 3% and 5%. High risk deals might also require high monitoring intensity (both direct and indirect) thus increasing the final gross T.IRR of the
deal. According to the interviewees, high levels of monitoring intensity might increase the T.IRR by between 1% and 2%.

7.3 The PEF Portfolio – Decisions and Drivers Affecting the T.IRR

7.3.1 Specialization vs. Diversification

Chapter 6 section 6.2.4 has shown how a specialist fund like CAP2 has a low net T.IRR because of the low risk perception of a specialization strategy. It has also shown that specialist funds have a very low difference (much lower than the average) between the net T.IRR and the gross T.IRR because of lower internal costs due to both specialization and the nature of a captive fund.

Therefore, the gross T.IRR is driven by both forces: the resource-based theory (RBT) for the internal costs and the portfolio theory (PT) for the systematic risk. Manigart et al. (2002) suggested that PEFs might not behave according to the traditional finance theory regarding these two forces.

According to this researcher, the conclusions of Manigart et al. (2002) were very interesting but incomplete\textsuperscript{160}. PEFs (regarding these two forces) may well behave according to the finance theory. The problem is that, it is first necessary to understand that the gross T.IRR has a risk component and a

\textsuperscript{160} As discussed in chapter 4, this is due to the limited approach (methodology) used. They did not have a close contact with GPs and therefore they could not address questions like “why” or “how”. 

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cost component. The first answers to the PT as finance theory would predict and the second to the RBT. That is why, both strategies are used and PEFs might obtain a profit from both, depending on the circumstances (see figure 7.8).

**Figure 7.8 Diversification vs. Specialization**

Figure 7.8 shows the balance of the two forces: the diversification forces and the specialization forces. The first are driven by the portfolio theory and the second, by the resource-based theory. In addition, the resource-based theory is driven by PEFs' internal costs. The opportunity cost might be related to the cost of fees and influenced by the MCD phenomenon and the speed effect, as explained in previous sections, and as shown in Figure 7.8.

Going back now to the question: Which force prevails? Is there a way to calculate which force is more important in each case? The answer might emerge from measuring the relative importance of the internal costs and the risk deal coefficient (this coefficient was defined in chapter 6 section 6.2.4). If
the gain generated by an internal cost reduction due to a specialization strategy is superior to the gain generated by a reduction in the risk deal coefficient due to a diversification strategy, then a specialization strategy should be supported. Figure 7.9 explains this last statement.

**Figure 7.9 Choosing for the Best Strategy**

As shown in Figure 7.9\textsuperscript{161}, if the gain in cost-savings due to a specialization strategy is superior to the gain in risk due to a diversification strategy, the first should be taken. The formulae necessary to assess these gains will be examined in chapter 8.

However, as stated in chapter 6 section 6.2.4, there is still a behaviour difficult to explain. Why, in CAP2, is the net T.IRR for specialist funds 6% and for generalist funds 9%? If the net T.IRR reflects only the risk perception of

\textsuperscript{161} A similar figure was shown in chapter 6 section 6.3.5.3. However, that figure did not include the opportunity costs because GPs do not assess them when defining the gross T.IRR. In contrast, this chapter intends to show all the drivers in existence.
the portfolio without internal costs, why is there this difference? Do banks (captive LPs) perceive a specialization strategy to have lower risk than a diversification one? If the answer is “yes”, this might contradict traditional finance, and the explanations given during this section are incomplete.

Although the answers to these questions might need a bigger sample (with more specialist funds) with further analysis, it is possible to offer the following tentative explanations:

- PEFs are not like private investors holding a portfolio of shares in which there is little to do beyond getting dividends and eventually selling and rebuilding part of the portfolio. In such situations, diversification is the only important driver to reduce risk. In contrast, PEFs are, in some respect, like industrial holding groups in which management, cost-efficiency, know-how, and synergies are important factors. Specialized management, cost-efficiency, and synergies, that is, a RBT strategy, might also be an important factor to reduce risk and therefore the net T.IRR is also influenced by this factor.

- CAP2 is specialized in the food industry where betas are lower than in some diversified portfolios. In addition, the diversification effect in the PEFs is bounded to a limited number of deals (incomplete diversification), and this implies higher risk and, therefore, higher net T.IRR.

Figure 7.10 re-states the model seen in the two previous figures.
Figure 7.10 The forces of behind Diversification and Specialization

Source: Author’s own work

Figure 7.10 shows in the middle panel how the lower risk perception due to specialization as well as an incomplete diversification might influence the chosen strategy. These forces contradict traditional finance theory and emerge from the particular nature of a PEF in which:

- Specialization might reduce risk due to: Know-how, synergies and low betas.
- Diversification is bounded to a limited number of deals.

In this sense, it is necessary to assess again the question: which force prevails? Figure 7.11 might answer this question.
In comparison with Figure 7.9, Figure 7.11 shows two new factors to be added to the formula: the factor (1) and the factor (4). In this case, the forces of specialization seem to be stronger than those of diversification\(^{162}\). In such a case, a new question might be addressed: why there are not more specialist funds? The answer to this question can be divided into four parts:

- **First:** The last explanation, including the new factors (1) and (4), does not demonstrate that the specialization forces are more important than those of diversification.

- **Second:** Given the largely closed, blockaded nature of the PEFs markets in which the access to any deal depends on many variables (high transaction costs as well as high entry and exit barriers), the strategy in terms of specialization or diversification, cannot be easily

\(^{162}\) Chapter 8 and its quantitative model will show how to assess these factors.
chosen (GPs might be forced to choose the deals they are able to find and afford).

- Third: The Italian company structure (potential target of the PEFs) is based on family-owned small-to medium firms. A PEF entrance in this sector is not easy due to the fact that Italian family owners do not want to relinquish any degree of control of their firms which means not only the store of their wealth but also the family tradition.

- Fourth: The investment holding period which is related to the duration of the fund is too short to create value through sector specialization. These short periods are more adapted for LBO operations (3 or 4 years). Value creation generated by know-how, synergies, identification of new opportunities, etc might need more time. Both GPs and LPs should review their investment periods and, in fact, this is what is happening nowadays (see chapter 5): LBO deals are decreasing and expansion deals are increasing. This last trend might push PEFs into longer investment periods and more specialization.

In addition, if a PEF decides to have a specialized strategy, the target deals will be reduced (due to the limit of the chosen sector) and the investment speed might be increased, considerably affecting the opportunity costs. This might also depend on the sector: there might be sectors with a high number of available deals (niche).

In any case, it appears that the speed effect and the expected investment holding periods as well as the fund’s expected life are important factors when
choosing the strategy. This is why (according to the interviews), captive funds can better afford a specialist strategy than non-captive funds. As seen in chapter 5, captive funds have lower opportunity costs due to the nature of their LPs (banks), less pressure to invest fast and longer investment holding periods. Banks are able to manage funds (while not invested in deals) with higher risk-return efficiency and with lower transaction costs than private LPs.

To conclude, the choosing of the right strategy might always depend on the relationship \((1) + (2) > (3) – (4)\) (as shown in figure 7.11) but with one new consideration: the forces working around the factor (2) might work against specialization. In other words, the decision depends on other drivers like: deals available in a specific sector, the type of PEF (captive or non-captive), the entry barriers, and the transaction costs present in PEFs’ sectors. Figure 7.12 shows how these factors work.

**Figure 7.12 Forces against Specialization**

Source: Author’s own work
Figure 7.12 shows a new quadrant including some new drivers that might work against the forces of specialization (RBT) by increasing the PEFs’ internal costs instead of reducing them. The availability of deals, the entry barriers, and the transaction costs might adversely affect the investment speed, increasing the opportunity costs. The type of PEF has also an important influence on the internal costs. For instance: Non-captive PEFs that choose a specialization strategy might increase their opportunity costs (due to low investment speed). Instead, a Captive Fund does not increase the opportunity costs since there are none. In addition, captive funds do not have reserves (the reserve is the bank itself), no carried interests (GPs are like bank employees with no participation in the capital gains) and, lower fees.

7.3.2 The PEF Portfolio: Big Deals vs. Small Deals

As seen in chapter 6, section 6.2.6, bigger PEFs that have access to bigger deals tend to have a higher net T.IRR and this might influence the value of the gross T.IRR. In other words, big PEFs seek higher threshold targets due to a better past performance. Does relying on a few bigger deals increase the T.IRR? Or is the T.IRR increased because big PEFs (which have access to bigger deals) ask for higher T.IRRs (performance persistence)? Through the quantitative analysis, where these two phenomena might be mixed, it was not possible to answer these questions.
However, some simple reasoning based on the answers of GPs might better approach an answer. There is no doubt that a few big deals increase the economies of scale by reducing the number of executives, as well as the transaction costs (once more, this has to do with the RBT). In addition, bigger deals might have (according to traditional finance) lower size and marketability risk. On the other side, small PEFs suffer diseconomies of scale and have higher risk due to the size-marketability issue. However, more deals (from different sectors) might reduce risk because of diversification (according to traditional finance).

Yet all these forces have also to do with the type of PEF (big or small). Small PEFs cannot afford to hold big deals and, in such cases, the only possible strategy might be to hold several small deals. For instance, two extreme situations for a small PEF might be possible: The first is to have only one deal using the whole capital committed. The second might be to have many small deals. The first might increase economies of scale but might be too risky due to the total lack of diversification. The second might incur diseconomies of scale and high size-marketability risk but with a significant level of diversification. A balance between these forces is necessary. Figure 7.13 shows the driver-flow of all these factors.
Figure 7.13 shows that big PEFs might be more capable to pursue a strategy of few big deals than small PEFs. This is due to two main reasons: First, bigger PEFs can afford to have bigger deals; Second, bigger PEFs have easier access to deals and, therefore, they are more capable of choosing the investment strategy. In addition, Figure 7.13 shows how the three drivers (economies of scale, diversification risk, and size-marketability risk) affect the T.IRR. But which force is stronger? Figure 7.14 and the related explanation will try to address this question.
With the same criteria used in section 7.3.1 of this chapter, if the gain from costs-savings plus the gain from size-marketability risk (with the “few big deals” strategy) is higher than the loss due to the increase in diversification risk, then a strategy with few bigger deals might create value.

7.4 The Threshold IRR

Sections 7.2 and 7.3, based on the qualitative and quantitative analysis, have proposed not only what are the main drivers of the phenomena found in the last couple of decades of research (this project has also revealed new
phenomena), but also how they might operate. This section will assess how
the T.IRR is assessed by GPs.

As seen in chapter 6, section 6.3, no PEF uses an explicit formula to
calculate the T.IRR (only intuition and experience) and therefore the question
was: is it possible to trust the T.IRR for what it purports to be? The next sub-
sections, will address this question.

7.4.1 The Basic Determinants of the gross T.IRR

Chapter 6, section 6.3.4 showed how both GPs and LPs converge to a
similar estimated value of the Net IRR. Both GPs and LPs base their
expectations and targets on past experience and intuition about the future:
“what we think is possible” (stated by one GP of BIF3). This “what is
possible” comment also recalls the fact that PEFs’ performance is evolving
and current expectations are lower than past expectations:

“10 years ago, our target was to have an ex-post IRR higher than 30%,
nowadays, instead, our expectation is to have an ex-post IRR higher than
20%.” (stated by one GP of BIF2).

In addition, contracts between LPs and GPs are constantly evolving:
“LPs do not want to pay fees during the time in which the capital under commitment is not invested and, in this case, GPs will have to back the first years from their own pockets” (stated by one GP of BIF2).

Such a situation will change factors like the speed effect and the opportunity costs.

The statements of the last two paragraphs conform to Arnott & Bernstein (2002) who stated that by, using the past premium, we are assuming that investor expectations and their risk perceptions are only based on past realized returns (see chapter 2). In addition, these important differences between past and future weaken\(^{163}\) most of the studies seen in chapter 3 that have developed models by looking at past performance. Figure 7.15 shows an interesting perspective on the determinants of the gross T.IRR, the net T.IRR being one of its components.

**Figure 7.15 The Gross T.IRR and its Determinants**

163 If the present and the future in terms of expected returns are different than in the past, then models based on past information are incomplete.
Figure 7.15 shows what main drivers are used currently by GPs to assess the gross T.IRR. In addition, the “other drivers” (shown in the previous figure in the factor “deal risks & other factors”) are the determinants of the business plan of the target company (external and internal factors) which were outlined in chapter 6, section 6.3.1. The figure 7.16 shows another perspective of the determinants used by GPs to calculate the gross T.IRR.

**Figure 7.16 The Gross T.IRR and its Determinants: Another Perspective**

![Diagram showing gross T.IRR and its determinants](Source: Author's own work)

Figure 7.16 shows another perspective to estimate the gross T.IRR where the variable “other Drivers from BP” refers to other drivers included in the business plan.
7.4.2 The Business Plan and the Gross T.IRR

In chapter 6, section 6.3.1, it was shown how both the internal and external variables of the business plan directly affect the value of the E.IRR. On the contrary, the T.IRR might not be directly affected by these drivers but defined according to the potential volatility of them. One of the main problems of PEFs relates to their specific nature: closed markets (they cannot buy and sell freely as if they were in an open public market, difficult access to deals, limited number of deals in their portfolios, etc), is the fact that their diversification strategy can only be very limited. This implies that unsystematic risk might be higher. On the contrary, systematic risk\textsuperscript{164} (the risk that cannot be diversified and the one assessed by the coefficient beta of the CAPM) might be approached as in public markets.

However, since the unsystematic risks might not be efficiently offset by diversification, a study of the business plan variables and their volatilities might be a crucial point for the definition of the T.IRR. In fact, most GPs using intuition, assess the volatility of the main business plan drivers and assess the T.IRR for that deal accordingly.

\textsuperscript{164}In finance, systematic risk, sometimes called market risk, aggregate risk, or undiversifiable risk, is the risk associated with aggregate market returns. By contrast, unsystematic risk, sometimes called specific risk, idiosyncratic risk, residual risk, or diversifiable risk, is the company-specific or industry-specific risk in a portfolio, which is uncorrelated with aggregate market returns. Unsystematic risk can be mitigated through diversification, and systematic risk cannot be.
In the same way, some covenants agreed with entrepreneurs might positively impact the T.IRR. Figure 7.17 shows how GPs currently assess these drivers (using intuition) to define the T.IRR of the project.

**Figure 7.17 How GPs assess Unsystematic Risks**

Figure 7.17 shows how the “other drivers”, that include contract covenants and business plans, affect unsystematic risk. GPs using intuition, experience and sensitivity analysis assess the volatility of the variables involved in a business plan and, thereafter, define the risk of the deal and the gross T.IRR. Instead, Figure 7.18 shows a proposition (based on the data collected and data analysis) as how GPs could assess risk.

Source: Author’s own work
Figure 7.18 How GPs could assess Unsystematic Risks

Figure 7.18 shows that one part of the risk deal is systematic and, therefore included in the CAPM. In addition, the volatility of the unsystematic risk variables could be measured using tools like Monte Carlo simulation.\textsuperscript{165}

7.4.3 Conflict of Interest between LPs and GPs

Chapter 6, section 6.3.5.2 has shown how PEFs prefer a 4-year deal with a 25% IRR than a 1-year deal with a 50% IRR. GPs try to keep the capital

\textsuperscript{165} It is used to model phenomena with uncertainty in their inputs such as, the calculation of risk in business. When Monte Carlo simulations were applied in space exploration, oil exploration, and macroeconomics their predictions of failures and cost overruns are better than human intuition (Lanser, & Kranendonk, 2007).
assured for longer periods in order to increase the PEF’s life as well as their fees. This obviously implies an agency problem between LPs and GPs.

In other words, what really matters to the GPs is to arrive to the end of the PEF life with a net IRR of 15% (depending on each particular PEF) and meet the LPs’ expectations for that period and be able to obtain new capital for a new fund. The following figure might better explain this issue.

Figure 7.19 Conflict of Interests between LPs and GPs.

Source: Author’s own work

This conflict of interest also reveals an important information asymmetry between LPs and GPs. Clearly, LPs cannot know when the optimal time for exiting a deal has arrived. On top of this, LPs cannot force GPs to manage the portfolio as they wish during the holding period.
Therefore, the gross T.IRR is influenced by two forces: First, GPs’ personal targets of having longer holding periods (for the capital committed) in order to earn more fees; Second, GPs’ target to achieve the net T.IRR and keep LPs happy. See Figure 7.20.

**Figure 7.20 GPs’ Interests**

Chapter 6, section 6.3.5, has also shown that there are several behavioral approaches by which the gross T.IRR is defined:

- The gross T.IRR acts as a buffer: Therefore, when defining the gross T.IRR, GPs add 5% more as a buffer (see the following formula):

\[
\text{Gross T.IRR} = \text{Net T.IRR} + \text{Internal Costs} + \text{Buffer}
\]
This system might suggest the existence of hubristic behavior\textsuperscript{166} (behavioral factor) when assessing business plans and the E.IRR.

- When the risk of individual deals is assessed: A rational approach (based on traditional finance) could use the CAPM to calculate both the net T.IRR and the extra-premium due to the risk of the deal.

\[
\text{Gross T.IRR} = \text{Net T.IRR} + \text{Internal Costs} + \text{Risk premium of the single deal}
\]

A rational assessment of the net T.IRR could be based on the CAPM. In this case, the CAPM should include the premium for investing in a PEF. In the same way, the Gross T.IRR of a single deal could be assessed by GPs using the same model.

CAPM (Net T.IRR) includes the premium for investing in a PEF

CAPM (Gross T.IRR) includes an extra-premium to offset risks of a single deal

\[
\text{CAPM (gross T.IRR)} \geq \text{CAPM (net T.IRR) + Internal Costs}
\]

The last formula shows that if GPs wish to achieve LPs expectations, the risk premium to be obtained by a single deal (measured using the CAPM for that single deal) should be equal or superior to the LP’s required return (measured using the CAPM for that PEF) plus the internal costs. This explanation must not be intended as a duplication in the use of the CAPM since:

\[
\text{CAPM (gross T.IRR)} - \text{CAPM (net T.IRR)} = \text{the premium for investing in a single deal rather than in a portfolio of companies held by a CAPM.}
\]

CAPM (gross T.IRR) could be inferior to the CAPM (net T.IRR) if the former is calculated over a company sector with a beta lower than that of the PEF.

\textsuperscript{166} They already recognized that their business plans are typically overestimated since the E.IRR is normally 5\% higher than the ex-post IRR.
Using the same criteria seen in Figure 7.16, Figure 7.21 shows a more complete schematic which includes: The opportunity cost and an assessment of the risk of the deals based on a more systematic measure like the CAPM.

**Figure 7.21 The Gross T.IRR and its main Determinants**

Other behavioral drivers were studied in the pilot case (chapter 5) in which the entrepreneur’s strong feelings (attachment to family tradition) made the closing of the deal difficult. Figure 7.22 explains how these forces work in this sort of case.
Figure 7.22 shows how the entrepreneur’s feelings decrease the E.IRR (red arrow) because the PEF might offer a higher entry price for the company. On the other side, financial distress increases the E.IRR (green arrow) for the opposite reason.

Finally, in section 7.2.3 (performance persistence), two additional behavioral factors were found and explained: LPs’ bounded information and attachment to local institutions, and LPs’ representativeness behavior that takes them to follow the most successful GPs.
7.5 Conclusion

This chapter has proposed a new explanatory model which shows in detail all the factors (beyond the traditional CAPM factors) revealed in the first chapters of this thesis (outside traditional finance) that drive the risk premium in the private equity funds. Recent papers have proposed models accounting only for risk and CAPM factors without being able to explain neither their drivers nor their nature.

In addition, most of the academic papers between 1997 and 2011 had only vaguely grasped the existence of new phenomena outside the traditional finance. From a completely different approach, this thesis has not only confirmed the existence of those phenomena and identified others, but also has been able to explain how they work through an explanatory model.

Consequently, the next chapter, based on the explanatory model of this chapter as well as on the data collected and exhibited in chapter 5, will quantify most of the determinants of the risk premium. In addition, the next chapter is designed to illustrate the application of the model and to explain how to operationalise it.
8 MODELLING THE PEFs RISK PREMIUM DRIVERS

8.1 Introduction

This chapter, based on the findings of chapter 5, on the analysis of chapter 6, and on the explanatory model of chapter 7, is aimed at quantifying the determinants of the PEFs’ risk premium and thus, the T.IRR.

It will both illustrate the application of the model (seen in chapter 7) and explain how to operationalise it. The quantitative model illustrated in this chapter is aimed at complementing the CAPM factors with new factors able to explain the unique phenomena which drive the PEFs’ premium. To achieve this goal, it is important to understand the nature of the factors involved: Do they reflect risk factors, cost factors or other factors? In fact, in understanding their nature, it will be possible to separate them, see how they behave, and ultimately understand how they combine in setting the risk premium.

Section 8.2 will start by classifying the nature of the drivers of the model seen in chapter 7. The classification of T.IRR determinants is necessary in order to use the correct paradigm and tools to quantify them. Section 8.3 will illustrate the gaps of the models offered by academia which are only based on CAPM factors. Subsequently, sections 8.4 and 8.5 will develop a quantitative model (based on the qualitative model introduced in chapter 7) with new factors to complement those included in the “old” CAPM.
Section 8.6 will offer quantitative tools to assess GPs’ strategic decisions regarding the portfolio (diversification vs. specialization / big deals vs. small deals). Subsequently, section 8.7 will discuss the different applications of the model which can be used to assess the T.IRR of a portfolio or a single deal. Finally, in section 8.8, the model will be tested by applying it to some illustrative examples. The results given by the model will be compared with the figures given by some of the PEF executives in the research sample.

8.2 Determinants of the Risk Premium

In order to measure the determinants revealed during this research project, it is first necessary to understand their nature: Do they reflect traditional finance theory, the behavioral theory, or some other new theory not yet recognized?

All the determinants of the T.IRR analyzed during the previous sections can be classified into groups of a different nature. Figure 8.1 intends to capture that classification.
As shown in figure 8.1, the bigger sphere divides the determinants of the T.IRR into three important groups:

1 – Factors that are governed by the traditional finance theory and the CAPM. (CAPM)
2 – Factors that are not governed by the traditional finance theory but are rational. (RF)
3 – Factors that are not rational but behavioural (IR)

The small sphere has a further classification:

1 – The so-called PEF drivers: These are the newly-identified phenomena associated with the specific nature of PEFs and the way they operate: speed effect, MCD phenomenon, performance persistence, etc. Some of these phenomena have rational drivers and some others have irrational drivers: For instance, the performance persistence has two drivers. The first is the learning cost effect which is a rational factor. The second is the
representativeness which is a behavioural factor. These factors also include the PEFs' internal costs like the fees perceived by GPs.

2 - Factors that are governed by the traditional finance theory and the **CAPM**: For instance: The net T.IRR which is, in some cases\(^\text{167}\), based on past performance and ex-post IRR analysis as well as rational future expectations (fundamentals). In the same way, the gross T.IRR should assess the risk of the deal by using the CAPM.

3 – **Behavioural drivers**: For instance: the intuition used to assess the risk-deal (extra-premium), the representativeness in the performance persistence phenomena, *etc.*

Figure 8.2 shows the classification with the most important drivers studied in chapter 7.

\(^{167}\) Sometimes, there is also intuition and no clear value for the net T.IRR
Figure 8.2, shows a classification according to the nature of the T.IRR driver. In addition, figure 8.2 illustrates in red which factors drive abnormal returns (Jensen’s alpha), that is, returns which are superior or inferior to the risk-adjusted returns plus internal costs. For instance: Drivers like performance persistence (GPs’ skills), speed effect, money-chasing deals phenomena, market inefficiency, etc do not have a risk nature and therefore their outputs in terms of performance generate abnormal returns. In the north-west sector, figure 8.2 also illustrates in black which factors drive the risk premium or the risk-adjusted return.
By exploiting the factors driving abnormal returns (delimited in red in the figure 8.2), PEFs expect to generate alpha. In addition, one can understand this separation between alpha factors and risk-adjusted factors as follows:

The expected return should be the sum of a risk-adjusted return (the T.IRR) and an expected abnormal return. In other words, the expected return (E.IRR as an output of a business plan) should be equal or superior to the T.IRR. If the E.IRR is superior to the T.IRR then the excess return is an abnormal return.

\[
E.IRR = \text{Risk-Adjusted Return} + \text{Abnormal Return}
\]

\[
E.IRR = T.IRR + \text{Jensen’s alpha}
\]

Until now, this thesis studied which are the determinants of the T.IRR and how they work (see the qualitative model of chapter 7). However, in order to measure some of these drivers, it will also be necessary to understand the process by which PEFs create value.

Considering the explanations given in chapter 3 section 3.3, regarding transaction costs (Coase, 1937), the agency theory (Bratton, 2008), and the prisoner’s dilemma approach (Cable & Shane, 1997), it is possible to understand the reasons (including the Jensen’s alpha factors) why PEFs are able to create value and to achieve high returns. Considering these explanations, the following classification design should better reveal the PEF premium drivers:

168 Although ex-post evidence seen in chapter 3 does not always support this.
**Gains in Inefficiency (GI) Including Jensen's alpha factors:** This is one of the so-called PEFs’ drivers seen in the last classification. These are the ways in which private equity funds respond to the inefficiencies of the privately-held markets. They take advantage of certain inefficiencies and thereby obtain a gain. The EMH is obviously not applicable in privately-held markets in which inefficiencies and opportunistic behaviors are not reflected in market prices, and where it is much more difficult for investors to trade the shares. Therefore, part of the success of the private equity firms stems from three main reasons. First, they are able to minimize transaction costs incurred by common private investors in buying and selling companies. Second, they profit from a new agency paradigm. Acting as insiders and aligning the management of the target firms, they eliminate any potential opportunistic behavior and therefore can gain from the huge inefficiencies present in privately-held markets. Third, as a consequence of this new agency approach (owners acting as insiders), they become specialized managers in specific types of target companies and deals and are able to further gain from specialization as well as from the economies of scale and scope generated.
Considering the last classification, a PEF can be seen as an entity that attempts to create value by taking advantage of the inefficiencies present in the PHCM’s: GI (red segment which is classified into four segments indicated by the red arrow in the new sphere): New agency theory approach, economies of scale and scope, lower transaction costs, specialization and synergies, etc). The following figure shows this new classification paying special attention to the factors or drivers grouped to gains in inefficiency.
8.3 The Capital Asset Pricing Models

By using a four-factor model, Korteweg and Sorensen (2009) estimate the risk premium for PEFs in general *circa* 15.8% (without including the liquidity factor explicitly). They also stated that small firms (privately-held companies) have important levels of unsystematic risk which should be considered. In addition, they stated that the PEFs’ premium is very sensitive to the industry sector of their portfolios.
Franzoni et al. (2010) computed that liquidity risk (for PEFs) is in a range between 5% and 15% depending on the type of PEF: bigger PEFs with bigger deals are more sensitive to liquidity shocks and therefore they ask for higher T.IRRs. This is also confirmed by Manigart et al. (2002) who stated that small deals require lower returns. In the light of the conclusions discussed in sections 7.2.1, 7.2.2, 7.2.3 and 7.3.2 of chapter 7, this project also found that smaller PEFs holding smaller deals require lower T.IRRs, but with different drivers. Therefore, a further task of this thesis is to reveal which drivers are behind the liquidity factor.

A problem with studies like that of Korteweg and Sorensen (2009) or Franzoni et al. (2010) is that while they were able to estimate, in general terms, the PEFs’ equity premium using general factors like that of liquidity, they were not able to explain nor understand what is behind that factor. These authors based their conclusions on assumptions like “bigger PEFs with bigger deals are more sensitive to liquidity shocks and therefore they ask for higher T.IRRs”. This statement might be true but is not complete and is based on no evidence. In contrast, this research project reveals evidence regarding the true drivers as shown in the first sections of this chapter.

Franzoni et al. (2010) estimated the risk premium and the cost of capital for PEFs using the three-factor model of Fama & French (1993), and adding a new factor: The Pastor and Stambaugh (2003) (PS) liquidity factor. Using this model, Franzoni et al. (2010) were able to reduce alpha to a minimum value
compared with capital asset pricing models\textsuperscript{169} (see chapters 2 and 3 for more
details). However, this model was developed by Fama and French (1993) to
explain past returns and to be used in organized markets and where some
drivers might be different. The phenomena present in the very nature of
PEFs and their markets could be explained not only by traditional models, but
also by new theories based on the patterns shown in chapter 7.

For instance, the three-factor model of Fama and French considers that
value companies have higher risks than growth companies. This is due to the
fact that growth companies can sooner have an IPO. But this contradicts
evidence that was revealed in this research project in which expansion firms
(high growth) tend to have higher risk than LBOs. This is another example in
which the FF three-factor model alone does not apply.

In addition, models based on the three-factor model like those of Franzoni \textit{et al.} (2010) or Korteweg and Sorensen, (2009), try to estimate the value of the
gross T.IRR and as a consequence, they mix drivers of a risk nature with
drivers of a cost nature (or a nature rather than risk).

Therefore, they cannot explain what happens inside the PEFs and how
drivers like the expected investment speed, expected cost of opportunity,
expected nature of target deals in term of size and sector, the synergies
among different deals, the size of the PEF, the monitoring intensity, expected
strategy (diversification vs. economies of scale), expected cost of fees,

\textsuperscript{169} This might mean that their illiquidity factor is hiding other factors (seen in these last two
 chapters) which are the true generators of such abnormal returns or Jensen’s alpha.
expected cost of immobilized capital (reserves), expected exit, etc, influence the premium and, ultimately, GP’s decisions. In other words, they lack internal validity.

Consequently, recent models which are only based on the three-factor model alone might not be enough nor suitable to assess the PEFs’ premium. In addition, instead of making assumptions about the drivers behind the general factors of three-factor-model, it is first advisable to take the opposite route, that is: Reveal and understand the drivers and their nature in order to use the appropriate theory which, as shown in the first section of this chapter, might differ from the theories developed for organized markets.

8.4 A New Quantitative Model

Section 8.3 of this chapter, as well as chapter 7, has shown that there are factors not included in the classical CAPM that drive the PEF premium, not all of them of a risk nature. In fact, the illiquidity factor might be only a blanket variable that hides the factors revealed by this study. Therefore, this model will try to unbundle the “liquidity” factor which some authors have used in attempting to explain the abnormal returns.

Before presenting a new quantitative model, it is first necessary to summarize the factors that have to be considered. There are factors that must be based on the drivers shown in the qualitative models and graphs shown in chapter 7 and in section 8.2 of this chapter.
8.4.1 The classical CAPM

Not all the PEF premium can be explained with the classical CAPM but as shown in section 8.2, some part might be (a part of the cake of Figure 8.1) and, therefore, it should not be completely removed from the final quantitative model. The CAPM is about systematic risk ($\beta$) and those risks cannot be mitigated by diversification.

However, there are many factors (exhibited in the qualitative models of the first sections of this chapter) which revealed a great deal of unsystematic or specific risks. PEFs are not able to diversify those risks completely. The power of diversification is very limited due to the small number of deals that a PEF might hold. That is why other forces like economies of scale and the search for synergies, forces that apply to the resource-based theory, might oppose, and therefore, mitigate the strength of those specific factors.

In other words, a PEF cannot diversify extensively and cannot totally eliminate its unsystematic risk. Chapter 2 presented the three factor model:

$$E(R) = R_f + \beta \cdot R_m + bs \cdot SMB + bv \cdot HML + \alpha$$

According to Brown (2005): The Fama-French Three Factor Model is a regression analysis that tries to separate out the systematic risk of a stock from the unsystematic risk by compensating for three factors. The last two factors are unsystematic risk. Alpha refers to abnormal returns.
However, the CAPM is not enough and new factors need to be added to any PEF model. Therefore, any model intuitively should consider the following initial factors:

<table>
<thead>
<tr>
<th>(1) Gross T.IRR = Rf + β_p Rm + β_s SMB + β_v HML + ω + IC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1b) Gross T.IRR = Three Factor Model CAPM factors + ω + IC</td>
</tr>
</tbody>
</table>

Where:

- $\beta_p =$ systematic risk of the expected PEF portfolio.
- $\beta_s =$ unsystematic risk originated by the size of the companies of the expected portfolio.
- $\beta_v =$ unsystematic risk originated by the value factor of the companies of the expected portfolio.
- IC represents the internal costs (they are not risk components) as annualized percentages of the CC.
- $\omega =$ other potential unsystematic risks present in privately-held markets.

However, the nature of PEFs’ returns as well as their expectations (E.IRR) also includes abnormal returns:

<table>
<thead>
<tr>
<th>(2) E.IRR = Risk-Adjusted Return + Abnormal Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2b) E.IRR = Gross T.IRR + Jensen’s alpha</td>
</tr>
<tr>
<td>(2c) E.IRR = Gross T.IRR + $\sigma$</td>
</tr>
</tbody>
</table>

Where $\sigma$ represents those factors (some of them are PEF phenomena and some others are behavioral determinants) which drive abnormal returns (Jensen’s alpha).

---

170 The use of this factor is absolutely coherent with the findings of this research project. In fact, the existence of a size premium was confirmed by all PEFs of the sample of this thesis. Some of them price this risk when estimating the T.IRR (for more details see chapter 6).

171 The use of this factor in the case of the PEFs needs some important considerations which are addressed in appendix 1.
The first part of (1) is the three-factor model\textsuperscript{172} of Fama and French (1993) (seen in chapter 2) which is not rich enough either to assess the full premium or to explain all the drivers in the case of PEFs. That is why two more general factors must be added: IC and $\sigma$. The quantitative study and estimation of the drivers behind these two factors will be the main concern of the next sections.

But why unsystematic risk can be very important in PEFs’ investments? That is partly because of the PEFs’ imperfect diversification opportunities, that is, the limited number of deals in their portfolios. One of the reasons why PEFs might prefer a high number of small deals (instead of a few big deals), is the fact that, in this way, they can reduce the value of $\sigma$. As seen in the “cake” of section 4.1, $\sigma$ is comprised of the following general factors:

\begin{equation}
(3) \quad \sigma = \text{PEFF} + \text{BF}
\end{equation}

Where:

\begin{align*}
\text{PEFF} &= \text{PEF factors} \\
\text{BF} &= \text{Behavioural factors}
\end{align*}

The distinctive feature of this model is that these factors might not necessarily contain risk factors. Additionally, it is possible to reformulate (1) as follows. Therefore, it is also important to separate risk factors from non-risk factors. The first calculates the risk premium and the second, the abnormal returns (Jensen’s alpha).

\textsuperscript{172} As seen in chapter 3, this is (for the time being) the most widely-tested and recognized model used to predict the risk premium in organized markets. It is able to explain 90\% of past returns instead of the 70\% of the SML-CAPM.
(4) Gross T.IRR = Risk adjusted Returns + IC + Abnormal Returns ($\sigma$)

(5) Risk adjusted Returns = CAPM factors

(6) $\sigma = PEFF + BF$

IC: the internal costs have to be considered as a part of the threshold IRR. Part of them might have an alpha component (For instance: BIFs have lower fees than REFs or experienced GPs might achieve lower opportunity costs than other GPs). However, the ICs (even some part of it might generate abnormal returns) have to be considered as part of the threshold IRR.

In addition:

(7) Gross T.IRR = Net T.IRR + IC

Where:

Net T.IRR is the LPs’ expectations.

LPs’ expectations are based on previous experience (past PEF performance) and on alternative investments to which they might have access in the organized markets. The net T.IRR can be understood as follows:

(8) Net T.IRR = H.IRR + $\lambda$

Where:

H.IRR = The opportunity cost that LPs incurred by not investing in organized markets. In other words, this is what they might have earned if they would not have invested in a PEF.

$\lambda = The additional return risk-adjusted (premium) for investing in a PEF$

Additionally, it is also possible to reformulate (4) as follows.
(9) \[ \text{Net T.IRR} = R_f + \beta_{PEF} (R_m) + \beta_{s2} \text{SMB} + \beta_{v2} \text{HML} + \gamma \]

Where:

The values of \( R_m, \text{SMB}, \) and \( \text{HML} \) are taken from organized markets since LPs look at organized markets when comparing with alternative investments.

\( \beta_{PEF} \) represents the PEF systematic risk, as measured by an LP.

\( \beta_{s2} \) might differ from \( \beta_s \) since LPs measure the size of the PEF in terms of capital committed. In contrast, GPs measure the size of the companies to be held by the expected portfolio which is a GP’s strategic decision.

\( \beta_{v2} \) might differ from \( \beta_v \) since LPs measure the PEF as a whole in terms of value risk. In contrast, GPs measure the value risk of the companies to be held by the expected portfolio which is a GP’s strategic decision.

\( \gamma = \) The additional PEF risk drivers that an LP has to consider when investing in it.

Note that, in (9), a new factor \( \gamma \) (different from the \( \sigma \) of (1)) has been considered. This is because an LP through the net T.IRR measures only risk factors (\( \gamma \) considers only risk drivers). Instead, \( \sigma \) accounts for internal PEF drivers which might consider drivers other than risk drivers.

In the same way as in (1), \( \beta_p \) should indicate the systematic risk of the portfolio that GPs expect to hold. In other words, \( \beta_p \) is associated with the strategy that GPs intend to follow in terms of portfolio (industry sector, small deals, big deals, diversification vs. specialization, etc). Instead, \( \beta_{PEF} \) should indicate the systematic risk of the PEF (relative to alternative investments outside the PEF) as perceived and measured by an LP. The next sections will further develop the model but concentrate attention on the PEF factors (PEFF) presented in (3) and the conclusions seen in this section will be further analyzed.
8.4.2 The Speed Effect (SE) and the Opportunity Cost (OC)

Section 7.2.2 of chapter 7 has shown that some PEFs calculate their ex-post IRR over capital drawdowns and some others over capital committed. In the first case, the opportunity cost should be seen as the difference between the H.IRR\textsuperscript{173} (between 6\% and 8\%) and the interest given by a liquid current bank account (less than the Euribor rate which is around 1.5\%\textsuperscript{174}). In the second case, the opportunity costs can be intuitively understood as the difference between the Net T.IRR (between 12\% and 20\%) and the H.IRR (between 6\% and 8\%). The difference between these two variables is what LPs do not earn (opportunity cost) while the capital committed is waiting to be invested in a potential deal.

In the first case, the OC is between 4.5\% and 6.5\% with an average value of 5.5\%. In the second case, the OC is between 4\% and 14\% with an average value of 9\%. For simplicity\textsuperscript{175}, a unique value will be taken: the average OC of the two methodologies which is 7\%. Although, in the first case, the PEFs calculate the ex-post IRR based on capital draw-downs, it is logical to think that LPs’ expectations look at the whole PEF life since their cash was committed and not since the cash was called.

\textsuperscript{173} This is what LPs might earn outside the PEF in their alternative investment portfolios.

\textsuperscript{174} Euribor estimation for the year 2011 (1.5\% between September and November 2011)

\textsuperscript{175} Each PEF according to its own methodologies and contracts will have to define its own opportunity cost. Through this work, the researcher is setting the basis through a generalization.
(10) OC = H.IRR – Euribor (First Case)

(11) OC = Net T.IRR – H.IRR (Second Case)

(12) T.OC = OC x \[ E.SY / 2 \] x CC

Where:

OC = The opportunity cost as a percentage.

E.SY = Expected speed in years (expected by GPs) to invest all the capital committed.

T.OC = Total opportunity costs.

CC = Capital committed.

Equation (12) obtains the total opportunity cost incurred by the PEF and this depends on the investment speed (E.SY). This factor is divided by two because if GPs expect to invest all the CC in E.SY years (a linear investing process is assumed here), this would be like investing all at once in half that period. In addition, the following formula expresses the yearly opportunity cost (measured as a percentage of the whole PEF life).

\[
(13) \text{YOC} = \frac{OC \cdot (ESY/2)}{E.LY}
\]

Where:

YOC = Yearly Opportunity Cost

E.LY = Expected PEF life in years

Equation (13) indicates the yearly opportunity cost that can be used in a model directed at estimating the gross T.IRR. For instance:
Example:
OC = 7%
E.SY = 5 years (investment period)
E.LY = 10 years
Then:
\[
YOC = \frac{7\% \times (5/2)}{10} = 1.75% 
\]
The yearly opportunity cost for this PEF will be 1.75% and this must be considered when assessing the gross T.IRR

Therefore, returning to equation (3), the first PEF factor to be considered is the value of YOC (1.75% in the last example).

\[(2) \sigma = \text{PEFF} + BF\]
Where as a starting point:
\[(14) \text{PEFF} = \text{YOC} + \text{other PEFFs}\]

But what happens during the disinvestment process (last five years) in which capital returns to LPs? At this last stage, there should not be any opportunity cost since LPs can again reinvest their capital at the H.IRR (unless they wish to invest in a new fund and start a new cycle) which means a well-diversified portfolio.

Conversely, during the last stage (as seen in section 7.3.3 of chapter 7 regarding the conflict of interests between LPs and GPs), GPs might tend to delay the exit of the companies. This problem was confirmed by Lerner and Schoar who stated that:
“the liquidity level of private equity funds is a decision variable for fund managers. Fund managers deliberately make the fund illiquid to screen investors that are less likely to face a liquidity shock.” Lerner & Schoar (2004:3).

In line with this last statement, this project found that GPs prefer to hold longer deals with a lower IRR than shorter deals with a higher IRR as a way to keep the capital “locked in” and increase the PEF life as well as their fees. However, it is obvious that the duration of the deal will not only depend on the strategy chosen by GPs and their conflict of interests with LPs, but also on the exit conditions of the market at the end of the PEF life.

This conflict of interest factor cannot be quantified. However, this has more to do with the liquidity conditions (external variable) of the market than with these so-called opportunity costs (an internal variable which is a consequence of a GP’s strategic decision). Therefore, this factor should be included in the liquidity factor to be approached in the next section.

8.4.3 Liquidity Risk

Liquidity conditions are connected to a number of macro-economic variables seen in chapter 3. In addition, three kinds of liquidity risk were also identified in chapter 3 section 3.2.4.2:

- Uncertainty over transaction costs;
- Higher tolerance for liquidity risk;
- The level of leverage of the companies which might need to be re-financed.

This implies that PEFs might have lower returns (more bankruptcies) when aggregate market liquidity deteriorates. Therefore, a new factor should be included in the model: The illiquidity minus liquidity (IML)\textsuperscript{176} factor which corresponds to a long position in high-liquidity-beta public stocks and a short position in low-liquidity-beta stocks.

\begin{equation}
\text{Gross T.IRR} = R_f + \beta_p (R_m - R_f) + \beta_s \text{SMB} + \beta_v \text{HML} \beta_{\text{liq}} \text{PIML} + \text{IC}
\end{equation}

Where:

\[ \beta_{\text{liq}} \] represents the unsystematic risk for the liquidity factor.

\text{PIML} this factor is included in the factor \( \omega \) presented in (1). It is the pure illiquidity minus liquidity premium (pure of opportunity costs) estimated for the private equity funds\textsuperscript{177}

In (15), the value \( \beta_{\text{liq}} \) will depend on four main drivers:

- The expected market liquidity conditions during the life of the PEF:
  The weaker the aggregate liquidity conditions, the higher the \( \beta_{\text{liq}} \).

- The level of leverage of the companies to be held in the portfolio: The higher the leverage, the higher the \( \beta_{\text{liq}} \). This is because highly leveraged companies might find it difficult to re-finance their debts

\textsuperscript{176} The liquidity-mimicking portfolio was obtained by Stambaugh and Pastor (2003) calculating the difference between the average return of the least liquid portfolios and the average return of the most liquid portfolios, therefore the term IML (Illiquid Minus Liquid).

Franzoni \textit{et al.} (2010), applying the same method for unquoted private equity funds, found an IML premium (PIML) of 4.5\% and a \( \beta_{\text{liq}} \) of 0.67.

\textsuperscript{177} The value of this premium for PEFs was estimated by Franzoni \textit{et al.} (2010) which is around 4.5\%. However, this risk is mixed with opportunity costs found in this thesis.

Therefore, in order to understand the true drivers of the PEF premium, it is necessary to subtract the opportunity costs from the total IML.
the event of financial crisis. In such cases, banking creditors might choose to send highly leveraged companies into bankruptcy.

- The company’s intrinsic conditions to find an exit: The greater difficulty in exiting (due to the lack of trade buyers in its market or to the impossibility of making an IPO), the higher the $\beta_{\text{liq}}$. As stated in the previous section, GPs could also delay the exit and make the fund more illiquid thus increasing the IML factor.

As stated in section 8.4, one of the targets of this analysis is to unbundle the liquidity factor. Consequently, the opportunity costs calculated in (13) will be separated from the liquidity premium. See the example below.

<table>
<thead>
<tr>
<th>Taking mean values of the findings exhibited in chapter 6:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC = 7%</td>
</tr>
<tr>
<td>E.SY = 5 years</td>
</tr>
<tr>
<td>E.LY = 10 years</td>
</tr>
<tr>
<td>Then:</td>
</tr>
<tr>
<td>YOC = $\frac{7% (5/2)}{10} = 1.75%$</td>
</tr>
<tr>
<td>IML = 4.5% (this value was calculated by Franzoni et al. for PEFs’ deals between 1975 and 2006 using the same methodologies applied by Stambaugh and Pastor (2003) for quoted companies.</td>
</tr>
<tr>
<td>(16) PIML = IML – YOC</td>
</tr>
<tr>
<td>PIML = 4.5% - 1.75% = 2.75%</td>
</tr>
</tbody>
</table>

Considering these last values, the values of the three factors taken from Kenneth French’s website (see chapter 2), and the value for the liquidity factor taken from the estimations of Franzoni et al. (2010), it is possible to assess the first part of the model:
(17) CAPM factors = R_f + \beta_p \ R_m + \beta_s \ SMB + \beta_v \ HML \ \beta_l \ PIML

\[ \text{CAPM factors} = 5\% + 1.3 \ (4\%) + 0.034 \ (3\%) + 0.93 \ (5\%) + 0.67 \ (2.75\%) = 17\% \]

Appendix 8.2 explains the source of the values chosen for the previous formula.

Adding YOC = 1.75%

(18) CAPM factors + YOC = R_f + \beta_p \ R_m + \beta_s \ SMB + \beta_v \ HML \ \beta_l \ PIML + YOC

\[ \text{CAPM factors + YOC} = 18.75\% \]

The value of 18.75% is only a general estimation for illustration\(^{178}\). However, as stated before in this section, each single PEF should assess its own value according to its portfolio, strategy and future expectations. Note that the size premium and the liquidity premium together account for 2% which is in line with the answers given by the interviewees (see chapter 5). In fact, this premium was between 1% and 3%.

But the model developed in these first sections is incomplete since it refers only to the CAPM drivers. The only new contribution until now was the specification of the opportunity costs. Therefore, it is now necessary to address and reveal the drivers which might generate abnormal returns (\(\sigma\)) and where not included in the formula (1):

(3) IC + \sigma \ where \ \sigma = PEFF + BF

\(^{178}\) This is a standard estimation for a big PEF that is able to have a well-diversified portfolio (many few deals) without specialization (a generalist PEF).
8.4.4 The Internal Costs (IC)

The internal costs (IC) are mainly three: Fees, carried interests and the opportunity costs generated by the reserves:

\[
(19) \text{IC} = \text{EF} + \text{ECI} + \text{OCR}
\]

Where:

- $\text{EF} = \text{Expected Fees}$
- $\text{ECI} = \text{Expected Carried Interests}$
- $\text{OCR} = \text{Opportunity cost generated by the reserves}$

The expected fees (EF) have already been measured through a model introduced in chapter 6 appendix 8.1 (see chapter 6, section 6.2). In order to calculate the true cost generated by the fees, it is necessary to account for each of the formulae applied by the PEFs. The results for each method and each PEF of the sample have been shown in chapter 6 (appendix 8.1). Appendix 8.1 shows that the values of the EFs depend on the type of PEF:

- For BIFs and PAFs, this is *circa* 1%;
- For CAPs (generalist), it is *circa* 1%;
- For CAPs (specialist), it is 0.7%;
- For REFs, it is between 1.5% and 2%

(for more details regarding these figures, refer to chapter 6).
The expected carried interest (ECI) can be calculated as follows:

(20) \[ ECI = [ CI \times (\text{Gross T.IRR}) ] \]

Where:

CI = normally 20% of the capital gain.

Example:

ECI (REF) = [ 20% x 20%] = 4 %
ECI (BIF & PAFs) = [20% x 25%] = 5 %

This difference is due to the fact that BIFs and PAFs have higher net T.IRRs than REFs

Finally, the opportunity cost originated by the reserves (OCR) can be calculated as follows:

(21) \[ ORC = [ R \times (E.LY \times 2 / 3) \times OC ] \]

Where:

R = Reserves

(E.LY x 2 / 3) = the first two thirds of the life of the PEF, when the reserves must be kept in case of emergencies.

Example:

R = 10% over capital committed
OC = 7%
E.LY = 10

ORC = 10% x (10 x 2/3) x 7% = 0.5%

Summarizing, a general estimation for the IC will be:
These last values are in line with the answers of the interviewees who stated (in the case of BIFs, PAFs and REFs) that the difference between the net T.IRR and the gross T.IRR (that is, the internal costs) is between 5% and 10% (see chapter 5).

Nevertheless, as underlined in sections 8.4.2 and 8.4.3 of this chapter, it is very important to separate the risk drivers from the cost drivers. In fact, the YOC assessed in section 8.4.2 belongs to the internal costs and not to the risk drivers. The distinction between risk drivers and cost drivers is one of the main contributions of this theory. Therefore, although GPs do not price this factor, this model will consider it as a part of the internal costs:

Until now, two general factors (or two parts of the cake of section 4.1) of the model were developed as an initial framework for the final model:

179 If drivers of different natures are not separated, it will not be possible to understand how the T.IRR is driven and how these influence GPs’ strategic decisions: For instance specialization vs. diversification, big deals vs. small deals, etc.
(1) Gross T.IRR = CAPM factors + IC

CAPM factors = Rf + \( \beta_p \) (Rm - Rf) + \( \beta_s \) SMB + \( \beta_v \) HML \( \beta_{liq} \) PIML \( \Rightarrow \) first part of (18)

CAPM factors = 5% + 1.3 (4%) + 0.034 (3%) + 0.93 (5%) + 0.67 (2.75%) = 17%

(19) IC = EF + ECI + OCR + YOC

IC (BIFs) = 1 % + 5% + 0.5% + 1.75 % = 8.25%

Therefore:

(20) Gross T.IRR (BIFs) = 17% + 8.25% = 25.25 %

8.4.5 Performance Persistence Factor (PPF)

As shown in section 7.2.3 of chapter 7, bigger and older PEFs tend to have higher net T.IRRs (higher LPs’ expectations). This implies that they have access to better deals. It is possible to express this specific driver with the following factor, the PPF:

(23) PPF = \( \mu_{pp} \times PP \)

Where:

PPF = performance persistence factor

\( \mu_{pp} \) = performance persistence coefficient (whose values are between 0 and 1)

PP = performance persistence premium. In the sample of this thesis, the difference between big PEFs and small PEFs in terms of net T.IRR is 5%.

Then:

PPF = \( \mu_{pp} \times (5\%) \) \( \Rightarrow \) for the smallest PEF \( \mu_{pp} = 0 \) and PPF = 0.

\( \Rightarrow \) for the biggest PEF \( \mu_{pp} = 1 \) and PPF = 5%
Therefore, both the net T.IRR and the H.IRR will have the following drivers and formulae:

(24) Net T.IRR = 4F-CAPM + PPF  
(25) H.IRR = S&P500 + PPF or H.IRR = SML CAPM + PPF  
Where:  
4F-CAPM = 4 factor model seen in the equation (17)  

8.4.6 The Money-Chasing Deals Factor (MCDF)

In section 7.2.1 of chapter 7, it was shown how small PEFs need to buy at very low EBITDA multiples (discounts set at 30% or 35% which, translated into a component of the IRR of about 3%). Conversely, big PEFs are able to pay more (30% more as an extreme value) than the market value (especially when competition is present). This affects the E.IRR which can vary from -3% to 3%. A low E.IRR can affect and decrease the acceptance level (the T.IRR).

Consequently, the following formula illustrates this effect:
\[
MCDF = \mu_{mcd} \times MDC
\]
Where:

MCDF = money-chasing deals factor

\[\mu_{mcd} = \text{money-chasing deals coefficient}\]

MCD = money chasing deal premium. In the sample of this thesis, the difference between big PEFs and small PEFs in terms of E.IRR affecting the gross T.IRR is 6%. In other words, MCD can have values of -3% for big PEFs and +3% for small PEFs.

Then:

\[MCDF = \mu_{mcd} \times (6\%)\]

The value of \[\mu_{mcd}\] will be between -0.5 and +0.5 depending on the expected competition with other PEFs and on the number of available deals. The higher the competition, the lower the coefficient (nearer to -0.5). The higher the number of deals available, the higher the coefficient (nearer to 0.5). The smaller the PEF, the higher the coefficient (nearer to 0.5).

**8.4.7 Speed Factor (SF)**

Section 7.2.2 of chapter 7 showed the necessary balance between speed and the magnitude of the gross T.IRR (the opportunity cost standard value for a 5-year investment period is YOC = 1.75%). If the opportunity cost increases, the gross T.IRR must offset that situation. These forces can be measured as follows:
(27) \( EOC = \mu_{mcd2} \times (YOC) \)

Where:

EOC = expected opportunity cost.

\( \mu_{mcd2} = \) money-chasing deal second coefficient (whose values are between 0 and 1). This coefficient affects both the speed and the opportunity costs. In the sample of PEFs, it has been shown that a standard value for the opportunity costs is 1.75%. It is therefore possible to assume that an extreme high value might be 3.5% and an extreme low value 0%.

Therefore:

\( EOC = \mu_{mcd2} \times (3.5\%) \)

\( \mu_{mcd} \) is negatively correlated to \( \mu_{mcd2} \) \( \rightarrow \) if \( \mu_{mcd} = -0.5 \) (the lowest value), then \( \mu_{mcd2} = 1 \) (the highest value). This is due to the fact that an unfavorable MCD situation (high competition and a few deals available) will imply both a low MCDF (PEFs have to pay higher values for their acquisitions) and a high EOC (opportunity costs will be high due to the lack of available deals). However, one of the differences between the MCDF and the EOC is the fact that the former can take negative values. The MCDF can be negative because PEFs could acquire companies at values lower than the market values.

8.4.8 Type-of-Deal Factor (TDF)

The type of deal mainly refers to the stage of development: start-up, turnaround, expansion, LBO, MBO, replacement, etc. In contrast, with the PEF factors seen in sections: 8.4.5, 8.4.6, 8.4.7, this factor is a risk driver. This factor can be assessed as follows:
(28) TDF = $\mu_{td} \times (TD)$

Where:

TDF = type-of-deal factor.

$\mu_{td} = \text{type-of-deal coefficient (whose values are between 0 and 1).}$

TD = type-of-deal premium. According to the interviews held during the project, the riskier deals are the start-up deals in which the gross T.IRR is increased by \textit{circa} 5%.

From the sample assessed in this research project, it is possible to infer the following figures for the coefficient ($\mu_{td}$):

- Start-up deals = 1
- Turnaround deals = 0.6 - 1
- Expansion deals = 0.3 – 0.5
- LBOs, MBOs and Replacement deals = 0 – 0.3

8.4.9 Monitoring Intensity Factor (MIF)

The effect of direct monitoring intensity seen in section 2.5 can be estimated by using the following formula:

(29) MIF = $\mu_{mi} \times (MI)$

Where:

MIF = monitoring intensity factor

$\mu_{mi} = \text{monitoring intensity coefficient (whose values are between 0 and 1).}$

MI = monitoring intensity premium. According to the interviews held during the project, this value can reach a value of 2%.

Therefore:

MIF = $\mu_{mi} \times (2\%)$
8.4.10 The Business Plan and the Contract Covenants

Section 7.4.2 of chapter 7 showed that the volatility of a business plan is also driven by many unsystematic risk factors that section 8.4.2 is trying to include in a consolidated model. Therefore, a simple model could be seen as follows:

\[
\text{(30) } \text{Gross T.IRR} = \text{Systematic Risk} + \text{Unsystematic Risk} + \text{IC}
\]

or

\[
\text{(31) } \text{Gross T.IRR} = \text{SML-CAPM} + \text{IC} + \sigma (\text{E.IRR})
\]

Where:

\( \sigma (\text{E.IRR}) = \) could be measured as the standard deviation of the E.IRR as an output of a Monte Carlo simulation.

This standard deviation (the volatility of the E.IRR measured as a standard deviation of the expected business plan) might include the unsystematic risks of the investment: SMB factor, Liquidity factor, etc.

What the contract covenants try to do is to mitigate the \( \sigma (\text{E.IRR}) \). The covenants might limit the volatility of some of the variables of the business plan (For instance: to assure the exit by forcing the entrepreneur to buy the shares back at an established minimum price). In this way, a new business plan with new variables will have as an output a new \( \sigma (\text{E.IRR}) \):
(32) Gross T.IRR = SML CAPM + IC + σc (E.IRR)

Where:

σc (E.IRR) = could be measured as the standard deviation of the E.IRR with covenants as an output of a Monte Carlo simulation. This standard deviations will be mitigated by the covenants whose target is to reduce the volatility of the variables.

Therefore:

(33) ΔGross T.IRR = σ (E.IRR) - σc (E.IRR)

Gross T.IRR with covenants = Gross T.IRR without covenants - ΔGross T.IRR

Where

ΔGross T.IRR = risk variation (mitigation) due to the settlement of contract covenants

However:

(34) Gross T.IRR with covenants > Net T.IRR + IC

8.4.11 Behavioral Factors (BF)

Among all the behavioral drivers revealed during this research project (chapter 5 & 6), the only one that might be quantitatively included in the model is the so-called buffer. In fact, section 7.3.4 of chapter 7 has explained GPs’ behavior when setting a buffer and has suggested that this kind of pattern has a connection with the concept of over-confidence developed by behavioral finance. GPs tend to be over-optimistic when assessing the business plans and the E.IRR, and, therefore, they increase the gross T.IRR to be protected from too high expectations. They intuitionnely increase the gross T.IRR (5% was the maximum increase found – see chapter 5),
depending on their uncertainty perception (it might be an attempt to price some unknown risk drivers). This factor can be measured as follows:

(35) \( UBF = \mu_{ub} \times (UB) \)

Where:

\( UBF = \) uncertainty buffer factor
\( \mu_{ub} = \) uncertainty buffer coefficient (whose values are between 0 and 1).
\( UB = \) uncertainty buffer premium. According to the interviews held during the project, this value can reach a value of 5%.

Therefore:
\( UBF = \mu_{ub} \times (5\%) \)
8.5 The Final Model (Summary)

Now it is time to consolidate all the factors in order to obtain the final model.

(36) Gross T.IRR = SRF + URF + IC\(^{180}\)
(37) \(\sigma = \text{PEFF} + BF\)

Where:

SRF + URF = CAPM factors

SRF = systematic risk factors = \(R_f + \beta_p \text{(Rm)}\)

URF = unsystematic risk factors = \(\beta_s \text{SMB} + \beta_v \text{HML} \beta_{\text{liq}} \text{PIML} + [\sigma \text{(E.IRR)} - \sigma_c \text{(E.IRR)}]\)

IC = EF + ECI + OCR

PEFF = PPF + MCDF + EOC + TDF + MIF

PEFF = \(\mu_{pp} x (5\%) + \mu_{mcd} x (6\%) + \mu_{mcd2} x (3.5\%) + \mu_{td} x (5\%) + \mu_{mi} x (2\%)\)

BF = UBF

BF = \(\mu_{ub} x (5\%)\)

In addition:

(32) Gross T.IRR = SML CAPM + IC + \(\sigma_c \text{(E.IRR)}\)

(34) Gross T.IRR with covenants > Net T.IRR + IC

(24) Net T.IRR = 4F CAPM + PPF

(25) H.IRR = S&P500 + PPF or H.IRR = SML CAPM + PPF

The researcher using the knowledge and the understanding acquired during this research project proposed a qualitative model (shown in chapter 7 and in the first part of chapter 8) and a quantitative model summarized in the last blue chart. The goal of the researcher was to simplify and explain the complexity and confusion of the PEFs’ behavior when assessing their

\(^{180}\) In the cake of section 8.2, the factor IC is included as a PEF factor
threshold IRR.

In general, the greater the number of simplifying assumptions made about the essential structure of the real world, the simpler the model. The aim of this researcher was to create a simple model that has a great deal of explanatory power. Such models are called parsimonious models. The researcher in this case had to face a trade-off between the power of the model and the number of simplifying assumptions made about the world. A decision has to be made: At what point the gain in the explanatory power of the model no longer warrants the additional complexity of the model (Stockburger, 2001).

8.6 PEF Portfolio and GPs' Strategic Decisions

Section 7.3 of chapter 7 has proposed some tools and models to improve GPs' decisions regarding portfolio management. This section will offer quantitative models to assess GPs' decisions.

8.6.1 Specialization vs. Diversification

According to section 7.3.1 of chapter 7, it is possible to estimate which strategy might be most suitable. This section will propose a formula that might be useful to assess which strategy is more rewarding. These formulae
will not be included in the final model since the model already assesses the T.IRR according to the portfolio strategy chosen.

1 – Assessment of a general / diversified Portfolio (Generalist GPs)
Risk Nature T.IRR (general portfolio) = 4 CAPM Factors (A)
Non-Risk Nature T.IRR (general portfolio) = IC + EOC + PEFF +BF (B)

2 – Assessment of a specialized Portfolio (Specialists GPs)
Risk Nature T.IRR (specialist portfolio) = 4 CAPM Factors (C)
Non-Risk Nature T.IRR (specialist portfolio) = IC + EOC + PEFF +BF (D)

3 - Strategic Decision
If C – A > B – D → a generalist strategy is advised.
If C – A < B – D → a specialist strategy is advised.

8.6.2 Big Deals vs. Small Deals

Here again, (as in the case of specialization vs. diversification), and according to the conclusions addressed in section 7.3.2 of chapter 7, it is necessary to compare both strategies in terms of risks and costs.

1 – Assessment of a “Few Big Deals Portfolio” (FBD)
Risk Nature T.IRR (FBD portfolio) = 4 CAPM Factors (A)
Non-Risk Nature T.IRR (FBD portfolio) = IC + EOC + PEFF +BF (B)

2 – Assessment of a “Many Small Deals Portfolio” (MSD)
Risk Nature T.IRR (MSD portfolio) = 4 CAPM Factors (C)
Non-Risk Nature T.IRR (MSD) = IC + EOC + PEFF +BF (D)

3 - Strategic Decision
If C – A > B – D → A FBD strategy is advised.
If C – A < B – D → A MSD strategy is advised.

8.7 Expected Portfolio Premium vs. Expected deal Premium

The model introduced in this chapter can be used for two purposes:

- First, it serves to assess the risk premium of the expected portfolio.

  Depending on the type and size of the PEF as well as on the GP’s
strategy. GP’s strategy will consider: Type of deals; number and size of the deals; diversified or specialized portfolio; expected fees; expected investment speed. Therefore, this model can help to estimate a general ex-ante T.IRR for the expected portfolio as a basis for assessing single deals.

- Second, it serves to assess the risk premium of the single deal, in which case, the betas of the CAPM factors should refer to the sector, size and particular features of the deal under analysis.

The model is potentially operational for both scopes but with some precautions to consider:

- The data of the CAPM factors is found in the Kenneth French Website (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/) according to the profile of the company or portfolio of companies to be considered.

- For the IC factors, this thesis has presented some examples according to different type of PEFs (see section 8.8 of this chapter). However, for any specific case, and PEF profile in terms of contracts (fees, reserves, expected speed, carried interests, etc), the formulae applied in this chapter can be used to assess any other specific situation.

- The PEFP premiums and coefficients are summarized in the appendix 8.3.

- The BFP premium as well as its coefficients are summarized in appendix 8.3.

- The liquidity Premium (PIML) is 2.75%
In the case of the liquidity coefficient $\beta_{\text{liq}}$, the value of 0.67 can be applied as a general value for a portfolio of companies and as a point of reference. Unfortunately, Franzoni et al. (2010) did not provide a dataset with different values for the $\beta_{\text{liq}}$ according to the type of PEF, size of PEF, type of deals, etc. In addition, there are no coefficients to assess the $\beta_{\text{liq}}$ for a single deal. Therefore, the researcher advises the use of intuition and experience as follows:

- Since the value of 0.67 is a general value coming from all types of PEFs, it is a useful value as a standard point of reference.
- If GPs consider that the expected liquidity risk\(^{181}\) will be higher than the average values (for a single deal or for the expected portfolio), then they can intuitively increase the value of 0.67. In contrast, if they expect low levels of liquidity risk, then they can intuitively decrease the value of 0.67.

The model is far from perfect and presents some problems that can be improved with future research. The most important aspects that need to be improved are the following:

- Create a database to assess the factors HML and SMB per single deal. In this way, it would be possible to find better comparators for future PEFs deals. Instead, this model is taking these factors from the French website database whose values reflect quoted US companies.

\(^{181}\) Illiquidity risk, in this case, refers to two kinds of risk: First, the risk inherent in the business operations. Highly leveraged companies, such as LBOs, could run out of cash during a financial crisis. Second, it might be difficult to sell a highly leveraged company during a financial crisis.
- The same concept should be applied to the liquidity factor. It is necessary to have a database showing the $\beta_{\text{liq}}$ for each single deal in order to avoid the over-use of intuition.

- In addition, the liquidity premium calculated by Stambaugh and Pastor (2003) (the IML) refers to organized markets. It is necessary to do the same work for PEFs’ deals.

- Finally, there is another issue in the HML factor (book-value to market-value) to consider: how can one assess the market value for the case of privately-held companies? This is another reason why, interpretations and assumptions made by Franzoni et al. (2010) regarding their four-factor model might be biased. Therefore, at first sight, it might be worth considering (for future research) the model of Chen and Zhang (2010) (seen in chapter 2) who look only at book values. The problem with this model is the fact that, being too young, there are no data regarding its factors.

The following section will assess some examples of the expected portfolios of some of the PEFs of this research sample\textsuperscript{182}.

\textbf{8.8 Applying the Model - Examples}

Using the model proposed in section 8.4, this section shows the results for the gross T.IRR of four different examples:

\textsuperscript{182} Only a few general examples were considered (for general expected portfolios) in order to show the functionality of the model and because of the problem of space.
1) A big generalist PEF with a high number of deals (BIFs’ general values),
2) A small generalist PEF (general values of the REFs),
3) A big specialist fund in the food industry,
4) A big specialist captive fund in the food industry (CAP2 of the sample)

The following table and figure shows the results (calculations details are shown in appendix 8.4) for each kind of PEF split down by type of driver183:

### Table 8.1 Examples Using the Model

<table>
<thead>
<tr>
<th></th>
<th>PEF 1</th>
<th>PEF 2</th>
<th>PEF 3</th>
<th>PEF 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPM factors</td>
<td>15.00%</td>
<td>17.50%</td>
<td>11.50%</td>
<td>11.50%</td>
</tr>
<tr>
<td>IC</td>
<td>8.25%</td>
<td>8.00%</td>
<td>5.00%</td>
<td>1.00%</td>
</tr>
<tr>
<td><strong>TOTAL Gross T.IRR</strong></td>
<td><strong>23.25%</strong></td>
<td><strong>25.50%</strong></td>
<td><strong>16.50%</strong></td>
<td><strong>12.50%</strong></td>
</tr>
<tr>
<td>PEFF</td>
<td>7.00%</td>
<td>4.00%</td>
<td>7.00%</td>
<td>7.00%</td>
</tr>
<tr>
<td><strong>E.IRR without BFF with alpha</strong></td>
<td><strong>30.25%</strong></td>
<td><strong>29.50%</strong></td>
<td><strong>23.50%</strong></td>
<td><strong>19.50%</strong></td>
</tr>
<tr>
<td>BFF</td>
<td>0.50%</td>
<td>4.00%</td>
<td>1.00%</td>
<td>1.00%</td>
</tr>
<tr>
<td><strong>TOTAL E.IRR with alpha</strong></td>
<td><strong>30.75%</strong></td>
<td><strong>33.50%</strong></td>
<td><strong>24.50%</strong></td>
<td><strong>20.50%</strong></td>
</tr>
</tbody>
</table>

![Graph showing the breakdown of returns for each PEF]

**Source: Author’s own work**

183 These calculations were made based on the standard values calculated in the previous sections for the different types of PEFs: IC (REFs) = 8%; IC (BIFs & PAFs) = 8.25%; IC (CAPs) = 1%
The following observations can be made:

- Only the CAPM factors and the IC factors (the blue part and the red part of the blocks), as explained in figure 8.2 and in the equations (4), (4), and (6), conform to risk factors and internal costs thus assessing the gross T.IRR. On the contrary, the violet and green blocks do not include risk factors and assess the expected abnormal returns (Jensen's alpha).

- PEF2 has the highest T.IRR, mainly due to the risk of its portfolio (the size of the companies) reflected in the CAPM factors. Behavioral drivers are also high in this PEF due to the lack of experience of the GPs. However, these factors are partially offset by the low value of the PEF factors whose main driver is the low LPs’ expectations in terms of net T.IRR (Performance Persistence factor).

- PEF1 has the second highest T.IRR mainly due to the higher LPs’ expectations (performance persistence factor) which also implies a higher cost of the carried interest (remember that carried interest is proportional to the magnitude of the expected gross T.IRR). This last factor is offset by the lower level of the expected fees (EFs) present in big PEFs. The portfolio of this PEF also reflects a lower portfolio risk (CAPM factors) and this is due to the fact that Big PEFs have access to better deals (bigger in size and with lower risk).

It is very interesting to compare these two last results. Although the gross T.IRR for PEF1 is slightly lower, the components are very different and
these differences are what make possible the understanding of the drivers' behavior.

- PEF3 has even a lower gross T.IRR due to the low risk of a food industry portfolio (the food industry has lower betas). PEF factors are also low (only PPF is high). The speed here might be high due to the lack of competition and therefore opportunity costs are low.
- PEF4 has the lowest gross T.IRR due to its captive nature which means the lowest ICs (no OCs and no OCRs)

In (3), it was stated that the internal costs have to be considered as a part of threshold IRR. However, part of them might have an alpha component (For instance: BIFs have lower fees than REFS or experienced GPs might achieve lower opportunity costs than other GPs). In table 8.1 there are values which go from 8% to 1% meaning that PEF4 expect to earn abnormal returns (due to internal costs efficiency) of circa 7% (compared with PEF2).

Now, it is possible to compare some of these results with the T.IRR used by the PEFs of the sample:

For instance:

1. PEF1 could refer to BIF1, BIF2, BIF3, PAF1, PAF2, and PEF3. These are big PEFs with LBOs and expansion deals with the characteristics of PEF1. In addition, these PEFs apply a general T.IRR for the whole portfolio. The T.IRR for PEF1 calculated with the model is 23.25%
(using Italian bond yields at 3% instead of 5%). In addition, the BIFs and PAFs present gross T.IRRs between 20% and 30% (with an average of 25%).

2. PEF2 could refer to the REFs of the sample whose gross T.IRRs are between 17% to 25% with an average of 21%. According to the model, the PEF2 has a T.IRR of 25.75% (considering Italian bonds at 3% instead of 5%).

3. PEF4 could refer to CAP2 of the sample whose gross T.IRR is 15%. According to the model, the PEF4 has a T.IRR of 16.5% (considering Italian bond yields at 3% instead of 5%).

The discrepancies with the values given by the model are:

- for the BIFs and PAFs: 1.75%.
- for the REFs: 4.75%
- for the specialist CAP2: 1.5%
Such differences can be explained as follows:

- GPs assess the T.IRR using only intuition and experience.
- GPs are based on LPs’ expectations which might be underestimated since they have no knowledge about the risk and drivers involved in PEFs investments. LPs do not assess risk and, therefore, the net T.IRR (LPs’ expectations) is not calculated as a risk-adjusted return.
- GPs do not price liquidity risk, opportunity costs and PEF factors when assessing the T.IRR but they price buffers (especially the REFs), and other drivers like performance persistence which are not considered here as a part of the T.IRR (T.IRR in this model considers only risk factors and costs factors)
- Small regional PEFs, whose figures show the biggest gaps with the ones calculated by the model, have regional LPs with more behavioral drivers (this was explained in chapter 7)

These results confirm once more the performance persistence effect: “large funds significantly out-perform small funds” (Kaplan and Schoar, 2005). Furthermore, in these examples, the high gap present in small PEFs between the T.IRR of the REFs and the T.IRR of the model makes the risk-return relationship more dramatic.

Now it is also possible consider the whole expected IRR including Jensen’s alpha:
Table 8.2 Expected E.IRR considering Alpha

<table>
<thead>
<tr>
<th>Type of PEF</th>
<th>Gross T.IRR</th>
<th>E.IRR (*)</th>
<th>Expected Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>REFs</td>
<td>23.25</td>
<td>30.25</td>
<td>3.5</td>
</tr>
<tr>
<td>BIF &amp; PAFs</td>
<td>25.75</td>
<td>29.5</td>
<td>7.25</td>
</tr>
<tr>
<td>BIF (specialist)</td>
<td>17.50</td>
<td>23.5</td>
<td>7</td>
</tr>
<tr>
<td>CAP2 (specialist)</td>
<td>12.50</td>
<td>19.5</td>
<td>7</td>
</tr>
</tbody>
</table>

Source: Author's own work

(*) It does not include behavioural drivers like the buffer. The buffer is not an expectation but an increase in the T.IRR. This is a way to protect the PEF from unexpected issues. The results confirm that REFs have lower potential to gain abnormal returns.

8.9 Conclusion

This chapter has proposed a new model which quantifies most of the factors (outside traditional finance) that drive the risk premium in the private equity funds. Recent papers have proposed models accounting only for risk and CAPM factors without being able to explain the presence of other important drivers confirmed by past literature (chapter 3) as well as their nature. Conversely, this work has been able to propose a new theory including drivers outside the CAPM, thus complementing those previous models.
However, it is now important to ask if this thesis, through this model, has accomplished its targets. Consequently, the next chapter will discuss the most important contributions, the implications for practice and academia, as well as the limitations of the model and the whole work. In any case, it is important to recognize that this thesis is only a “brick in the wall” and, therefore, the researcher will give some suggestions for future research.
9 CONCLUSIONS

9.1 Introduction

This thesis has finally come to the task of asking whether the objectives proposed in chapter 1 have been accomplished. Consequently, this chapter will highlight the most important contributions, the implications for practice and academia, as well as the limitations of the model proposed in chapters 7 and 8. It is also important to recognize that this thesis is only a brick in the wall and therefore the researcher will give some suggestions for future research.

As outlined in the beginning of Chapter 1, the research presented in this thesis had the following aims:

- To understand the nature of the risk-return drivers present in private equity funds by looking at GPs’ risk perceptions and return expectations when assessing the value of deals.
- To propose an explanatory model by revealing all the determinants of the risk premium (having in mind the phenomena found in the last couple of decades of research)
- To propose a model\(^{184}\) by quantifying some of those drivers thus being able to estimate the required return on a PEF portfolio and on the cost of a single deal by using a modified

\(^{184}\) The aim was to propose a model that sets the bases to assess PEFs’ portfolios and deals through a different criteria based on a more complete scenario of determinants.
Has this project accomplished these aims? This concluding chapter of the thesis will start by providing a summary of the most important contributions and accomplishments. On the basis of the findings and the model proposed in chapter 7, it discusses implications for practice (for PEFs) and academia (for finance theory). Finally, the chapter discusses the limitations of the research and offers suggestions for future research.

9.2 Contributions

This research, within its limitations, has been able to achieve its main aims. Most of the academic papers between 1997 and 2011 had only grasped the existence of newly-revealed phenomena to academia outside the traditional finance arena. This project, from a completely different approach, has deepened the knowledge of those phenomena, found some new ones, and proposed an explanatory and quantitative model which, for the first time,\textsuperscript{185} includes those phenomena to assess the premium.

What this new theory shows can be summarized with the following four elements:

1. The cause-effect relationship among all factors driving the premium through a driver-flow chart. It describes how the premium is driven.

\textsuperscript{185} At least to the knowledge of this researcher.
2. The drivers classification by nature: CAPM factors, Risk Factors, Outside CAPM, PEF Factors, Behavioural Factors, Non-Risk Factors, Cost Factors, etc.

3. The factors classification by Jensen’s alpha concept: risk-adjusted premium and abnormal returns.

4. It has proposed a new model incorporating the drivers of the previous point.

Related to these main accomplished targets, the next sub-sections will enumerate further contributions and implications of this project.

9.2.1 Contribution to Practitioners (GPs and LPs)

Overall, the model presented in chapters 7 and 8 is an innovative way to assess the risk premium of the PEF portfolios and deals:

- First: It includes drivers outside traditional finance.

- Second: It separates drivers of different nature (such as: costs, RBT, PEFF, BF, etc).

- Third: It will allow GPs not only to assess risk but also to take decisions regarding their investment strategy. In concrete, the model is capable of assessing the attractiveness of alternative portfolios: Specialization vs. Diversification; Big Deals vs. Small deals; High investment speed vs. Low investment Speed; etc.

- Fourth: It will also allow LPs to better assess the required return or net T.IRR.
- Fifth: As a result, the project has been able to offer practical advice to GPs.

In addition, this type of study is unique for Italy where there are no previous research experiences in this field. In fact, being younger and less developed than in other EU countries like the UK or France, the Italian private equity sector still tends to be very reluctant to reveal information and research is very limited.

**9.2.2 Contribution to Academia**

This research project has also been able to reveal many new concepts not previously found in the academic literature:

- First: The meaning of the T.IRR (net and gross) and the H.IRR: Previous papers have studied the ex-post IRR but overlooking the ex-ante variables. This research project provides in-depth analysis about these ex-ante variables as well as GPs’ risk perceptions and return expectations.

- Second: The opportunity cost in relationship with the speed effect: This is the first work\(^{186}\) to assess the opportunity cost as a dependent variable of the speed effect. Furthermore, it has been measured as the difference between the net T.IRR and the H.IRR.

- Third: The drivers-flow: Since 1997 (starting with Lerner & Gompers 1997), researchers have suggested (by observing ex-post statistical

\(^{186}\) To the knowledge of the researcher.
data) the existence of certain phenomena not included in the concepts of traditional finance. Through a completely different approach, this research project has been able to confirm the existence of such phenomena (and also observed new phenomena) and, for the first time\textsuperscript{187}, propose a drivers-flow explaining the causes of the phenomena as well as the relationship among variables.

- Fourth: The model itself is the first attempt\textsuperscript{188} in the PEFs’ sector to measure the risk premium not hitherto found in finance theory.

9.2.3 Contribution to Corporate Finance and Valuation

This research project makes a contribution to valuation, in particular to privately-held companies’ valuation. In fact, it sheds light on the understanding of those markets outside the organized markets which do not correspond to the EMH, and where bounded rationality, lack of information and therefore, behavioral drivers are more important. It complements valuation theory by proposing a new model based on the CAPM as well as on newly-revealed theories in order to explain those phenomena that the CAPM alone is not able to enlighten. This model also contributes to behavioral finance and its attempts to develop a behavioral CAPM (see chapter 2).

\textsuperscript{187} To the knowledge of the researcher.
\textsuperscript{188} To the knowledge of the researcher.
9.2.4 Contribution to strategic finance and risk management

This thesis has shown how PEFs and GPs do not behave as private investors who only care about buying and selling shares. On the contrary, PEFs are like holding companies and GPs are managers involved in the company strategy (insiders). GPs must work in the definition of two types of strategy:

1 – The portfolio strategy: it refers to the choosing of the portfolio (the expected portfolio) in terms of industry sector, specialization, firm size, diversification, type of deal (LBO, expansion, turnaround, etc), etc. This strategy is also related to risk management.

2 – Company strategy: it refers to the GPs’ involvement in the strategy of each single deal.

This thesis is making a contribution to the first type of strategy: In fact, by revealing the risk premium drivers, this thesis is shedding light as to how GPs should choose and manage their portfolios. It might be a tool to support GPs in the choosing a value-oriented strategy in terms of investment decisions, portfolio management and risk mitigation.

9.2.5 Contribution in terms of approach and research method

This thesis has also made some contributions in terms of epistemological approach, research method and perspective:

1 – The model developed in this thesis is based on a positivistic approach in terms of an ontological stance but from an epistemological perspective, it is
based on critical realism (the Burrell and Morgan spectrum, Burrell & Morgan, 1979). Epistemological approach: As stated in chapter 4, observations of statistical effects alone are not enough to find causations and hence, to develop a model. According to Stanley L. Jaki (1978:145): “many researchers are still influenced by the conviction that science is a mere empiricist of sensations.” In terms of research method, this work has followed the opposite direction: Instead of making assumptions (only by observing statistical effects) of the possible causes driving the premium, this project has revealed, by first studying 26 cases in-depth\textsuperscript{189}, the drivers-flow chain and, only after this, has it proposed a model.

2 – New Perspective: This is the first attempt\textsuperscript{190} to develop a model aimed at assessing the PEFs’ risk premium based from an ex-ante perspective. As seen in chapter 3, there are few research papers which try to analyze PEFs’ performance from an ex-ante perspective. However, they are not able to build a drivers-flow (they only assume causation) and, therefore, they are not able to propose models based on GPs’ risk perceptions and return expectations in the way that this thesis does.

\textsuperscript{189} Spending time in each PEF, interviewing GPs, and leveraging from” why” and “how” questions. The close relationship to PEFs is one of the most important differentiations and contribution of this research project

\textsuperscript{190} To the knowledge of the researcher.
9.3 Limitations and Gaps

Like all research studies, this thesis presents some limitations that have to be recognized and be considered in future research. The limitations are generally a consequence of the researcher's choice regarding the methodology: data collection methods and analysis. The most important limitations can be listed as follows:

9.3.1 The size of the sample

The size of the sample might be considered as a limitation. In fact, in Italy, in 2010, there were \textit{circa} 272 active PEFs with a total amount invested of € 21.5 billion in 1,160 companies (AIFI yearbook 2011) and this sample is including only 13 PEFs and 26 deals, managing € 4.1 billion (from which \textit{circa} € 2\textsuperscript{191} million is invested). This is due to the fact that a qualitative in-depth case study like this requires a huge amount of time and most PEFs are not accessible for such a work. As a result, a bigger sample is very difficult to obtain.

In contrast, if the depth of the interviews, the time spent in each PEF, and the nature of the data collected is considered, 13 PEFs and 26 deals could be seen as a significant number. In fact, the section 4.3.5.3 of chapter 4 explains how, according to Yin (2003), this sample in terms of size might possess sufficient external validity.

\textsuperscript{191} Meaning less than 10\% of the total.
Moreover, the researcher believed it to be more valuable to extend and complement past research in terms of approach (even forsaking the size of the sample) rather than having a bigger sample with the same approach.

### 9.3.2 Homogeneity of the Sample PEFs

Due to the difficulty of finding PEFs disposed to disclose information, the sample is not as homogeneous as the researcher would have desired. For instance, there is only one specialist fund (one of the captive funds) and therefore, the conclusions regarding the nature and effects of specialization, diversification and captivity need further research and analysis. This work has given an initial input and proposal for those drivers which need to be deepened in future research.

Therefore, it might be important to emphasize the issue of access to PEFs in Italy: First, they are not disposed to disclose information; Second: They are not willing to invest 3 or 4 hours in such a project. That is the reason why the choosing of the sample does not depend on the researcher’s desires but on the PEFs which are eager to participate.

### 9.3.3 Generalizations are difficult

This thesis has proposed a model to assess a risk premium for each PEF according to its portfolio and its strategy. However, each single deal is a whole universe in itself in terms of drivers and this makes a generalization through a unique model very difficult.
Furthermore, one of the most important hurdles of the study is ensuring not only that the factors accurately represent reality, but also that all important factors were included in the model. In fact, the PEFs’ world is constantly evolving and future contracts between LPs and GPs might differ from the past ones. This implies that new drivers might appear and old drivers like the speed-effect and the opportunity costs might change. Therefore, the model proposed in this thesis will also have to evolve and adapt to changes.

In addition, chapter 8 section 8.7 showed that, although the model is operational, it presents some problems (see the list in chapter 8) that can be improved with future research. Therefore, the model proposed in this thesis, although far from perfect, sets the basis for a new type of approach and this achieves the initial aim proposed in Chapter 1.

Such issues mean that the model might not explain each single situation leaving a part of the risk assessment to the subjective judgment of GPs. For instance, as seen in chapters 7 and 8, each deal might involve its own covenants (covenants directed at mitigating the risks) and although the model proposed in this thesis might help GPs to assess risk mitigation, it does not provide an exact value.

As a further example, the assessment of a new management presents similar problems. The final figure should be decided by GPs not only using the model but also by trusting past experience.
According to the researcher’s opinion, no model can completely replace GPs’ experience and there will always be a part of the expected risk premium left to their experience and know-how.

In addition, being this a DBA thesis, it might be relevant to report that the model was presented to some of the GPs who participated to this project and, in general, they were very impressed about the potential of the model (the results of these feedbacks to the GPs are shown in appendix 9.1).

### 9.3.4 Possible bias

There might have been bias in the questionnaires addressed to PEFs. In fact, since the researcher was much closer to the pilot case than to the other 12, and thus is an outsider in most of the analysis assessed in chapter 6, one could argue that the interpretation of the answers given by the 12 PEFs had some influence from previous research and the outsider might be nearer to true conclusions. However, as explained in chapter 6, this was due to the fact of a true particular case with particular drivers (covenants in this case) and this situation can be found in section 8.3.3. In addition, and according to the researcher, it is quite improbable to have repeated the same error (bias) with 24 different cases.

### 9.3.5 Regionalism of the Sample

The findings of this research are limited to the Italian experience (the study consists only of Italian PEFs and Italian deals, even if the sample includes
pan-European PEFs) even though most of the conclusions might be applied to the PEFs in general. In order to make the model stronger in terms of generalization, it might be advisable to extend the sample to other countries and cultures.

9.3.6 Lack of Testing

There is of course a further task that needs to be undertaken: Test the model using a bigger sample (both qualitative and quantitative). As stated in chapter 4, this project has the target of proposing a new model for future testing. At the end of chapter 8, there were some applications and illustrations. They were just examples for general cases. These examples were aimed at assessing the coherence of the quantitative model with the qualitative one. In other words, their scope was only to check if the quantitative model corresponded to the drivers-flow proposed in the qualitative model. However, both the qualitative and quantitative model need to be tested on a bigger sample.

9.4 Recommendations for Future Research

There are four main recommendations for future research. In the first place, it is recommended that future researchers continue to use this type of approach (less positivistic and closer to the source of information) but making the effort of using larger samples. This research has shown the need for a different approach to reveal and understand all the factors driving the premium, and in that direction; it has put an initial brick in the wall. However,
this process must continue to analyze larger samples in order to give a more representative view of the population.

Second, and related to the first recommendation, future studies could be set in a multi-country context to determine if they are any inherent differences in the determinants of the premium from different countries. Third, the researcher should try to have a more homogenous sample: generalist PEFs, specialist PEFs, captive PEFs, non-captive PEFs, etc.

Fourth, it is necessary to create a database to assess the factors HML and SMB for privately-held markets. In this way, it would be possible to find better comparators for future PEFs deals (the values taken from the French website reflect quoted companies). It also necessary to have a database showing the $\beta_{\text{liq}}$ for each single deal. Finally, the liquidity premium calculated by Stambaugh and Pastor (2003) (the IML) refers to organized markets. It is necessary to do the same work for PEFs’ deals.
BIBLIOGRAPHY AND REFERENCES


EVCA (2011). Yearbook


Flyvbjerg, B. (2006) Five Misunderstandings About Case Study Research. *Qualitative Inquiry*, vol. 12, no. 2, April, pp. 219-245


Hansson, S.O. *Decision Theory: A Brief Introduction*. Royal Institute of Technology (KTH), Stockholm, Available at


The Economist 27 November 2004


### APPENDIX 4.1: Summary of the Steps and Tasks

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
<th>Destination</th>
<th>Description</th>
<th>Interaction</th>
<th>Timing</th>
</tr>
</thead>
</table>
| 1    | Introduction | To all PEFs | • Paper project synthesis  
• General questions  
• Detail of the necessary documentation | Via email | In advance second week of February |
| 2    | First Direct Contact | Pilot PEF | • First Interview  
• General questions  
• Choosing of the deals  
• Look at the documentation, files, procedures, etc | Personal Visit | End of February |
| 3    | Deals Information | Pilot PEF | Reception of the information regarding the specific deals chosen | Via email | First week of March |
| 4    | Deal Analysis | ---------------------------- | Analysis of the information sent by the pilot PEF regarding the specific deals: Valuations, procedures, excel files, etc | Second week of March |
| 5    | Second Direct Visit | Pilot PEF | Second Interview  
Specific questions level 1 & level 2. Questions about the specific deals under analysis | Personal Visit | Third Week of March |
| 6    | Case Report | Pilot PEF | Brief feedback to pilot PEF and confirmation of the information revealed during the interviews. | Via email and Visit | First Week of April |
| 7    | Repetition | The rest of the PEFs | Repetition of the steps 2 to 6 for the rest of the PEFs | Between April and September |
| 8    | Cross Analysis | All PEFs | Cross analysis considering the information from all PEFs and all deals | October |
| 9    | Third Visit | All PEFs | Third Interview  
Level 3 question or cross questions | Personal Visit | Between October & December |
APPENDIX 5.1: Figures of the Target Company

### Profit & Loss statement

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Sales</th>
<th>%</th>
<th>Other incomes</th>
<th>%</th>
<th>Inventories</th>
<th>%</th>
<th>Total Income</th>
<th>%</th>
<th>Cost of Goods</th>
<th>%</th>
<th>Gross Margin</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2,160,455</td>
<td>97.96%</td>
<td>21,133</td>
<td>0.96%</td>
<td>23,876</td>
<td>1.08%</td>
<td>2,205,464</td>
<td>100.00%</td>
<td>1,054,354</td>
<td>47.81%</td>
<td>1,151,111</td>
<td>52.19%</td>
</tr>
<tr>
<td>2008</td>
<td>2,700,569</td>
<td>98.12%</td>
<td>26,195</td>
<td>0.95%</td>
<td>25,621</td>
<td>0.93%</td>
<td>2,752,385</td>
<td>100.00%</td>
<td>317,942</td>
<td>47.88%</td>
<td>1,434,443</td>
<td>52.12%</td>
</tr>
<tr>
<td>2009</td>
<td>3,543,354</td>
<td>84.89%</td>
<td>49,000</td>
<td>1.17%</td>
<td>581,570</td>
<td>13.93%</td>
<td>4,173,924</td>
<td>100.00%</td>
<td>1,872,000</td>
<td>44.85%</td>
<td>2,301,924</td>
<td>55.15%</td>
</tr>
</tbody>
</table>

### Balance Sheet

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash on hands</th>
<th>%</th>
<th>Inventories</th>
<th>%</th>
<th>Receivables</th>
<th>%</th>
<th>Other credits</th>
<th>%</th>
<th>Current Assets</th>
<th>%</th>
<th>Fixed Assets</th>
<th>%</th>
<th>Total Assets</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>0</td>
<td>0</td>
<td>1,243,092</td>
<td>37%</td>
<td>467,150</td>
<td>14%</td>
<td>165,834</td>
<td>5%</td>
<td>1,876,076</td>
<td>56%</td>
<td>1,481,375</td>
<td>44%</td>
<td>3,357,451</td>
<td>100%</td>
</tr>
<tr>
<td>2008</td>
<td>0</td>
<td>0</td>
<td>1,458,969</td>
<td>42%</td>
<td>602,451</td>
<td>17%</td>
<td>182,166</td>
<td>5%</td>
<td>2,243,586</td>
<td>64%</td>
<td>1,241,988</td>
<td>36%</td>
<td>3,485,574</td>
<td>100%</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>0</td>
<td>1,609,177</td>
<td>43%</td>
<td>901,888</td>
<td>24%</td>
<td>264,302</td>
<td>7%</td>
<td>2,755,367</td>
<td>74%</td>
<td>954,888</td>
<td>28%</td>
<td>3,730,255</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Some Rates

| Year | Days Inventories | | Days Receivables | | Days Payables | | Days net working capital | | Net Working Capital | | Debt / Equity | | Debt / Turnover | | Debt / fixed Assets | | Debt / net working capital | | Total Financial Debt |
|------|-----------------|---|-----------------|---|--------------|---|-------------------------|---|-------------------|---|-------------------|---|-----------------|---|-----------------|---|------------------|
| 2007 | 206 | | 77 | | 151 | | 132 | | 1,158,249 | | 3.94 | | 0.93 | | 1.39 | | 1.78 | | 2,058,744 |
| 2008 | 193 | | 80 | | 147 | | 127 | | 1,407,321 | | 2.71 | | 0.69 | | 1.53 | | 1.35 | | 1,902,862 |
| 2009 | 141 | | 79 | | 107 | | 113 | | 1,852,413 | | 1.49 | | 0.39 | | 1.72 | | 0.88 | | 1,637,639 |
### Valuation tables used by the PEF

#### Scenario 1 2007 2008 2009 2010 2011

**Profit & Lost Statement**

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Sales</td>
<td>2,436,845</td>
<td>2,997,094</td>
<td>4,429,192</td>
<td>6,126,620</td>
<td>6,739,282</td>
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<tr>
<td>Cost of Goods</td>
<td>(1,505,795)</td>
<td>(2,132,880)</td>
<td>(2,927,998)</td>
<td>(4,763,368)</td>
<td>(5,833,005)</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>931,050</td>
<td>864,214</td>
<td>1,501,194</td>
<td>1,362,251</td>
<td>1,906,277</td>
</tr>
<tr>
<td>Cost of Services / Energy</td>
<td>(1,694,449)</td>
<td>(1,511,900)</td>
<td>(3,113,998)</td>
<td>(3,476,368)</td>
<td>(3,833,005)</td>
</tr>
<tr>
<td>Rented assets</td>
<td>(80,000)</td>
<td>(80,000)</td>
<td>(80,000)</td>
<td>(80,000)</td>
<td>(80,000)</td>
</tr>
<tr>
<td>Salaries</td>
<td>(205,000)</td>
<td>(210,000)</td>
<td>(234,000)</td>
<td>(244,000)</td>
<td>(251,320)</td>
</tr>
<tr>
<td>Other operating costs</td>
<td>(543,200)</td>
<td>(543,200)</td>
<td>(543,200)</td>
<td>(543,200)</td>
<td>(543,200)</td>
</tr>
<tr>
<td>Operating Costs</td>
<td>(2,407,949)</td>
<td>(2,132,880)</td>
<td>(2,927,998)</td>
<td>(4,763,368)</td>
<td>(5,833,005)</td>
</tr>
<tr>
<td>EBITDA</td>
<td>450,399</td>
<td>412,314</td>
<td>865,194</td>
<td>1,945,251</td>
<td>2,183,127</td>
</tr>
<tr>
<td>Intangible assets Depreciations</td>
<td>0</td>
<td>(16,800)</td>
<td>(33,600)</td>
<td>(33,600)</td>
<td>(33,600)</td>
</tr>
<tr>
<td>Tangible assets Depreciations</td>
<td>(235,000)</td>
<td>(237,143)</td>
<td>(263,571)</td>
<td>(289,286)</td>
<td>(292,143)</td>
</tr>
<tr>
<td>EBIT</td>
<td>215,399</td>
<td>158,371</td>
<td>568,023</td>
<td>1,622,366</td>
<td>1,857,384</td>
</tr>
<tr>
<td>Taxes</td>
<td>(34,987)</td>
<td>(28,250)</td>
<td>(159,380)</td>
<td>(485,968)</td>
<td>(577,479)</td>
</tr>
<tr>
<td>EAT</td>
<td>15,987</td>
<td>61,302</td>
<td>319,137</td>
<td>1,031,394</td>
<td>1,230,412</td>
</tr>
</tbody>
</table>

#### Balance Sheet

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net working capital</td>
<td>1,099,496</td>
<td>1,514,990</td>
<td>2,110,091</td>
<td>2,925,286</td>
<td>3,222,796</td>
</tr>
<tr>
<td>Intangible Assets</td>
<td>168,000</td>
<td>151,200</td>
<td>117,600</td>
<td>84,000</td>
<td>50,400</td>
</tr>
<tr>
<td>Tangible Assets</td>
<td>1,313,375</td>
<td>1,106,232</td>
<td>1,182,661</td>
<td>913,375</td>
<td>641,232</td>
</tr>
<tr>
<td>Total Fixed Assets</td>
<td>1,481,375</td>
<td>1,257,432</td>
<td>1,300,261</td>
<td>926,737</td>
<td>691,632</td>
</tr>
<tr>
<td>Capital Invested</td>
<td>2,580,871</td>
<td>2,772,422</td>
<td>3,410,352</td>
<td>3,922,661</td>
<td>3,914,429</td>
</tr>
<tr>
<td>Net Capital Invested</td>
<td>2,548,892</td>
<td>2,727,843</td>
<td>3,351,733</td>
<td>3,849,402</td>
<td>3,826,090</td>
</tr>
<tr>
<td>Short term debts</td>
<td>782,417</td>
<td>902,831</td>
<td>850,000</td>
<td>750,000</td>
<td>750,000</td>
</tr>
<tr>
<td>Long term debts</td>
<td>1,276,327</td>
<td>976,327</td>
<td>668,468</td>
<td>423,007</td>
<td>343,274</td>
</tr>
<tr>
<td>Financial Debt</td>
<td>2,058,744</td>
<td>1,879,158</td>
<td>1,518,468</td>
<td>1,173,007</td>
<td>1,097,274</td>
</tr>
<tr>
<td>Further need of financing</td>
<td>0</td>
<td>297,236</td>
<td>962,679</td>
<td>774,416</td>
<td>(401,576)</td>
</tr>
<tr>
<td>Net financial Position</td>
<td>2,058,744</td>
<td>2,176,394</td>
<td>2,481,147</td>
<td>1,947,422</td>
<td>693,698</td>
</tr>
<tr>
<td>Shareholders</td>
<td>474,161</td>
<td>474,161</td>
<td>474,161</td>
<td>474,161</td>
<td>474,161</td>
</tr>
<tr>
<td>Reserves</td>
<td>0</td>
<td>15,987</td>
<td>77,288</td>
<td>396,425</td>
<td>1,427,819</td>
</tr>
<tr>
<td>EAT</td>
<td>15,987</td>
<td>61,302</td>
<td>319,137</td>
<td>1,031,394</td>
<td>1,230,412</td>
</tr>
<tr>
<td>Total Equity</td>
<td>490,148</td>
<td>551,449</td>
<td>870,586</td>
<td>1,901,980</td>
<td>3,132,392</td>
</tr>
<tr>
<td>Total Sources</td>
<td>2,548,892</td>
<td>2,727,843</td>
<td>3,351,733</td>
<td>3,849,402</td>
<td>3,826,090</td>
</tr>
</tbody>
</table>
APPENDIX 5.2: Questions and Issues to be Discussed – Guiding Points for the Interview.

1. Identification of those responsible for the determination of the IRR.

2. Introductory description of the valuation process and the calculation of the IRR in detail.

3. Analysis of the rational equation commonly used for calculating the IRR (rational drivers): Adjustments: size, lack of marketability, stage of development and other rational drivers.

4. Methodology used and drivers considers to calculate the threshold IRR\(^{192}\) (that is the minimum IRR necessary to accept a deal).

5. Observation of the influences of the required return from LPs (net) to define the IRR for the target companies (gross). How the expected agreed return for the LP investors’ influences the IRR? Does bigger and more prestigious PEFs require higher returns from their target companies? (performance persistence effect or a potential behavioral driver like representativeness).

6. Examination of the influences from the cash flow fluctuations (LPs inflows) in the IRR during the lifetime of the PEF. Analyze the number of deals available (investment alternatives) versus available cash and IRR during the lifetime of the PEF. (money chasing deal phenomenon).

7. Exploration of the influence from competitors (other PEFs) when defining the IRR (PEF segmentation phenomenon and money chasing deal phenomenon).

8. Portfolio strategy: Investigation of the strategy when searching for new target companies (diversification vs. specialization). What is the impact in the IRR when huge synergies with the portfolio are found? (specialization effect)

9. Description of the monitoring intensity strategy in the target companies (low, medium, high). What’s the number of managers and members of the board in the target company? What’s the time employed? How does this affect the final IRR. (Fees effect – monitoring intensity effect)

\(^{192}\) In italian: “IRR di soglia”
10. Description of the alternative policies for other financial tools like carried interest which could be hiding required return (fees effect).

11. Analysis of the investment speed and its influence in the IRR. Holding period during the cash inflows and the investment in the target companies (investment fees effect).

12. Describe the evolution (if any) in the calculation of the IRR during the years of existence of the PEF (learning cost effect).

13. Analyze the number of investment deals versus IRR (economies of scale and scope).

14. Analyze the expected past IRR versus realized return (over-confidence).

Two Specific Cases – Deal Analysis:

1. Analyze the drivers of a particular deal, How was the RR calculated. Analyze the proportions of each driver in detail?

2. Analyze how specific factors (target company entrepreneur behaviors) like dependence, financial distress, affiliation feeling, and holding time period might affect the deal and its final IRR.

Complementary and Convenient Documentation:

- IRR calculations general procedures.
- Strategy and scope procedures.
- Performance reports.
- Excel files – Specific deals valuation & IRR calculation.
APPENDIX 5.3: One Example (Answers sent by e-mail)

1. Observation of the influences of the required return from LPs (net) to define the IRR for the target companies (gross). How the expected agreed return for the LP investors’ influences the IRR? Does bigger and more prestigious PEFs require higher returns from their target companies? (performance persistence effect or a potential behavioral driver like representativeness).

In presenting a new deal to our LPs the expected return should at least match the target return of the whole fund. This means that if a PEF offered a 20% target return to his LPs, cannot present deals with lower return. If the fund is performing below target, the target IRR for new investment will higher in order to compensate for bad deals.

2. Examination of the influences from the cash flow fluctuations (LPs inflows) in the IRR during the lifetime of the PEF. Analyze the number of deals available (investment alternatives) versus available cash and IRR during the lifetime of the PEF. (money chasing deal phenomenon).

Pressure to invest is for sure influencing the way a fund put its money at work. My understating though, is that this pressure acts more in the way people (under)evaluate intangible risk (i.e. determine expected cash flow from a deal) better that be part of an explicit reduction of the target IRR. It’s therefore key that a fund manager be conscious of this risk and make his best to challenge his judgment in order to limit the extent of these psychological factors. Furthermore, pressure to invest make acceptable IRR levels closer to the threshold IRR, while tendency is to be more selective when the amount of money to invest is smaller.

3. Exploration of the influence from competitors (other PEFs) when defining the IRR (PEF segmentation phenomenon and money chasing deal phenomenon)
   a. If a fund is performing below the average of comparable funds of the same vintage (i.e. its direct competitors), new deals will tend to be made with a higher expected return, in order for the fund to improve its competitive positioning and therefore gain better chances to get new money at the next fundraising.
   b. Direct competitive pressure also obviously pushes fund managers to close deals to IRR levels closer to the minimum threshold.

4. Portfolio strategy: Investigation of the strategy when searching for new target companies (diversification vs. specialization). What is the impact in the IRR when huge synergies with the portfolio are found? (specialization effect)
In our opinion, advantages from diversification prevails over specialization. Except for add-on deals, usually smaller in size, synergies between portfolio companies are limited, while there is a serious risk from having portfolio investments concentrated in one sector.

5. Description of the monitoring intensity strategy in the target companies (low, medium, high). What’s the number of managers and members of the board in the target company? What’s the time employed? How does this affect the final IRR. (Fees effect – monitoring intensity effect) I would say that we put a medium to high intensity in monitoring portfolio companies, depending on the specific need and investment strategy. Time employed also varies depending on the phase of the investment cycle: in this period, with small remaining available funds and problems in portfolio performance, we dedicate strong effort in monitoring. Time employed in “active” monitoring does affect final IRR.

6. Description of the alternative policies for other financial tools like carried interest which could be hiding required return (fees effect). Fees may condition exit strategies better than acquisitions. If carried interest in frozen, waiting for a minimum IRR to be achieved, it’s possible that an exit may be accelerated at a value that could not reflect full potential.

7. Analysis of the investment speed and its influence in the IRR. Holding period during the cash inflows and the investment in the target companies (investment fees effect). IRR is often calculated since the drawdown date and not since the commitment date, therefore there is no pressure to invest quickly to get a higher IRR. Of course high turnover of portfolio companies means bigger return for the fund.

8. Describe the evolution (if any) in the calculation of the IRR during the years of existence of the PEF (learning cost effect) No substantial changes.

9. Analyze the number of investment deals versus IRR (economies of scale and scope) Studies shows that there is no correlation between fund size and fund performance. Since bigger funds also means more investments (even if larger funds tend to do bigger investments) we can say that there is no or weak correlation between number of deals and IRR.

10. Analyze the expected past IRR versus realized return (over-confidence) Over confidence related to past IRR may lead to a less rational and more instinctive approach to deal making and can therefore be a source of bad deals.
# APPENDIX 5.4: Summary of the Second Round

<table>
<thead>
<tr>
<th>Phenomena Studied</th>
<th>IFI</th>
<th>IFP</th>
<th>PES</th>
<th>Caps</th>
<th>IFES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Money管局 deal is present</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the IRR can be reduced as long as the IRR is lower</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>Return targets with IRRs right</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the IRR is influenced by the IRR net return, if not achieved the target for the IRR net return</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the internal fees and the internal fees plus the internal fees plus the internal earnings of the cap</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>The longer the time to invest all capital collected by the UPS</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the capital collected by the UPS</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the more important the need of deal with higher IRRs</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>the performance is driven by the IRR, there is a time target to invest all capital</td>
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<td>confirmed</td>
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<td>confirmed</td>
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<tr>
<td>Performance Persistence</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>Big IFIs get better deals</td>
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<td>and are able to ask for them</td>
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<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>smaller IFIs</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>they strive to get deals</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>to quantify it</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>to quantify it</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>lower UPS</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>smaller IFIs with higher UPS</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>similar deals</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<td>bigger IFIs</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>bigger IFIs can analyze more deals than small IFIs</td>
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<td>confirmed</td>
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<td>confirmed</td>
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<tr>
<td>Behavioral factors</td>
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<td>confirmed</td>
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<tr>
<td>overconfidence</td>
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<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>the way IFIs assess TIRR</td>
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<td>confirmed</td>
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<tr>
<td>the IRR is higher than the TIRR</td>
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<td>confirmed</td>
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<tr>
<td>they know how to use TIRR</td>
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<tr>
<td>they don’t know how to use TIRR</td>
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<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
</tr>
<tr>
<td>they don’t know how they can use TIRR</td>
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<td>confirmed</td>
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<td>bigger IFIs can analyze more deals than small IFIs</td>
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<td>BEF1</td>
<td>BEF2</td>
<td>BEF3</td>
<td>BEF4</td>
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<td>------</td>
<td>------</td>
<td>------</td>
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<td>Money changing deal</td>
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<td>when competitors are present, the E.I.R. can be</td>
<td>the PE normally buy</td>
<td>this PE normally buy</td>
<td>in order to achieve the LIR</td>
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<td>reduced as long as the T.I.R.R. is lower, the capital</td>
<td>Ebitda multiples and therefore</td>
<td>Ebitda multiples and therefore</td>
<td>they have to buy at a very low entry</td>
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<td>market is chosen for deals with higher IRR is</td>
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<td>competition is not present</td>
<td>Ebitda multiple and therefore</td>
<td>better deals</td>
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<td>Internal fees / LIR pressures / speed affect</td>
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<td>confirmed</td>
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<td>If LIR pay normally 5% for the target LIR</td>
<td>the longer the time to invest in there is a clause in the contract</td>
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<td>the cost of opportunity of the cap not invested</td>
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<td>choosing of the deals</td>
<td>the target LIR.</td>
<td>invest as soon as possible</td>
<td>the LP and the way they offset risk</td>
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<td>fees/IRR</td>
<td>from LPs</td>
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<td>fees/IRR</td>
<td>on the portfolio of each LP and the way they offset risk</td>
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<td>Big PEIs get better deals</td>
<td>bigger PEIs get higher fees</td>
<td>the difference between Ebitda multiples are 30% or 40%</td>
<td>Big PEIs pay more than</td>
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<td>and are able to ask for</td>
<td>(same % but more capital).</td>
<td>between 5% and 20%</td>
<td>lower than those of other PEIs</td>
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<td>lower LIRs</td>
<td>small LIRs need higher</td>
<td>low returns are</td>
<td>between 5% and 20%</td>
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<td>Smaller PEIs need higher LIRs</td>
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<td>of smaller portfolios</td>
<td>professionals, better deals</td>
<td>in fact they buy companies at a lower Ebitda multiple than others</td>
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<td>Behavioral Factors</td>
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<td>confirmed</td>
<td>confirmed</td>
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<td>they don't know how</td>
<td>they don't know how</td>
<td>they don't know how</td>
<td>they don't know how</td>
<td></td>
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<tr>
<td>hearing behaviour</td>
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<td>they don't have a rational</td>
<td>they don't have a rational</td>
<td>they don't have a rational</td>
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<td>of intuition, experience, &amp;</td>
<td>they confirm the use</td>
<td>they confirm the use</td>
<td>they confirm the use</td>
<td>they confirm the use</td>
<td></td>
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<td>qualitative drivers</td>
<td>therefore they account this</td>
<td>overconfidence effect in the T.I.R.</td>
<td>overconfidence effect in the T.I.R.</td>
<td>overconfidence effect in the T.I.R.</td>
<td></td>
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<td>Strategy: Specialization vs. Diversification</td>
<td>both strategies are</td>
<td>both strategies are</td>
<td>specialisation prevails over</td>
<td>both strategies are</td>
<td></td>
</tr>
<tr>
<td>one previous study inferred that PEFs</td>
<td>used and non of them</td>
<td>used and non of them</td>
<td>diversification the fund</td>
<td>used and non of them</td>
<td></td>
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<td>prefer specialisation and synergies</td>
<td>this factor don't affect</td>
<td>this factor don't affect</td>
<td>prefer to work in the food</td>
<td>this factor don't affect</td>
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<td>rather than diversification as traditional</td>
<td>the IRR</td>
<td>the IRR</td>
<td>industry</td>
<td>the IRR</td>
<td></td>
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<tr>
<td>Finance Teach us.</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>Monitoring intensity</td>
<td>low level</td>
<td>low level</td>
<td>low level</td>
<td>low level</td>
<td></td>
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<tr>
<td>the high presence of fund professionals in the target</td>
<td>low level</td>
<td>low level</td>
<td>low level</td>
<td>low level</td>
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<tr>
<td>companies might increase the IRR</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<tr>
<td>if more professionals are needed because of the particular</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
<td>confirmed</td>
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<td>situation of the target and its strategy, the T.I.R. is</td>
<td>increased (the entry multiple is reduced)</td>
<td>(it cannot be quantified)</td>
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<td>confirmed</td>
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<tr>
<td>increased (the entry multiple is reduced)</td>
<td>(it cannot be quantified)</td>
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### Phenomena Studied

<table>
<thead>
<tr>
<th>Phenomenon</th>
<th>CAP2</th>
<th>BIF3</th>
<th>REF4</th>
<th>PAI3</th>
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<tr>
<td>Money chasing deal</td>
<td>Confirmed</td>
<td>Confirmed</td>
<td>Confirmed</td>
<td>Confirmed</td>
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<tr>
<td>When competitors are present, the EIRR can be reduced as long as the T.IRR is lower.</td>
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<td></td>
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<tr>
<td>Reduced fees / LPs pressure / Speed Effect</td>
<td>Confirmed</td>
<td>Confirmed</td>
<td>Confirmed</td>
<td>Confirmed</td>
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<td>Return targets with LPs might specialization increases speed</td>
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<td></td>
<td></td>
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<tr>
<td>Influence the T.IRR and the opportunity costs (OC)</td>
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<td>Choosing the deals they don't have opportunity to obtain outside the PE</td>
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<td>The longer the time to invest all costs for the cap not invested is kept by the bank.</td>
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<td></td>
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<td>The capital collected by the LPs due to the fact that the cap is kept by the bank. Bigger PEFs can ask for a lower IRR.</td>
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<td></td>
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<td>The more important the need of deals with higher IRR.</td>
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### Behavioural Factors

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<tr>
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<th>Confirmed</th>
<th>Confirmed</th>
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<td>Overconfidence</td>
<td>they don't know how</td>
<td>they don't know how</td>
<td>they don't know how</td>
<td>they don't know how</td>
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<td>The way PEFS assess T.IRR</td>
<td>model to calculate T.IRR</td>
<td>model to calculate T.IRR</td>
<td>model to calculate T.IRR</td>
<td>model to calculate T.IRR</td>
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<tr>
<td>of intuition, experience, &amp; qualitative drivers</td>
<td>T.IRR might change during time</td>
<td>T.IRR depends on the liquidity</td>
<td>T.IRR also depends on the degree of intution, experience, &amp; qualitative drivers</td>
<td>T.IRR confirms the use of intuition, experience, &amp; qualitative drivers</td>
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<td>Monitoring intensity</td>
<td>Low level</td>
<td>Medium to low level</td>
<td>Medium to low level</td>
<td>Low level</td>
</tr>
<tr>
<td>Strategic vs. diversification</td>
<td>specialization prevails over both strategies are both strategies are specialization prevails over</td>
<td>diversification prevails over both strategies are both strategies are specialization prevails over</td>
<td>diversification prevails over both strategies are both strategies are specialization prevails over</td>
<td>diversification prevails over both strategies are both strategies are specialization prevails over</td>
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<tr>
<td>Monitoring intensity</td>
<td>low level</td>
<td>Medium to low level</td>
<td>Medium to low level</td>
<td>Low level</td>
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</tbody>
</table>
APPENDIX 5.5: Second Questionnaire

Information on private equity fund (PEF).
1) What percentage of the total capital raised by the PEF is collected at the beginning (estimate).
2) How many years did it take (or do we need) to invest all the capital at the beginning (estimate).
3) What would be the target of eventual return (an estimate in%) for investors at the end of the life of PEF and when all the capital will be distributed to LPs? Here are two completely different things:
   a) Net IRR Target: the target pursued by the PEFs or expectations from LPs
   b) Arrangements for carried interest: Distribution of capital gains in case of exceeding a certain threshold (which would be the threshold and what percentage of the capital gain is distributed to GPs)
4) Percentage of capital held by the commitment (Fees) for internal costs of the PEF. How long the procedure would be the life of the PEF? Is increasingly seen as a percentage of total commitment and this varies depending on the stage is located in the bottom?
5) How are funded abortions Costs
6) Percentage of commitment that is left in reserve (not invested in deals) for contingencies and other purposes (such as managed).
7) percentage (expected to write off the beginning of the life of the PEF).
8) In your opinion, the LPs suffer an opportunity cost during the period in which the capital commitment has not yet invested? It 'obvious that they cannot do long-term investment and should hold relatively liquid capital to invest in deals that may occur suddenly. What do you think? It is estimated that the opportunity cost of LPs?

Information relating to the expectations of two analyzed by PEF Deals
9) These questions relate to two deals to choose from. Some of the questions have a quantitative output, and you can fill in the tables below. The qualitative part and additional comments can be answered below the questions themselves.
10)What is the IRR (expected IRR) during the initial evaluation of the two deals?
11)During the evaluation have hypothesized / simulated different IRR (worst case, best case, etc)? Could give the value chosen for the two deals?
12)Consider a threshold IRR? That is, a minimum IRR for the acceptance of a deal? As it calculated? Why not 30% and 25% or 35%?. This IRR threshold depends on each deal (it should be so because in every deal involves different risk and therefore a different threshold IRR)?
13)What was the IRR threshold for the two deals shown for this query?
14)How was it structured the deal: Estimation of the ratio D / E (debt / equity) of the deal (the level of leverage at the beginning (estimate).
15)Percentage of discount applied to the multiple of EBITDA during the valuation effect of the size and Lack of marketability (estimate).
16)In the two deals chosen, there have been some cases where you have been forced to increase the value of the multiple planned initially for the
presence of competition or for reasons of negotiations? If this were the case, as (approximately) was increased and why?
17) What was the ROE (return on equity of the company) prior to the PEF (estimate)?
18) Year in which the deal was made.
19) The value of the deal (total investment made: Leverage Equity +).
20) Type of operation: Expansion, MBO, LBO?
21) Percentage of shares acquired?
22) Sector in which the company acquired: Food, Energy, Pharma, etc.?
## APPENDIX 5.6: Summary of the Quantitative Data

<table>
<thead>
<tr>
<th>Type of PEF</th>
<th>CC (capital committed) in millions</th>
<th>N of companies</th>
<th>N of executives</th>
<th>Fund raised Year</th>
<th>PEF ex-life (L)</th>
<th>Speed - Years (L)</th>
<th>Carried Interest % over H.IRR</th>
<th>Reserves % over capital committed</th>
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<td>13</td>
<td>12</td>
<td>1993</td>
<td>10</td>
<td>4</td>
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<td>23</td>
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<td>2002</td>
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<td>30</td>
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<td>7</td>
<td>2006</td>
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<td>10%</td>
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<td>20%</td>
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<td>10%</td>
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<tr>
<td>CAP2</td>
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<td>2009</td>
<td>15</td>
<td>3</td>
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<td>no carried interest (%)</td>
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<table>
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<tr>
<th>Type of PEF</th>
<th>Abort costs per year outside Fees</th>
<th>Write Off</th>
<th>Net Consolidated IRR (LPs expectations &amp; GPs target IRR)</th>
<th>Multiple</th>
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**Definitions:**

**CC (capital commitment):** Amount of capital under commitment.

**Number of Companies:** Number of companies managed at the time of the interview.

**Number of executives:** Number of executives (directors, seniors and juniors) working for the PEFs.

**PEF ex-life:** Expected life for the PEF since the foundation of the PEF to the end of it.

**Speed Years:** Expected number of years required to invest all the capital in deals.

**Carried Interest:** The value of the H.IRR

**Net Consolidated IRR:** LPs expectations and GPs target net of internal costs

**Size + Dlom:** The percentage discounted due to size and liquidity risk. It directly affects the E.IRR.

**T.IRR type:** Indicates if the T.IRR is used by the PEF as a general value applied to all deal equally (general) or as a single value depending on each deal.

**Competition Effect:** Percentage discounted due to the presence of other PEFs competing for the deal. It directly affects the E.IRR.

**D/E:** The Debt / Equity ratio planned for the deal.

The % of Reserves and write-offs are calculated over the capital under commitment.

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<tr>
<th>Type of PEF</th>
<th>Deal</th>
<th>Shares acquired</th>
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<th>Gross single deal IRR (LPs target)</th>
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<th>T.IRR at Multiple</th>
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<td>Operation Type</td>
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<td>Medical Services</td>
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<td>Clothes for women</td>
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**More Definitions:**

**Value:** Value invested by the PEF to buy part of the equity (capital invested by the PEF)

**Deal Entrance year:** Year in which the deal was closed

**Abbreviations used the column “Main Drivers G.I.”**

G.I = Gains in Inefficiency  
G = growth  
I = internationalization  
M&A = merger and acquisition transactions  
R = Rationalization and restructuring  
Mgm = high quality management  
L = Leverage  
SS = Solid Sector  
SCF = Stable Cash Flows  
NP = new products  
NT = new technology  
HSCF = High stable cash flows  
HLV = High liquidation value in line with the entry value paid  
SOA = Sell of operative assets  
S = Synergies with other deal
## APPENDIX 5.7: Internal Fees with its Methodologies

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<th>Type of PEF</th>
<th>PEF internal Fees</th>
<th>Fees methodology</th>
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</thead>
</table>
| BIF2        | 2.00%             | 2% over capital committed (CC) first 5 years  
               | 0.00%             | No fees in the last 5 years. They live out of a new fund |
| BIF1        | 2.00%             | 2% over capital committed (CC) first 3 years  
               | 1.75%             | 1.75% over capital invested (CAPI) last 7 years |
| CAP1        | 2.50%             | 2.5% over capital committed (CC) first 4 years  
               | 2.50%             | 2.5% over capital invested (CAPI) last 6 years |
| PAF1        | 2.00%             | 2% over capital committed (CC) first 5 years  
               | 1.75%             | 1.75% over capital invested (CAPI) last 7 years |
| REF1        | 1.75%             | 1.75% over capital invested (CAPI)  
               | 1.75%             | 1.75% over capital invested (CAPI) last 5 years |
| REF3        | 2.50%             | 2.5% over capital committed (CC) first year  
               | 2.50%             | 2.5% over capital invested (CAPI) last 9 years |
| BIF4        | 2.00%             | 2% over the capital committed(CC) first 5 years  
               | 2.00%             | 2 % over capital invested (CAPI) last 5 years |
| REF2        | 2.10%             | 2.1% over capital committed (CC) first 5 years  
               | 2.10%             | 2.1% over capital investd (CAPI) last 5 years |
| PAF2        | 2.00%             | 2% over capital subscribed (CS) which is sent by the mother PEF in tranches |
| BIF3        | 2.00%             | 2% over (CC not invested + CAPI) for each year  
               | 2.00%             | 2% over (CC not invested + CAPI) for each year |
| REF4        | 1.00%             | 1% over capital committed (CC) first 1 years  
               | 2.50%             | 2.5% over capital committed (CC) in the last 9 years |
| PAF3        | 2%                 | 2% over capital subscribed (CS) which is sent by the mother PEF in tranches |
| CAP2        | 1.00%             | 1% over capital committed (CC) first 3 years  
               | 1.50%             | 1.5% over capital invested (CAPI) in the last 7 years |

**Definitions**

**PEF internal fees**: The percentage apply for the internal fees. This percentage is not always applied over the capital under commitment. Each PEF has its own methodology and this is explained in the column called **Fees Method**.
APPENDIX 6.1: Calculation of the Expected Fees (EF)

**Calculation of the Expected Fees (EF) According to Each System**

1 – First Years over Capital Committed (CC) & last Years Over Capital Invested (CAPI)

\[
\text{EF First Years} = \frac{\text{NFY} \times \text{FFY}}{\text{E.LY}} \quad (1)
\]

\[
\text{EF Last Years} = \frac{(\text{CC} - \text{CC} \times \text{R}) \times (1 + \text{Net T.IRR}) \times (\text{FLY}) \times (\text{E.LY} - \text{E.SY} - \text{NFY})}{\text{E.LY} \times \text{CC}} \quad (2)
\]

\[
\text{EF} = \text{EF first years} + \text{EF last years} \quad (3)
\]

Where:

- **NFY** = Number of year in which the Fees are applied to the capital committed (CC)
- **FFY** = % of Fees applied in the first period (over capital committed)
- **E.LY** = Expected Life of the PEF in years
- **CC** = Capital Committed
- **CC x R** = Amount of reserves
- **(CC – CC x R)** = Capital Committed without considering the Reserves
- **CAPI** = Capital Invested
- **CAPI = (CC – CC x R) x (1 + Net T.IRR)** = Capital committed (without reserves) increased by the value created in the target investments (increased by the net T.IRR)
- **FLY** = Number of years in which the Fees are applied to the capital invested
- **E.SY** = expected years to invest = speed years
- **NFY** = Number of Years in which the fees where applied the CC (first period).

The first formula (1) is very intuitive and easy to understand.
The second formula (2) is a little more complicated and might need some explanation: The years in which the capital is invested is equal to (E.LY – E.SY), to this figure however the first part of the period in which the fees where applied to the CC must also be subtracted (E.LY – E.SY – NFY). Therefore for that period the fees (FLY) must be applied to the capital invested which is equal to the capital committed (minus reserves) increased by the value created. Thereafter, to arrive to the annual percentage, the whole formula must be divided for CC and E.LY.

At the end the total annual percentage (EF) will be the sum of both periods (formula (1) + formula (2))

2 – Fees applied to the Capital Committed only in the first period and no fees for the second period

\[
\text{EF First Years} = \frac{\text{NFY} \times \text{FFY}}{\text{E.LY}} \quad (1)
\]
EF Last Years = 0

3 – Fees applied to the Capital Subscribed (CS) Sent by the Mother PEF in Tranches

\[ EF = \frac{CC \times E.LY \times \text{Fees}}{2 \times CC \times E.LY} = \frac{\text{Fees}}{2} \quad (4) \]

In this case, the capital committed is received in tranches during the life of the PEF. It is assumed that in half of the life of the PEF (E.LY / 2) the whole amount of CC has been received by the PEF and the Fees are applied to the capital subscribe (CS) or capital received which will be equal to \((CC \times E.LY) / 2\).

4 – Fees Applied to the CC not Invested plus the Capital Invested for each Year

An example as how to calculate this system is shown in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Commitment</th>
<th>Invested value</th>
<th>Total</th>
<th>Fee (2%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>Year 2</td>
<td>80</td>
<td>25</td>
<td>105</td>
<td>2.1</td>
</tr>
<tr>
<td>Year 3</td>
<td>50</td>
<td>70</td>
<td>120</td>
<td>2.4</td>
</tr>
<tr>
<td>Year N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table shows a system by which the fees percentage is applied to the sum of capital committed and capital invested. In the example of the table the initial capital committed is always 100 but the capital invested changes according to value created.

The following table shows the results for the EF in each case applying the previous formulas:
<table>
<thead>
<tr>
<th>Type of PEF</th>
<th>CC</th>
<th>PEF Ex Life</th>
<th>Speed Years (1)</th>
<th>Reserves x Year</th>
<th>Abort costs % PEF int Fees</th>
<th>Net Consolidated IRR</th>
<th>Multiple</th>
<th>Total EF per year</th>
<th>Fees methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIF2</td>
<td>500</td>
<td>10</td>
<td>4</td>
<td>20%</td>
<td>- 2,00% 0,00%</td>
<td>15,0%</td>
<td>50</td>
<td>1,00%</td>
<td>2% over capital committed (CC) first 5 years. No fees in the last 5 years. They live out of a new fund.</td>
</tr>
<tr>
<td>BIF1</td>
<td>1180</td>
<td>10</td>
<td>5</td>
<td>15%</td>
<td>- 2,00% 1,75%</td>
<td>20,0%</td>
<td>111</td>
<td>0,94%</td>
<td>2% over capital committed (CC) first 3 years. 1,75% over capital invested (CAPI) in the last 7 years.</td>
</tr>
<tr>
<td>CAP1</td>
<td>352</td>
<td>10</td>
<td>5</td>
<td>15%</td>
<td>- 2,50% 2,50%</td>
<td>16,0%</td>
<td>44</td>
<td>1,26%</td>
<td>2,5% over capital committed (CC) first 4 years. 2,5% over capital invested (CAPI) in the last 6 years.</td>
</tr>
<tr>
<td>PAF1</td>
<td>450</td>
<td>10</td>
<td>4</td>
<td>20%</td>
<td>- 2,00% 1,75%</td>
<td>16,0%</td>
<td>52</td>
<td>1,16%</td>
<td>2% over capital committed (CC) first 5 years. 1,75% over capital invested (CAPI) in the last 5 years.</td>
</tr>
<tr>
<td>REF1</td>
<td>20</td>
<td>15</td>
<td>4</td>
<td>0%</td>
<td>- 1,75% 1,75%</td>
<td>10,0%</td>
<td>4</td>
<td>1,41%</td>
<td>1,75% over capital invested (CAPI).</td>
</tr>
<tr>
<td>REF3</td>
<td>30</td>
<td>10</td>
<td>4</td>
<td>15%</td>
<td>- 2,50% 2,50%</td>
<td>20,0%</td>
<td>5</td>
<td>1,53%</td>
<td>2,5% over capital committed (CC) first year. 2,5% over capital invested (CAPI) in the last 9 years.</td>
</tr>
<tr>
<td>BIF4</td>
<td>310</td>
<td>10</td>
<td>4</td>
<td>7,5%</td>
<td>- 2,00% 2,00%</td>
<td>25,0%</td>
<td>38</td>
<td>1,12%</td>
<td>2% over the capital committed (CC) first 5 years. 2% over capital invested (CAPI) in the last 5 years.</td>
</tr>
<tr>
<td>REF2</td>
<td>35</td>
<td>10</td>
<td>4</td>
<td>10%</td>
<td>- 2,10% 2,10%</td>
<td>10,0%</td>
<td>4</td>
<td>1,97%</td>
<td>2,1% over capital committed (CC) first 5 years. 2,1% over capital invested (CAPI) in the last 5 years.</td>
</tr>
<tr>
<td>PAF2</td>
<td>675</td>
<td>10</td>
<td>3</td>
<td>15%</td>
<td>- 2,00% 2,00%</td>
<td>25,0%</td>
<td>68</td>
<td>1,00%</td>
<td>2% over the capital subscribed (CS) which is sent by the mother PEF in tranches.</td>
</tr>
<tr>
<td>BIF3</td>
<td>300</td>
<td>10</td>
<td>3</td>
<td>20%</td>
<td>- 2,00% 2,00%</td>
<td>15,0%</td>
<td>57</td>
<td>1,91%</td>
<td>2% over (CC not invested + CAPI) for each year.</td>
</tr>
<tr>
<td>REF4</td>
<td>35</td>
<td>10</td>
<td>3</td>
<td>20%</td>
<td>- 1,00% 2,00%</td>
<td>15,0%</td>
<td>5</td>
<td>1,48%</td>
<td>1% over capital committed (CC) first 1 years. 2,5% over capital committed (CC) in the last 9 years.</td>
</tr>
<tr>
<td>PAF3</td>
<td>200</td>
<td>10</td>
<td>4</td>
<td>10%</td>
<td>- 2% 1,50%</td>
<td>15,0%</td>
<td>20</td>
<td>1,00%</td>
<td>2% over capital subscribed (CS) which is sent by the mother PEF in tranches.</td>
</tr>
<tr>
<td>CAP2</td>
<td>100</td>
<td>15</td>
<td>6</td>
<td>0%</td>
<td>financed by bank 1,00% 1,50%</td>
<td>6%</td>
<td>11</td>
<td>0,71%</td>
<td>1% over capital committed (CC) first 3 years. 1,5% over capital invested (CAPI) in the last 7 years.</td>
</tr>
</tbody>
</table>
APPENDIX 7.1: The Portfolio Standard Deviation

- Expected return:

\[ E(R_p) = \sum w_i E(R_i) \]

where \( R_p \) is the return on the portfolio, \( R_i \) is the return on asset \( i \) and \( w_i \) is the weighting of component asset \( i \) (that is, the share of asset \( i \) in the portfolio).

- Portfolio return variance:

\[ \sigma^2_p = \sum w_i^2 \sigma_i^2 + \sum \sum w_i w_j \sigma_i \sigma_j \rho_{ij}, \]

where \( \rho_{ij} \) is the correlation coefficient between the returns on assets \( i \) and \( j \). Alternatively the expression can be written as:

\[ \sigma^2_p = \sum \sum w_i w_j \sigma_i \sigma_j \rho_{ij}, \]

where \( \rho_{ij} = 1 \) for \( i=j \).

- Portfolio return volatility (standard deviation):

\[ \sigma_p = \sqrt{\sigma^2_p} \]
APPENDIX 8.1: Considerations about the HML Factors

This work (see chapters 5, 6, and 7) found that expansion deals are riskier than LBO deals. But according to Fama and French (1993), quoted high growth potential companies have lower risk. Why this contradiction? Before answering this last question, one must bear in mind the following:

- LBOs deals are cash cows with a low level of leverage before the PEF entrance. Such LBOs have the potential to repaid most of the debt in the short-term (3 or 4 years).
- Expansion deals instead, are more difficult since in 4 – 6 years the company needs to create value with new products, new technology, more market share, etc. These drivers might present more uncertainty and higher risk than short-term LBOs.

Then why Franzoni et al. (2010) found that PEFs have high betas for the HML factor? They assumed that the reason for this is the fact that PEFs companies have high leverage because they hold more LBOs than expansion deals. In other words, they are assuming that LBOs have higher risk than expansion deals. This statement might be truth (PEFs might hold more LBOs than expansion deals (at least in the past but probably not in the future). However, according to this researcher, the answer to this matter is the following:

- LBOs might have higher illiquidity risk than expansion deals but not higher risk as a whole.
- LBOs have higher illiquidity risk\(^{193}\) due to the debt itself which in case of crisis (this is what is happening nowadays), banks might not be willing to refinance leveraged companies (due to the lack of liquidity in the system) sending them to bankruptcy.. Instead, in expansion deals this might not happen since they do not need a great deal of leverage.

Therefore, the HML factor has to do with liquidity risk. It is therefore coherent to use this factor exactly as used by Fama and French but with another interpretation: The HML in the case of PEFs reflects liquidity risk and not value risk.

\(^{193}\) Illiquidity risk, in this case, refers to two kinds of risk: First, the risk inherent in the business operations. High leveraged companies such as the LBOs could run out of cash during a financial crisis. Second, it might be difficult to sell a high leveraged company during a financial crisis.
APPENDIX 8.2: The Four-Factor Model CAPM – Some Considerations

(13) CAPM factors = Rf + βp Rm + βs SMB + βv HML βliq PIML
CAPM factors = 5% + 1.3 (4%) + 0.034 (3%) + 0.93 (5%) + 0.67 (2.75%) = 17%

The value of Rf: is an estimation of the Italian 10 year bonds for the next 10 years (circa 7%) which is uncommonly high due to the financial crisis. Historic value has been about 3%. This situation is influencing the final values for the gross T.IRR obtained by this model. In order to compare these premiums with the T.IRR used by the PEFs of the sample, it is necessary to consider a rate of 3% since the ex-ante perspective of the PEFs included in the sample of this work, have started their lives before the crisis with an ex-ante perspective where Italian bonds had values inferior to 3%. However, the example shown in the formula (13) have considered a rate of 5% (which is something in between).

The value of Rm: There are some important considerations in relation what the market premium values discussed and reviewed in chapter 2:

The value of Welch (2000) is 5.5%. This is the only methodology that uses an ex-ante perspective based on a survey directed to professionals and academics and therefore, in terms of methodology, this study is coherent this thesis. However, the study is too old and is limited to the US markets.

The value of Dimson et al. (2008) is 3.9%. This is the only global study and intends to have an ex-ante perspective although its methodology differs from the one used by this thesis. These authors look at past data and try to eliminate survivorship bias or the effect of past events that should not happen in the future.

Italian Premium is 6.5% (Dimson et al. (2008)). This value has two problems: First, it is too high because the Italian bond rates were too low (low performance). Second, it is based on past data and the no survivorship bias (as in the case of the global study) has been taken out.

Therefore, it seems that the best value is the global value of Dimson et al (2008) which is 3.9% (the model will take the rounded 4%). In addition,
markets are becoming increasingly globalized and market premiums will certainly follow that trend as well. For the future, we must think globally and not locally.

**The values SMB, and HML:** are taken from the Kenneth French website for that same period although these do relate to quoted US firms.

**The values of the betas:** are the mean regressions estimated by Franzoni *et al.,* (2010) for the private equity funds in general.
APPENDIX 8.3: Data to be used in the Model

1 – PEF Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP</td>
<td>5%</td>
</tr>
<tr>
<td>MCD</td>
<td>6%</td>
</tr>
<tr>
<td>YOC</td>
<td>3.5%</td>
</tr>
<tr>
<td>TD</td>
<td>5%</td>
</tr>
<tr>
<td>MI</td>
<td>2%</td>
</tr>
</tbody>
</table>

2 – PEF coefficients

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>μ_{pp}</td>
<td>0 -1</td>
</tr>
<tr>
<td>μ_{mcd}</td>
<td>(-0.5) – (+0.5)</td>
</tr>
<tr>
<td>μ_{mcd2}</td>
<td>0 -1</td>
</tr>
<tr>
<td>μ_{td}</td>
<td>0 -1</td>
</tr>
<tr>
<td>μ_{mi}</td>
<td>0 -1</td>
</tr>
</tbody>
</table>

3 – BF factor & Coefficient

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>μ_{ub}</td>
<td>0 -1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>UB</td>
<td>5%</td>
</tr>
</tbody>
</table>
APPENDIX 8.4: Testing the Model

1 - E.IRR with alpha for a Big generalist PEF with a high number of deals.

1 – CAPM factors and IC factors:
SRF + URF = CAPM factors = 15%
The last formula, considers a standard value for a big generalist PEF with high number of deals which is the same example given in section 8.4.3 & 8.4.4. In this case there are no major changes with the standard. The only differences are:
- A lower value of $\beta_v$ (0.63 instead of 0.93) due to the fact that the value of 0.93 is based in pasta data were more LBO deals were present.
- A lower value of $\beta_{liq}$ (0.5 instead of 0.67) due to the fact that this is a PEF with high number of deals and the liquidity risk is well diversified.
However each case will have its own values according to the expected portfolio.

IC (BIF) = 8.25%

2 – PEF Factors and Behavioral Factors

PEFF = $\mu_{pp} \times (5\%) + \mu_{mcd} \times (6\%) + \mu_{mcd2} \times (3.5\%) + \mu_{ld} \times (5\%) + \mu_{mi} \times (2\%) + \left[ \sigma (E.IRR) - \sigma_c (E.IRR) \right]$

According to the reasoning explained in this chapter for each factor, the values to be considered in this example might be:
- $\mu_{pp} = 0.7$: being a big PEF (older and with past success) LPs will require higher net T.IRR
- $\mu_{mcd} = +0.2$: It might be logical to thing that being a successful experienced PEF, it might have easier access to deals but very high competition.
- $\mu_{mcd2} = 0.3$: Low opportunity costs due to high speed. Remember that this factor is negatively correlated to the previous one but cannot take negative values.
- $\mu_{ld} = 0.2$: a mix of expansion and MBO deals
- $\mu_{mi} = 0.1$: low monitoring intensity and no expected additional costs.

BF = $\mu_{ub} + (5\%)$

$\mu_{ub} = 0.1$: this are experienced GPs with realistic business plan.

Then:
PEFF = $0.7 \times (5\%) + 0.2 \times (6\%) + 0.3 \times (3.5\%) + 0.2 \times (5\%) + 0.1 \times (2\%) = 7\%$

BF = 0.1 x 5% = 0.5%
E.IRR with alpha = 15% + 8.25% + 7% + 0.5% = 30.75%

Thereafter, it will depend on the covenants to reduce this figure (mitigate the risks).
For this example the gross and the net T.IRR will be
Gross T.IRR = 15% + 8.25% = 23.25%
Net T.IRR = Gross T.IRR – IC = 15%

Since LPs might consider performance persistence (past experience), their expected net IRR can be (including alphas) calculated as follows:

Net T.IRR = CAPM factors + PPF = 15% + 0.7 x (5%) = 18.5%
2 – E.IRR with alpha for a small generalist PEF.

1 – CAPM factors and IC factors:
CAPM factors = 5% + 1.3 (4%) + 0.8 (3%) + 0.63 (5%) + 0.67 (2.75%) = 17.5%
In the last formula, the risk is higher than the first example due to a higher size risk (smaller deals)

IC (REF) = 8%
In this case the ECI is lower than the first example because of net T.IRR in a small PEF is lower.

2 – PEF Factors and Behavioral Factors

PEFF = \mu_{pp} \times 5\% + \mu_{mcd} \times 6\% + \mu_{mcd^2} \times 3.5\% + \mu_{td} \times 5\% + \mu_{mi} \times 2\% + \left[ \sigma (E.IRR) - \sigma_c (E.IRR) \right]

Where:
\mu_{pp} = 0.1 : being a small PEF, LPs will require a lower net T.IRR
\mu_{mcd} = -0.1: Being a new PEF with no experience, it might have more difficult access to deals. In contrast they have low competition (they have to pay less).
\mu_{mcd^2} = 0.6: higher OC than the previous example.
\mu_{td} = 0.3: a mix of expansion and MBO deals
\mu_{mi} = 0.3: higher monitoring intensity and more expected additional costs in comparison with the first example (less economies of scale).

BF = \mu_{ub} + (5\%)
\mu_{ub} = 0.8: higher level of uncertainty.

Then:
PEFF = 0.1 \times 5\% - 0.1 \times 6\% + 0.6 \times 3.5\% + 0.3 \times 5\% + 0.3 \times 2\% = 4\%
BF = 0.8 \times 5\% = 4\%

E.IRR with alpha = 17.5\% + 8\% + 4\% + 4\% = 33.5\%

Thereafter, it will depend on the covenants.
For this example the gross and the net T.IRR will be:
Gross T.IRR = 17.5\% + 8\% = 25.5\%
Net T.IRR = 17.5\%
Net E.IRR with alpha = 17.5\% + 0.1 \times 5\% = 18\%
1 – CAPM factors and IC factors:
CAPM factors = 5% + 0.8 (4%) + 0.2 (3%) + 0.4 (5%) + 0.5 (2.75%) = 11.5%
This PEF has more expansion deals and therefore $\beta_v$ is even lower (0.4 instead of 0.93)

$IC = EF + ECI + OCR$
$IC = 1% + 3.5% + 0.5% = 5\%$
In this case the ECI is lower than the previous two cases because of gross T.IRR for specialist funds is lower.

2 – PEF Factors and Behavioral Factors

$PEFF = \mu_{pp} \times (5\%) + \mu_{mcd} \times (6\%) + \mu_{mcd2} \times (3.5\%) + \mu_{td} \times (5\%) + \mu_{mi} \times (2\%) + [\sigma (E.IRR) - \sigma_c (E.IRR)]$
Where:
$\mu_{pp} = 0.7$: big specialized PEF
$\mu_{mcd} = + 0.2$: experienced PEF with contacts and working in a niche with low competition.
$\mu_{mcd2} = 0.3$: low opportunity cost.
$\mu_{td} = 0.3$: a mix of expansion and MBO deals
$\mu_{mi} = 0.1$: low monitoring intensity and no expected additional costs.

$BF = \mu_{ub} + (5\%)$
$\mu_{ub} = 0.2$: low level of uncertainty.

Then:

$PEFF = 0.7 \times (5\%) + 0.2 \times (6\%) + 0.1 \times (3.5\%) + 0.3 \times (5\%) + 0.1 \times (2\%) = 7\%$
$BF = 0.2 \times 5\% = 1\%$
$E.IRR$ with alpha = 11.5 % + 5% + 7% + 1 % = 24.5%

Thereafter, it will depend on the covenants.
For this example the gross and the net T.IRR will be:
Gross T.IRR = 11.5% + 5% = 16.5%
Net T.IRR = 11.5%
Net E.IRR with alpha = CAPM factors + PPF = 11.5% + 0.7 x (5%) = 15%
4 – E.IRR with alpha for big specialist captive fund in the food industry.

The only difference with the case 3 is:
IC = 1% + 0% + 0% = 1%
E.IRR with alpha = 11.5% + 1% + 7% + 1% = 20.5%
Gross T.IRR = 11.5% +1% = 12.5%
APPENDIX 9.1: Some Comments given by the GPs and Postscript

A drafted version of the Model was first presented at DBA seminar held at the University of St. Andrews in May 2010. In that occasion, the researcher represented the University of Bradford as a DBA student. The researcher received the first important feedback from the finance professors participating at that event.

Between September and October 2011, the final model was presented to some of the executives who participated in the project. One GP of BIF2 stated: “I think this could be a very good tool to assess our T.IRR in the future. It will be useful to define a point of reference but it will not replace our judgment based on experience.” Another GP of CAP2 stated: “This is a very interesting procedure to assess the T.IRR and we would like to have a presentation of the whole model for our GPs and senior analyst”

In addition, the model was presented to one of the top 3 academics and practitioners in Italy. He was very impressed and stated: “this is a very important contribution for the PEFs and you have to publish it”. Therefore, the researcher asked him to publish the model together and he accepted. The model will be published between May and July in the most important magazine in Italy in the topic of private equity funds.

\[194\] Professor at the University of Castellanza and Director of the most important PEF in Italy.