CHASING THE DEAL WITH THE MONEY: MEASURING THE REQUIRED RISK PREMIUM AND EXPECTED ABNORMAL RETURNS OF PRIVATE EQUITY FUNDS TO MAXIMIZE THEIR INTERNAL RATE OF RETURN

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Abstract

A number of scholars of private equity ("PE") have attempted to assess the ex-post returns, or performance, of PEs by adopting an ex-post perspective of asset pricing. In doing so a set of phenomena has been recognized that is thought to be specific to the PE sector, such as "money-chasing deal phenomenon" (Gompers and Lerner, 2000) and "performance persistence" (Lerner and Schoar, 2005). However, based on their continuing use of an ex-post perspective, few scholars have paid attention to the possible extent to which these and other PE phenomena may affect expected returns from PE investments. To address this problem this article draws on an ex-ante perspective of investment decision-making in suggesting how a number of drivers and factors of PE phenomena may produce "abnormal returns", and that each of those drivers and factors should therefore be considered in accurately assessing the required risk premium and expected abnormal returns of PE investments. In making these contributions we examined a private equity investment of a regional PE in Italy and administered a telephone questionnaire to 40 PEs in Italy and the UK and found principally that while size is the most important driver in producing abnormal returns illiquidity alone cannot explain the expected returns of PE investments (*cf*. Franzoni et al., 2012). Based on our findings we developed a predictive model of PE decision-making that draws on an ex-ante perspective of asset pricing and takes into account PE phenomena and abnormal returns. This model extends the work of Franzoni et al. (2012), Jegadeesh et al. (2009), and Korteweg and Sorensen (2010) who did not consider the possible influence of PE phenomena in decision-making and will also help PE managers in making better-informed decisions.

Keywords: Risk Premium; Abnormal Returns; Private Equity Funds; Internal Rate of Return

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1 Introduction

It has been suggested that General Partners (GPs) of PE funds do not normally take an ex-ante perspective of risk and abnormal returns where intuition and experience are the main drivers of their investment decisions (Gompers and Lerner, 1997). Additionally, Limited Partners (LPs) and GPs typically extrapolate past performance to assess future expectations (Lerner and Schoar, 2005). The PE literature has offered little support for an ex-ante perspective of investment decisions, and most papers are ex-post studies that have focused on calculating past returns as a basis for making prospective decisions.

Yet scholars should recognize the importance of an ex-ante perspective in studying PEs in order to *"reduce the dangerous temptation to merely extrapolate past excess returns in shaping expectations for the risk premium"* (Arnott and Bernstein, 2002, p. 82). In this paper therefore we have sought to address the question of whether and in what way(s) an ex-ante perspective may improve investment decisions and thereby contribute to the literature on evaluating investment decisions in PEs.

Ex-post studies have assumed the existence of a set of phenomena unique to the PE sector that might influence performance, such as performance persistence (Kaplan and Schoar, 2005), money chasing deal phenomenon (Gompers and Lerner 1999, 2000), and investment speed effect (Phalippou and Gottschalg, 2009). The existence of such phenomena, which we call "PE phenomena" in this paper, weakens the accuracy of the Efficient Market Hypothesis and Capital Asset Pricing Models because PE phenomena can significantly affect performance (see, for example, Gompers and Lerner, 1999).

Yet the few risk-premium predicting models that exist (Franzoni et al., 2012; Jegadeesh et al., 2009;

Korteweg and Sorensen, 2010) suggest that illiquidity is the only additional factor to include in assessing risk premium and required investment returns. These models also do not consider how PE phenomena may produce abnormal returns and instead continue to rely on the efficient market hypothesis: *"The unconditional liquidity risk premium is about 3% annually, the total risk premium is about 18%, and the alpha (gross of fees) is not statistically different from zero"* (Franzoni et al., 2012, p. 2341). The trouble with this view is that the perceived risk and expected return drivers of PE investments refer not to the ex-post realized returns that PE investors actually achieve but to the required return that PEs expect to gain from their target investment. Here, one of the principal contributions of this paper is to suggest a number of relatively unexplored concepts, drivers and behaviors that may be observed with an ex-ante approach. Furthermore, we suggest how PE scholars and managers may compute the risk perceptions and return expectations of new investment deals by considering a range of specialized PE phenomena, including but not limited to risk and internal cost factors.

In making our contributions we explored a case of the process in which a small regional private equity fund ("REF") in Italy valued and made an investment. The core findings of this case were then examined in a telephone questionnaire of 40 PEs. Based on our observations in our case and questionnaire we suggest how PE phenomena may play an important role in valuing target investments. A more comprehensive model of PE decision-making is then developed that contributes to and complements the investment formulae of Franzoni et al. (2012), Jegadeesh et al. (2009), and Korteweg and Sorensen (2010) by drawing on an ex-ante perspective of investment decision-making that takes into account a number of specific PE phenomena as well as abnormal returns.

Our article proceeds as follows. First we discuss key gaps in the literature on investment decision-making in PEs that gives rise to our research question. We then describe our research methodology to address this question and explain how we analysed our data and produced a number of findings that form the platform for our contributions. In the following *Discussion* we introduce our model and suggest through worked examples how it extends the work of Franzoni et al. (2012), Jegadeesh et al. (2009), and Korteweg and Sorensen (2010) by demonstrating that certain PE phenomena may significantly influence investment decision-making. The paper concludes by articulating core issues arising from our research and possible directions for research.

2 Literature Review

The existing literature on evaluating risk-premium in PE can be divided into two sets of studies (Table 1 below). The first set of studies examines the return expectations and risk perceptions of PEs that adopt an ex-ante perspective. The second set explores realized returns and risks from an ex-post perspective. Additionally, these studies may be divided along two different perspectives:

- The first perspective draws from a statistical database. Authors assess Internal Rate of Return ("IRR") and infer phenomena using statistical analysis, while
- The second perspective focuses on collecting data from surveys and cases.

Table 1. Literature on Risk-Premium in PE Investments

	EX-ANTE Return Expectations / Risk Perceptions	**EX-POST Realized Returns and Risks**
Data collected from statistical databases		Peng (2001); Quigley & Woodward (2003); Emery (2003); Jones & Rhodes-Kropf (2004); Ljungqvist & Richardson (2003); Kaplan & Schoar (2005); Anson (2007); Jegadeesh et al. (2009); Kojima & Murphy (2011); Franzoni et al. (2012); Phalippou & Gottschlag (2009); Cochrane (2005); Mehra and Prescott (1985); Villalonga (2004); Lerner & Schoar (2004); Cumming & Dai (2008); Cumming (2006); Gompers et al. (2005, 2006, 2008); Kaserer & Diller (2004, 2005 , 2009); Korteweg & Sorensen (2009); Graham et al. (2002); Lopez de Silani & Gottschlag (2009); Woodward (2004); Harris et al., (2013) and many others.
Data collected by Surveys and Case Studies.	Manigart et al. (2002) Scarpati & Ng (2013)	Gompers & Lerner (1997)

Table 1 suggests that almost all studies of investment decision-making in PEs have assessed ex-post realized returns and are principally concerned with past performance and not with understanding return expectations and risk perceptions. Typically in ex-post studies PE phenomena have been considered only to the extent that their statistical effects have

been audited (see, for example, Kaplan and Schoar, 2005, and Lerner and Schoar, 2004).

Based on the literature the most important PE phenomena seem to be:

- "Money-chasing deal phenomenon": Gompers and Lerner (1999, 2000) argued that there are a limited number of favourable investments in the PE sector and that these investments are to be matched with a fluctuating capital supply,

- "Performance Persistence: GPs whose funds outperform the industry are likely to also outperform the industry in the next fund they manage, and vice versa, as fund size and flows are positively correlated with past performance (Kaplan and Schoar, 2005),

- "Speed Effect": Poorly performing funds seem to invest more slowly (Phalippou and Gottschalg, 2009),

- Big PEs versus Small PEs: Big PEs have higher gross threshold internal rates of return ("T.IRR") than small PEs as large funds tend to outperform small funds (Phalippou and Gottschalg, 2009) and may also produce economies of scale in fees whereby GPs of large funds can offer lower percentages of fees, and

- "Economies of Scope": PE performance suffers when the value-adding capacity of a management team needs to be shared across a large number of investments, and scale increases may imply diseconomies of scope whereby PEs investing in many types of firms may lose specialization and scope (Lopez-de-Silanes and Phalippou, 2008).

Most ex-post authors in Table 1 seem to be concerned with measuring investment performance without questioning the risk-return trade-off or without accurately measuring the risk-premium of deals. For instance, authors make assumptions about the value of beta: Jones and Rhodes-Kropf (2004), Kaplan and Schoar (2005), and Ljungqvist and Richardson (2003) assume betas of circa 1. On the other hand, Phalippou and Zollo (2005) compare investment performance to the S&P 500 without assessing risk-to-return trade-offs.

Other authors such as Cochrane (2005) and Phalippou and Zollo (2005) use models such as SLM-CAPM or the three-factor model of Fama and French (1993), such as Jagadesh et al. (2009), Korteweg and Sorensen (2010), and Franzoni et al. (2012) that were developed for organized markets and do not consider PE phenomena.

Risk-premium and beta are sometimes based on intuition. For instance, Gompers and Lerner (1997) found that their (single) case of an investee firm earned positive-adjusted returns of 8% per year, and they considered that this performance was sufficient to cover any additional premium arising from the firm's lack of marketability. They did not assess the required risk premium.

Franzoni et al. (2012) seem to be among a limited number of studies that appear to have offered a complete predictive model. However, their work has important limitations. First, they were not able to relate risk-premium to PE phenomena beyond illiquidity risk. Second, they based their study on past information in terms of ex-post realized returns in calculating future expected returns and the risk premium of these returns. Third, Franzoni et al. (2012) were not able to account for the opportunity cost incurred by LPs where capital committed is not invested. Fourth, factors of different nature, for example, risk, PE internal costs, and PE drivers were not distinguished from one another. Fifth, Franzoni et al. (2012) sought to eliminate "abnormal returns" and yet research suggests that we should expect abnormal returns in PE markets that are typically inefficient (Bajaj et al., 2001; Margulis et al., 2005; Mercer, 2003; Pratt, 2002). Sixth, Franzoni et al. found only an average of their database for the liquidity (illiquid minus liquid) risk factor, or IML, of 4.5% and illiquidity beta of 0.67, and they did not present a list of different levels of IML and illiquidity beta.

Here we believe that an ex-ante perspective involving case studies of the processes of decision-making in PE investments is needed to complement past research in order to:

- Learn GPs' risk perceptions and return expectations,

- Be able to measure risk-premium and expected abnormal returns taking into account PE phenomena,

- Learn how GPs assess and mitigate risk during the valuation process, and

- Provide academics and GPs with a rational tool to assess risk premium and abnormal returns that avoids any need to extrapolate from realized returns.

3 Research Methods

3.1 Context

In our research we conducted and analyzed a qualitative case study of decision-making in a PE investment within a quantitative assessment of risk premium and abnormal returns. This approach was based on a number of criteria and operationalized as follows:

- An investment 'deal' was explored in which a regional PE ("REF") invested in a small, international family business, Carpiland (CL). CL was chosen because it seemed to represent an interesting case of a potentially high yielding investment made by a local PE who assessed the investment from an ex-post perspective. Furthermore, the first author had access to a considerable amount of data on CL.

- Then, in order to explore the possible existence of intrinsic drivers in this investment data from the study were compared and contrasted with data from other PEs. For instance, as we wanted to explore if the size of our case firm was a determining factor in producing abnormal returns we adopted a statistical approach in examining cross-sectional data from our questionnaire (Appendix B).

- For our comparative exercise we chose 40 PEs of all sizes, 20 in UK and 20 in Italy. The questionnaire was conducted by telephone and was repeated twice by two researchers to diminish bias (the co-researcher was the first author's assistant, Veronica Pinero). The interviewee was a different manager in both cases.

- With our data in hand we ran Pearson's correlations to try and locate patterns in the data. Since our main concern was to analyze correlations among size and other variables we believed that we would reach saturation point with data on 40 PEs. This approach was based on Manigart et al. (2002) who also conducted a survey, in their case of 200 PEs in five countries, or 40 PEs per country. The questions posed by Manigart et al. (2002) seemed simple, requiring only a "yes" or "no" answer. Furthermore, Manigart et al. (2002) ran a quantitative analysis, and we also adopted this approach. However, due to a paucity of qualitative data Manigart et al. (2002) inferred causations behind their answers without probing why and how questions.

We took up this challenge of developing Manigart et al. (2002)'s approach by exploring more deeply why CL and other investments were made, but within a similar quantitative paradigm as Manigart et al. (2002) to address our quantitative research question. To do so we divided our sample of 40 PEs in size groups according to the level of abnormal return generated. For instance, we found that a PE with a capital in excess of €2 billion can generate circa 6% of positive alpha. In the same way we found that the breakeven point (alpha equals zero) can be found in PEs of a capital size of between €300 million and €400 million. PEs smaller than €100 million in size may generate up to 6% negative abnormal returns.

Italian and British PEs were chosen to reduce potential bias generated by culture, while we sought PEs in Italy and the UK as we were familiar with these markets. Our questionnaire and statistical analysis are attached, respectively, in Appendix A and Appendix B.

3.2 Data Collection

3.2.1 Case: Carpiland

CL is a family business specializing in natural agriculture that has operated in Parma Italy since the end of the 18th century. In 2000 CL began producing and bottling organic tomato puree and introduced a wide range of pasta sauces. The firm's turnover increased exponentially from €500,000 in 2004 to €3.3 million in 2008. However, despite this turnover CL's financial position had deteriorated and the firm was in financial distress in July 2008.

CL's owner saw only one possible exit to this problem- a capital increase. The subsequent capital raising exercise seemed to offer an attractive investment for a small private equity fund because of CL's long established business and market networks although the owner was reluctant to part control of his company. The first author then put the owner in touch with REF.

3.2.2 The Private Equity Funder: Regional Equity Fund

REF was established in 2006 with a total issued capital of Euro 20 million. Its main activity is to acquire small privately held firms and add value by reinforcing capital structure and their managerial competences, which is partly provided by the Fund. The following tables set out key data on REF:

Table 2. key data on REF

Type of PEF	Size	CAP (commitment) MM	N of companies	N of executives	Fund raised Year	PEF ex-life (L)	Speed - Years (1)	Carried Interest
REF1	Small	20	1	2	2007	15	6	8%

Type of PEF	PEF internal Fees	Net Consolidated IRR (LPs expectations & GPs target		Fees Method	Min-Max Invest
		IRR	Multiple		
REF1	2%	10,0%		over cap invested and consultancy	€ 1 Mln - 5 Mln

Where:
CAP= The capital committed.
N of Companies= The number of investments held by a PE in REF.
N of executives= The number of executives working in a PE.
PE ex-life (L)= The expected life.
Speed-Years: The expected investment speed. How many years a PE will invest its entire capital.
Carried Interests= The minimum IRR (Hurdle IRR) net of fees established by contract between LP and GPs by which GPs may keep 20% of any capital gain.
Internal Fees= Fees are calculated over the capital committed at the beginning and over capital invested at the end of a contractual period (each PE has its own contract and method).
IRR (LPs' expectations)= The net Internal Rate of Return that LPs expect to gain.

REF had a list of other investments for private transactions with entry multiples of between 7 and 9. Most of these firms were similar in size but were financially healthier. REF therefore believed it had to offer a discount for CL, which after negotiation with CL's owner was reduced from c. 40%[4] (5 times price earnings ratio) to c. 35%.

Taking the average EBITDA for 2008 and 2009, the PE valued CL at c. €800,000. As its owner insisted on keeping a majority shareholding stake REF bought a minority stake of between 42% and 48% in the firm, with an aggregate value that equated to the required capital increase of €500,000 in the form of a €400,000 loan and the balance in cash**.**

There were many contractual covenants to protect REF's interest, including its exit. However, the owner's main concern was for a share buy-back clause. In response REF waited before converting its loan into equity, whereby its investment risk was reduced from 25% to 20%.

3.3 Data Analysis

3.3.1 Expected IRR (E.IRR), Threshold IRR (T.IRR) and Hurdle IRR (H.IRR)

In our data analysis we sought to address the question of whether the premium included in the E.IRR for the CL deal was enough to offset the risk of the deal. This E.IRR was estimated for each year with values of between 47% in 2009 and 59% in 2012. To answer this question, we first sought to understand a few concepts related to the study of this case, namely, T.IRR, H.IRR, and the LPs' net E.IRR. The first concept (T.IRR) concerns the measurement of the minimum IRR necessary to offset the risk of investments in terms of the value and determinants of the equity premium required by PEs when approaching their target investments. The second concept (H.IRR) concerns the minimum IRR that has to be achieved by GPs at the end of the PE's life in order to receive part of the capital gain as a bonus. The third concept (E.IRR) concerns LPs' expectations of their earnings. All these indicators are based on an ex-ante perspective of investment performance (*cf.* Franzoni et al., 2012; *cf.* Jegadeesh et al., 2009).

In CL the value of the H.IRR was 8%, net of fees, carried interests, and other costs. However, the value of the T.IRR, gross of fees, carried interests and other costs, was estimated for each deal. How did REF estimate such an important value given that they did not appear to have any models or formulae to assess the risk of deals? The first author raised this question with REF.

REF's investment managers responded by suggesting that at least for the CL investment they drew on their perception, experience, and pressure from LPs for a minimum T.IRR and higher net E.IRR. As REF saw significant investment risk in CL due its small size and financial distress they set a high minimum T.IRR of 25% (the normal range of T.IRR is between 18% and 25%). The PE then compared this 25% with the investee' firm's E.IRR. Given that the E.IRR of between 47% and 59% estimated by CL's business plan was superior to the minimum T.IRR of 25% REF accepted the investment in CL.

Overall, the studies we have reviewed seemed to consider IRR as a unique concept (ex-post IRR / performance / realized returns) without identifying T.IRR, H.IRR or the difference between E.IRR and ex-post IRR. We believe that this approach is partly due to researchers adopting an ex-post IRR perspective, where the E.IRR or T.IRR that measures ex-ante perceived risks is no longer considered to be important, possibly for three main reasons:

- First, the typically difficult access to PEs directly may have left researchers to obtain data from public ex-post databases,
- Second, researchers seem to have observed historical data and then sought to derive prospective conclusions based on them, and
- Third, the fact that most studies were conducted in publicly organized markets with a large amount of ex-post data may have influenced authors to draw on ex-post information to predict future premiums.

3.4 PE Phenomena in the Data

By contrast, by adopting an ex-ante perspective to draw on PE phenomena we observed that REF's investment in CL seemed to reveal a number of patterns and particular phenomena that do not recall traditional finance theory. Given the space limitation of this article we present and discuss here a number of PE phenomena that we observed with the potential on the basis of our case to make a significant impact on expected returns, but we also observed a number of other PE phenomena among those that we set out in another article (Scarpati & Ng, 2013), but whose impact seemed less clear:

The "Money-chasing deal phenomenon": Our statistical analysis in Appendix B suggests a high correlation between size and the EBITDA entry discount. One of the main aspects of REF's investment in CL was the low valuation compared with other, comparable transactions: A 5.5 times multiple of EBITDA with a discount of 35%. This high discount seemed to be based on the following drivers:

- CL's circumstances of financial distress, and
- REF's investment in CL in a situation where REF had no competition as the owner did not look for competing funders.

[4] The real reason for such a discount- as we will show in our Discussion section- was not only the risk involved in the deal but the need to offset diseconomies of scale. Small funds such as REF believe that they need to buy at deep discounts in order to perform.

In our sample questionnaire (Appendix A) most PEs suggested that GPs typically sought to "buy cheap" to obtain higher E.IRRs, and therefore that GPs should seek investments where competition was as low as possible and where the number of potential investments is a key factor.

Performance persistence: The high correlation between size and E.IRR implies that larger PEs have access to better deals (Appendix B). In addition, the questionnaire in Appendix A suggests that the T.IRR of REF is lower than that of larger PEs and this may be because PEs do not look entirely at the risk involved in a deal but at their LPs' expectations. This was the opinion of most GPs we questioned.

Fees-effect and economies of scale: The high correlation between fees and size seems to confirm this phenomenon (Appendix B). The annual management fee of 2% is high compared with other large PEs (Appendix A). This implies diseconomies of scale and the T.IRR should be higher to offset this level of fees.

Investment speed-effect: In Appendix B we show a high correlation between the speed of investment and its T.IRR: The larger the T.IRR, the lower the speed. At the time of this investment in November 2008 REF had over one year of its life remaining, and of its €20 million capital under commitment only €0.8 million had been invested. There were no investments other than CL under consideration and REF's senior executives felt pressured by their LPs to make more investments. After three years the fund's IRR was c. 20% compared with its internally agreed T.IRR of 25% and E.IRR of 47%. GPs recognized that they might have been too optimistic in their investment objectives. In addition, REF's T.IRR was correlated with its net T.IRR, which suggests that its LPs' expectations were considered when estimating the fund's T.IRR as the higher the LPs' expectations based on past performance, then the higher the T.IRR (Phalippou and Gottschalg, 2009). This also suggests that investment premium may be driven by expectations and not by risk.

PE non-pecuniary drivers: The owner's objectives in the case may not only be to maximize returns but to preserve the family's wealth, its prestige and history. This view seems to have influenced his negotiations, the value of the deal, and its T.IRR.

Big versus small PEs: We were able to confirm the presence of this phenomenon with the high correlation shown in Appendix B.

4 Discussion

Based on our findings, to address our research question we introduce and discuss a new model that seeks to extend and complement the work of Franzoni et al. (2012). Principally we shall demonstrate how we extend their model of decision-making in PE investments by adopting an ex-ante perspective of investment decision-making to account for a number of drivers that may significantly influence risk and produce abnormal returns but which have not usually been considered in the literature.

4.1 Regional Equity Fund's Calculation of T.IRR

While REF's managers suggest that they draw on intuition and experience to assess T.IRR, the basis of estimating the value of T.IRR is in fact the value of the net IRR expected by LPs. In our questionnaire LPs said that they expected net IRR to be 10%:

$$\text{T.IRR} = \text{net LPs T.IRR} + \text{Fees} + \text{Carried Interests} + \text{Other costs (1)} + \text{deal premium} \quad (1)$$

(1) Other Costs: Mainly consultants' fees. REF does not consider the opportunity cost of capital committed and yet not invested although LPs have pressed them to do so.

Yet based on this formula REF's managers computed the T.IRR of CL as follows:

$$\text{T.IRR} = 10\% + 2.5\% + 2\% + 1.5\% + 19\% = 25\%$$

Here it is interesting to observe that although the targeted net IRR is 10%, REF seems to have considered an investment risk premium of 19%. According to REF this premium was based on the following criteria:

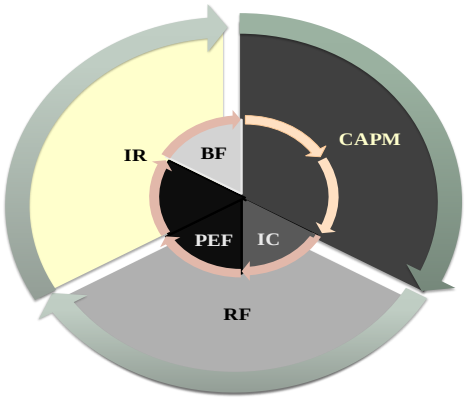
- Setting a protection margin,
- Taking into account the perceived risk of the deal, and
- Setting a minimum, achievable IRR based on past experience.

Instead of a systematic analysis of the factors and drivers of potential investments these criteria that were based on intuition and experience seemed to lie at the heart of REF's decision to invest in CL.

4.2 The Ex-Ante Model Explained

By contrast, we believe that all returns including "abnormal returns" in privately held firms may be systematically assessed. In fact, we believe that abnormal returns should be a consequence of the PE phenomena that Franzoni et al. (2012) do not consider in their model. Based on our case our model begins to identify a number of the drivers affecting risk premium and expected abnormal returns and to classify them accordingly.

Figure 1. General Classification of all Drivers



Source: Scarpati & Ng (2013)

Figure 1 divides all our drivers outlined in this paper into three main groups:

First: Factors that are governed by TFT. Being risk factors, they are "CAPM".

Second: Factors that don't belong to TFT but include rational and non-risk factors (RF).

Third: Factors that are not rational but behavioral. These are also non-risk factors (IR).

Figure 1 has a further classification:

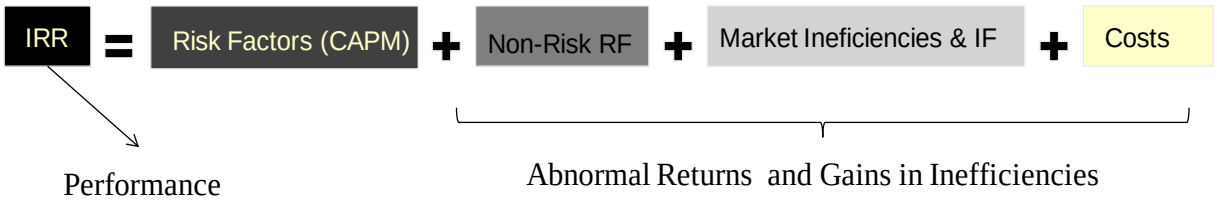
PE (Factors), which refer to the PE phenomena already seen.

Internal Costs (IC) are factors that also include PEs' internal costs such as fees, carried interests, opportunity costs, etc. These are non-risk factors but are rational.

Behavioural drivers include for instance, intuition in assessing risk-premium and an owner's sentimental attachment to his family-owned firm, as in CL.

Let us now present the following, preliminary formula of our model based on our findings in this case that seeks to identify factors according to their nature:

Figure 2. Preliminary formula of our model



Additionally, an external and highly influential factor outside the above formula may be that most PE phenomena generating abnormal returns have size as perhaps *the* core driver, namely, the size of the sponsoring PEs. This view is supported by recent research suggesting that bigger funds perform better, for example, due to experience, professionalism, and economies of scale (Harris et al., 2013; Kaplan and Schoar, 2005; Phalippou and Gottschalg, 2008; Phalippou and Zollo, 2005; Willis, 2009). For example, Harris et al. (2013) found that PEs below €250 million in capital destroy value, although this is time-dependent given changes in the PE market.

Having suggested that that the core driver for most PE phenomena might be the size of the sponsoring PE, we may now calculate the Big minus Small price-to-earnings factor of our sampled PEs (Big minus Small PE= the T.IRR for big funds minus the T.IRR for small funds) based on our close correlation in our analysis of PE size and performance (please see Appendix B). This factor is 13.8%[5]. However, in order to contribute to the model of Franzoni et al. (2012) we need to assess if this figure should be considered as positive or negative alpha. The answer to this question has to do with the size and in particular with the entry discount rate of investments.

In our assessment PEs that are not able to buy at market prices would already be destroying value at the start of a transaction. They do not have the skills, the size, the economies of scale and the access to good deals to create value, and thus have to buy cheaper than the market (this issue was mentioned by all small

[5] We apply the same methodology used by most authors who seek to modify CAPM. For instance, Franzoni et al. (2012) calculate liquidity minus illiquidity to assess the risk-premium of IML. Fama and French (1993) also calculate "Small minus Big" caps to assess risk-premium for the size factor.

PEs questioned and may be observed in both our Appendices). We could argue that such discounts are due to the risk involved in the deals that are chosen by smaller PEs. However, this is not quite true since such risks are not considered in the T.IRR. Instead, they have lower T.IRR, which in general might generate expected negative alphas. As a REF manager suggested: "*We have to buy cheaper than most big PEs to offset our diseconomies of scale. We need to find deals in which no competition is present and where the entrepreneur needs to sell*".

4.3 Applying our Ex-Ante Model to CL

In applying our model to analyze REF's investment in CL let us begin by setting out and applying the model of Franzoni *et al*. (2012) in analyzing the CL investment and then suggest how we may extend the model and offer a more comprehensive and accurate valuation of the investment. First, Franzoni et al. (2012) estimated risk premium and the cost of capital for PEs using the three-factor investment decision model of Fama and French (1993) and added a new factor: The Pastor and Stambaugh (2003) liquidity factor. The four-factor formula including the Liquidity Factor of Franzoni et al. (2012) is as follows:

$$E(R) = Rf + \beta * Rm + (\beta s * Rs) + (\beta v * Rv) + (\beta\ liq * R\ liq) \quad (2)$$

Where the new factor added is the liquidity: (β liq * R liq).

In the above formula the average result for PEs reported in Franzoni et al. (2012) was a liquidity premium of 4.5% annually, with an annual market risk premium of 7.5%. The HML and SMB average premiums were 4.9% and 2.9% annually, respectively. Furthermore, the illiquidity average beta was 0.67. In sum, the four-factor model produces a very high risk-premium and cost of capital of c. 24% compared with the three-factor model.

In our case, CL's Risk Factors were these:

*E(R) = Rf + β * Rm + (βs * Rs) + (βv * Rv) + (β liq * R liq)*
Where Rf = 4%,
Rm = 5%
βfood = 0.7 → βleveraged = 1.3 (using Hamada equation)
SMB = 3%
βsize = 1.4
HML = 5%
βgrowth = 0.8

(These data on CL considered its sector, size, and growth factors.)
And Liq = 4.5%
βliq = 1
Therefore, E(R) = 23.4%

Internal Cost Factors

Fees = 2.0% per year.
Expected life of the PE =15 years.
REF obtains fees as follows: First 2 years over capital committed, 7 years over capital invested, and nothing for the last two years.
First three years = 2% x euro 20MM x 2 years = Euro 400,000.
Second 6 years = 2% x euro 20MM x 10 years / 3 years = Euro 600,000. This equation is divided by three years as GPs do not expect to have all their capital invested after 10 years.
Total Expected Fees (estimation) = Euro 1,000,000
Total Expected Fees over Capital Committed = 5%

Carried Interest:
Minimum IRR = T.IRR= 22%
Hurdle Rate = 8%
Expected capital Gain = 22% - 8% = 14%
Total Carried Interest = 20% over capital gain = 20% x 14% = 2.8%

Opportunity Costs:
Expected Investment Speed (EIS) = 6 years
LPs return while capital is not invested = 2%
Expected life of the fund = 15 years
LPs return expectations = 10%
Total Opportunity Costs (OC) = (10% - 2%) = 8%
Yearly Expected OC = $= \frac{8\% \times (6/2)}{15} = 1.6\%$[6]

Total Internal Costs = 5% + 2.8% + 1.6% = 9.4%.

Therefore the T.IRR of REF (minimum return to offset systematic risks and costs) should be around 33%, which is considerably higher than their actual, maximum T.IRR of 25%

The above calculations seem to confirm what many authors have said about small funds destroying value (see, for example, Kaplan and Schoar, 2005; Phalippou and Gottschalg, 2008; Phalippou, 2012). However, our contributions in this paper begin at this point as we assess the PE phenomena in our data and the expected abnormal return that our case may generate.

Appendix A suggests that below a capital committed of approximately €350 million the entry discounts become negative and therefore we assume that those PEs generate negative alphas driven by the

[6] In this equation we have divided EIS by two as GPs do not expect to invest all their capital after 6 years in a day! On the contrary, investment is often an extremely slow process that typically considers that at the midpoint of a PE's life only half of the capital has been invested. All costs are then divided by the life of the PE to obtain the annual internal cost.

PE phenomena. The following table shows the alphas for each group of PEs in terms of size:

Table 3. The alphas for each group of PEs in terms of size

	PE1	PE2	PE3	PE4	PE5	PE6	PE7	PE8	PE9	PE10	PE11	PE12	PE13	PE14
CC	4000	3500	3000	2700	2400	2200	1700	1300	1000	800	700	650	500	400
Alpha	6%	8%	7%	6%	6%	6%	3%	3%	3%	3%	3%	0%	1%	0%
Ave Alpha	**6,6%**					**3,5%**						**0,3%**		
	PE15	PE16	PE17	PE18	PE19	PE20	PE21	PE22	PE23	PE24	PE25	PE26	PE27	PE28
CC	350	300	260	250	230	200	190	160	150	140	140	130	120	100
Alpha	-1%	-2%	0%	2%	-1%	-2%	-1%	-2%	-1%	-2%	-1%	0%	-5%	-2%
Ave Alpha	**-0,7%**						**-1,8%**							

	PE29	PE30	PE31	PE32	PE33	PE34	PE35	PE36	PE37	PE38	PE39 / REF	PE40
CC	90	80	70	60	55	50	40	35	30	25	20	10
Alpha	-2%	-7%	-7%	-2%	-7%	-4%	-7%	-9%	-7%	-7%	-4%	-9%
Ave Alpha	**-6%**											

In the above tables the total abnormal returns of investments is circa 12%, from -6% to 6%, with the coefficient (μ) from -0.5 to 0.5. These results may be expressed in the following formula:

$$E(R) = Rf + \beta * Rm + (\beta s * Rs) + (\beta v * Rv) + (\beta\ liq * R\ liq) + \alpha\ (Jensen's\ alpha)$$
$$E(R) = Rf + \beta * Rm + (\beta s * Rs) + (\beta v * Rv) + (\beta\ liq * R\ liq) + (\mu\ abnormal * R\ abnormal) \quad (3)$$

Where R =12%; μ goes between -0.5 and 0.5; in REF μ is -0.3 and μ * R abnormal is -4%.

Our case produced an alpha of -4% although the average of its group is -6%. We previously assessed the T.IRR of our REF as approximately 33%, but we can now calculate E.IRR by just adding the expected alpha for this PE.

The nature of PEs' returns as well as their expectations (E.IRR) also includes abnormal returns:

$$E.IRR = Risk\text{-}Adjusted\ Return + Abnormal\ Return$$
$$E.IRR = Gross\ T.IRR + Jensen's\ alpha \quad (4)$$
$$E.IRR = Gross\ T.IRR + \sigma$$

Where σ represents those factors, some of which are PE phenomena and others of which are behavioral determinants, that drive abnormal returns (Jensen's alpha).

In CL therefore: E.IRR = 33% - 4% = 29%.

We interpret the meaning of this last formula and values in our case as follows:

First, CL will have to increase its T.IRR to 33% to be able to offset both internal costs and risks. Second, as the size and PE phenomena might generate an abnormal return of -4% CL should look for business plans with an E.IRR of at least 37% to achieve the 33% T.IRR. REF in line with many other funds of €350 million and below may have to address negative PE phenomena (Phalippou, 2012; Phalippou and Gottschalg, 2008). In our sampled PEs, including REF, the E.IRRs of their business plans were much higher than 37%, but a number of as GPs suggested that these plans were probably too optimistic and resulted from pressure from LPs. The problem is that GPs and LPs may not be aware of these issues and might believe that they are still creating value and positive alphas despite discounted entry prices[7].

Based on differences among our sampled PEs let us suggest how PEs with different characteristics may strategically position themselves in terms of the phenomena and drivers shown in our model. For instance, in the following figure three PEs, including REF, are strategically positioned based on their size and growth.

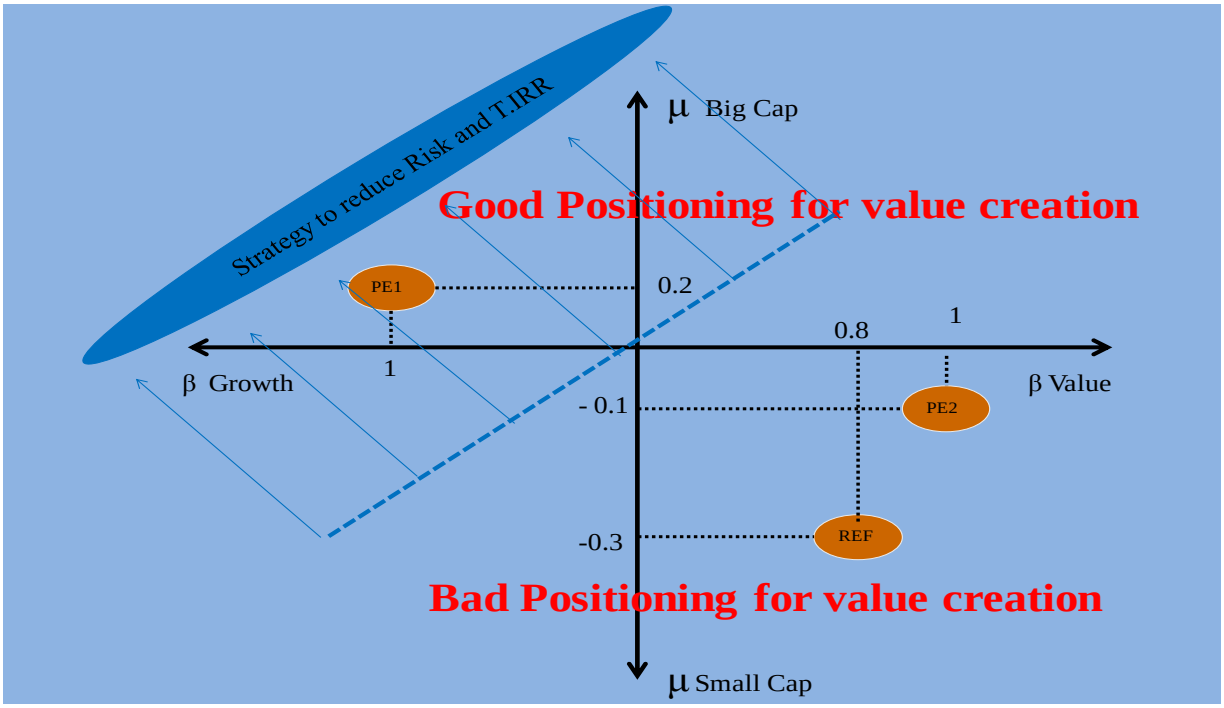
This figure suggests that PEs positioned over the x-axis may generate positive abnormal returns and that funds implementing strategies towards the blue arrows are likely to reduce risk. The following investment strategies may therefore mitigate the impact of abnormal returns:

- "PE1" is a PE in a "good" position, with positive expectations of abnormal returns, and it expects to generate c. 2% positive abnormal returns due to the influence of PE phenomena. Its investment strategy focuses mainly on rapid-growth firms, which reduces risk and therefore the T.IRR.
- "PE2" is a medium-to-small fund that generates insignificant abnormal returns. It also has a riskier portfolio (old and mature firms), and it seeks an investment strategy to reduce risk and offset abnormal returns in order to reach the blue line. To do so PE2 should alter its strategy by increasing its fundraising activity to augment its size and develop its investment portfolio, specifically to invest more expansion capital in high growth, later stage ventures, while lowering its leverage.

[7] There is a driver that might run contrary to our model: Economies of scope (Lopez-de-Silanes and Phalippou, 2008). This phenomenon may negatively affect the performance of bigger size. However, a more recent study (Humphery-Jenner, 2012) found that big funds lose scope only when the size of investee firms is small. Humphery-Jenner (2012) concluded that big funds should buy big firms. Consequently, since we are in an ex-ante perspective of investment strategy, we may assume that big PEs will normally buy big firms. In our sample, the bigger the PE, then the bigger the firms in its portfolio.

Compared with PE1 and PE2, REF is a very small fund with high abnormal return expectations. It invests in high-risk firms such as CL that are in financial distress. Based on the above figure, an alternative, more valuable strategy for REF might instead be to reduce risk by focusing on low-risk investments, concentrate on expansion capital, and buy at lower prices, for example, based on high entry EBITDA discount rates.

Figure 3. Strategic Position of PEs with Information on Ex-ante PE Phenomena



5. Conclusions

By analyzing REF's decision to invest in CL we have introduced and explained a number of concepts and drivers that were previously neglected in assessing risk and returns in PE investments. In our questionnaire to 40 PEs we found high correlations among size, T.IRR and other variables that seem to support the existence of specialized PE phenomena generating abnormal returns. We have also shown that PE size is among the most important drivers of PE phenomena, which supports the findings of many other authors, such as Kaplan and Schoar, 2005, and Phalippou and Gottschalg, 2008 but have done so in a context in which size is one of several identified PE phenomena, all of which may impact on investment returns in PE firms.

Here we have contributed to the work of Franzoni et al. (2012), Jegadeesh et al. (2012), and Korteweg and Sorenson (2010) by extending their model to account for a number of PE phenomena, and importantly to do so by adopting an ex-ante approach in assessing risk and return in a "live" example of a PE investment. In this assessment we have probed deeply into the required risk-premium and abnormal returns that may be expected of PE investments, and have explored T.IRR, H.IRR, E.IRR and their relationships in determining risk and possible returns of PE investments. We have then shown from an ex-ante perspective the operationalization of a number of specifically PE phenomena and have demonstrated that PE investments can generate positive or negative alphas, in contrast to Franzoni et al. (2012) who without considering the possible impact of PE phenomena suggested that PE investments should only generate positive alphas. Based on this impact it turns out that firm size is one of the most important drivers in generating either positive or negative alphas from abnormal returns.

In developing our findings we built on the work of Franzoni et al. (2012), Jegadeesh et al. (2009), and Korteweg and Sorensen (2010) by setting out a model that specifically considered the nature and effects of PE phenomena and abnormal returns. Here we have suggested how the work of these scholars may be usefully expanded to include a range of drivers and factors that are specific to the PE sector and which may provide the basis for a more accurately predictive model for the investment decisions of PEs. In doing so we have also provided rare, empirical evidence of PE decision making and shown through worked examples how investment decisions may be more informed by applying our predictive model. In this model we emphasized the importance of an ex-ante perspective in avoiding the tendency to extrapolate from past returns in computing the risk premium of PE investments. Additionally, in making these scholarly contributions we have argued in favour of observing

specific factors, some of which are PE phenomena and others of which are behavioral determinants, that drive both the required risk premium and expected abnormal returns.

Our second contribution is directed at PE managers. The key benefit of our model for those fund managers is that it allows them to balance their portfolios with greater or lesser exposure to each of the specified risk factors, and accordingly they may target more precisely different levels of expected return. Based on our findings in a single study we cannot and do not deny the role of intuition and experience in assessing deals, but we believe that our rational model may provide a useful tool to generate value for PEs by identifying a number of specific drivers and factors that may significantly increase or decrease risk in investment deals and by setting out a preliminary model for operationalizing each driver and factor in deal analysis. Specifically, GPs should include and assess *all* PE phenomena in order to more accurately evaluate the required risk premium, T.IRR, and expected abnormal returns of their investments.

Future research may deepen and broaden our ex-ante perspective with a larger number of more varied cases of different sizes and risk profiles. Knowledge from these cases should then feed into the development of a more sophisticated and refined ex-ante model. For example, in this paper we have measured firm size as the only driving factor, while future research may consider quantifying various factors we have identified, such as money-chasing deal phenomenon and performance persistence, that are driven by firm size.

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Appendix A. PE Questionnaire based on an Ex-Ante Perspective of Investment Decision-making

1) What is the capital committed of your PE?
2) Which modification do you apply to the market EBITDA multiples (from other similar private transactions) to value your target company? Do you pay more than the market or less? Which percentage do you normally apply (negative or positive) to market multiples?
3) Could you tell us what is your general threshold IRR to approve a deal? We mean the minimum IRR to offset LPs expectations, risks and all internal costs. In other words, what is your minimum target that is based on risk perceived in the deal?
4) What, in your opinion, are your LPs expectations in terms of net final performance?
5) At the beginning of your PE what were your expectations of investment fees?
6) What is the IRR you normally obtain for your approved business plans and deals (Expected IRR from closed deals)?
7) What typically are the percentage/s of fees you receive?
8) To assess the risk premium and threshold IRR of your target company, how far does your PE draw on a rational model (for instance: CAPM, or some version of this?) or does your PE prefers to trust managers and team skills, experience, know-how and intuition?

Table A.1. Answers

	CC	EBITDA discount	Gross T.IRR	Net T.IRR	expected Speed	E.IRR	Fees	Risk Assessement
PE1	4000	-10%	33%	20%	3	35%	1,20%	Experience
PE2	3500	-15%	35%	18%	3	35%	1,00%	Experience
PE3	3000	-10%	34%	20%	3	35%	1,25%	Rational Formula
PE4	2700	-7%	33%	15%	4	33%	1,25%	Mix
PE5	2400	0%	33%	18%	3	33%	1,50%	Mix
PE6	2200	0%	33%	15%	3	35%	1,30%	Rational Formula
PE7	1700	-5%	30%	17%	3	35%	1,20%	Experience
PE8	1300	0%	30%	18%	4	33%	1,50%	Experience
PE9	1000	5%	30%	15%	4	32%	1,70%	Experience
PE10	800	0%	30%	16%	3	33%	1,35%	Mix
PE11	700	0%	30%	15%	3	33%	1,50%	Rational Formula
PE12	650	-5%	27%	15%	4	30%	1,60%	Experience
PE13	500	-5%	28%	16%	5	30%	1,70%	Experience
PE14	400	5%	27%	16%	5	29%	1,70%	Experience
PE15	350	0%	26%	16%	5	30%	1,50%	Experience
PE16	300	5%	25%	13%	4	27%	1,50%	Experience
PE17	260	10%	27%	15%	4	28%	1,50%	Experience
PE18	250	15%	29%	14%	5	30%	1,30%	Experience
PE19	230	15%	26%	14%	3	27%	1,80%	Experience
PE20	200	20%	25%	15%	4	25%	2,00%	Experience
PE21	190	-5%	26%	20%	3	30%	1,90%	Experience
PE22	160	10%	25%	20%	5	25%	1,70%	Mix
PE23	150	10%	26%	18%	5	25%	1,50%	Experience
PE24	140	15%	25%	15%	6	30%	1,90%	Experience
PE25	140	15%	26%	16%	5	30%	2,00%	Experience
PE26	130	15%	27%	14%	5	30%	1,70%	Experience
PE27	120	20%	22%	13%	4	24%	1,70%	Experience
PE28	100	20%	25%	15%	4	27%	1,80%	Experience
PE29	90	25%	25%	14%	4	30%	2,00%	Experience
PE30	80	20%	20%	12%	5	25%	2,00%	Experience
PE31	70	20%	20%	12%	4	25%	2,00%	Mix
PE32	60	25%	25%	11%	5	27%	2,20%	Experience
PE33	55	20%	20%	11%	5	25%	2,20%	Experience
PE34	50	30%	23%	12%	4	28%	2,10%	Experience
PE35	40	30%	20%	11%	4	20%	2,00%	Experience
PE36	35	30%	18%	8%	5	20%	2,30%	Experience
PE37	30	35%	20%	10%	5	20%	1,90%	Experience
PE38	25	25%	20%	12%	5	23%	2,00%	Experience
PE39 / REF	20	30%	23%	10%	6	25%	2,00%	Experience
PE40	10	30%	18%	10%	5	23%	2,40%	Experience

Appendix B. Statistical Analysis with an Ex-Ante Perspective

Correlation CC vs. Entry Discount	-0,74
Correlation CC vs. T.IRR	0,74
Correlation gross T.IRR vs. net T.IRR	0,78
Corralation CC vs. Speed	-0,61
Correlation CC vs. Fees	-0,74
Correlation CC vs. E.IRR	0,56
Average T.IRR biggest five	33,6%
Average T.IRR Smallest five	19,8%
BMSP (big minus small Pes)	13,8%
Total Average T.IRR	26,5%
Minimum CC for PE that can buy at market values	551
Average of those PE that cannot buy at market values	103