Investment Strategies of Institutional Investors

THE PRIVATE EQUITY CASE

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Summary

Private equity involves investments in companies not quoted on a stock exchange. Many institutional investors find private equity an interesting asset class because of potential diversification benefits and higher expected risk-adjusted returns compared to other investments. We observe that institutional investors adopt diverse private equity investment strategies.

Little is known about the performance and determinants of these investment strategies due to the high level of confidentiality in the market and the lack of academic scrutiny. Insights into successful investment strategies can be adopted by PGGM Private Equity, the principal of our study, in order to shape an appropriate investment strategy that corresponds to their level of ambition and risk appetite.

The research question of our study is: What private equity investment strategies of institutional investors have been successful and why? In order to solve this question, we and analyze investment strategies in three parts; (1) a literature review, (2) a peer analysis, and (3) cash flow modeling.

Literature review

Based on the literature review conducted, we find that investment strategies of private equity institutional investors consist of three main elements: (1) product, (2) region, and (3) stage. Product refers to the way that the investor invests; through funds, fund-of-funds, secondary investments, co-investments, and direct investments. Region refers to the target location of the investment. Finally, stage refers to the maturity of the company in which the investor can ultimately invest. We define an investment strategy as the combination of these three dimensions. This paper aims to expand literature by evaluating multiple elements of institutional investment strategies and their performance (determinants).

Peer analysis

With our framework of product, region, and stage we qualitatively analyze the investment strategies and corresponding performance of a sample of 25 peers of PGGM Private Equity. We select them based on the size of their assets under management and their reputation in the market. Although the outlook of private equity differs across the institutional investors, we observe three trends among these peer institutional investors:

- (1) Institutional investors increase their exposure to emerging markets;
- (2) Institutional investors increase their exposure to buyout funds;
- (3) The number of fund managers in an institutional investor's portfolio is decreasing.

For a subsample of eight peers we analyze their investment strategy quantitatively based on investment datasets that they have sent us. This paper is the first that we have at our disposal to construct and analyze a dataset consisting of strictly confidential investment data of multiple institutional investors and not limited to fund investments only. We analyze the data per product, region, and stage. We find that for our subsample of peers, fund investment performance is more or less equal across the investors whereas the direct and co-investment performance differs more from peer to peer. The secondary investment performance is overall the highest. With regard to which region and stage the peers make their investments in, we see that the European investors commit more to European funds than their US counterpart. In general, buyout fund investments yield higher returns than venture fund investments. We find that Europe Buyout, US Buyout, and US Venture contribute most to the overall fund performance of the peers.

Cash flow modeling

We also find that co-investments yield higher returns than fund investments. We expect that this could be explained by the fact that investors do not have to pay management fees for co-investments to fund managers who make and manage the actual company investments. To test this hypothesis, we model the cash flows of an institutional investor's co-investments and add artificial management fees to them. Then, we again calculate the performance of the co-investments, but now with fees. We find that the difference between gross (without fees) and net (with fees) co-investment performance is grosso modo the difference between fund and co-investment performance. We also argue that management selection and risk premium contribute to the difference between fund and co-investments.

According to this study, the most important implications for PGGM are to negotiate with the fund manager to co-invest on a no-fee no-carry basis, to keep track of their co-investment rights compared to other investors in the fund, and to avoid investing in 'loser' co-investments. Furthermore, PGGM should consider building expertise and a network to be able to do secondary investments in the future.

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Thomas Mensink Utrecht, March 2012

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1. Introduction

1.1 Background

PGGM, the principal of our study, is an asset manager for a number of Dutch pension funds, including the major health care pension fund. As an institutional investor PGGM has a strong investment belief in private equity. Therefore PGGM allocates around 6% (i.e., EUR 7 bln) of its assets under management to private equity, which is much compared to other institutional investors.

Private equity is an asset class that encompasses equity investments in enterprises not quoted on a stock market. Private equity investors acquire large ownership stakes and take an active role in monitoring and advising portfolio companies (Fenn, Liang, & Prowse, 1997). Private equity can be used to (among others) develop new products and technologies, to make acquisitions, or for buyout and buyin of a firm by new management.¹ Private equity investments are characterized by their long-term – generally 5-10 year – nature (Fenn *et al.*, 1997).

To illustrate how private equity works, consider the following example. In 2003, PGGM coordinated their activities in private equity through AlpInvest Partners, one of the largest investors globally in the private equity asset class. Based on macro-level market analysis, AlpInvest thinks that the Northern European mid-market is an interesting investment opportunity. AlpInvest visits the Nordics multiple times per year and speaks to local fund managers on a regular basis. After comparing the most promising fund managers and analyzing their investment strategies more thoroughly, AlpInvest decides to commit EUR 25 mln to the Swedish based fund Nordic Capital V², which has a total size of EUR 1.5 bln.

The fund's manager, Nordic Capital, is continuously scanning the market for new business opportunities to invest in. After the commitment of AlpInvest and some more private equity investors, Nordic Capital meets the CEO of the pharmaceutical company Nycomed. Nycomed is a non-listed company with a solid revenue base and growth potential, and it is in need for equity to finance its growth. Nordic Capital wants, after extensive due diligence, to invest EUR 50

¹ Source: Glossary of the European Venture Capital Association (EVCA) (see

http://www.evca.eu/toolbox/glossary.aspx?id=982). See Appendix 1 for a glossary of terms used in this thesis.

² 'V' means that this is the fifth fund of Nordic Capital. It often happens that a GP has multiple funds parallel active. However, to prevent conflicts of interest between funds, it is common that only one fund is in its investment period at any given time.

million of Nordic Capital V in Nycomed.³ However, due to the terms of the fund (as agreed upon by AlpInvest, the other investors in Nordic Capital V and Nordic Capital), Nordic Capital is allowed to make investments up to EUR 35 mln only. Therefore, it wants to raise a co-investment and invites AlpInvest to co-invest in company Nycomed. Co-investments – investments alongside a fund manager directly into a company – are often part of the investment strategy of institutional investors. AlpInvest takes a closer look at the company and decides to do the co-investment to get more exposure to this interesting opportunity without having to pay extra fees to Nordic Capital. AlpInvest invests an additional amount of EUR 20 mln directly in Nycomed. At the same time, Nordic Capital also invests EUR 30 mln of Nordic Capital V in the company.

After the EUR 50 mln investment, Nycomed performs well, enjoys significant organic growth, makes several major achievements, and implements a new sourcing strategy. In 2011, Nordic Capital – in agreement with AlpInvest – sells Nycomed to a strategic Japanese buyer and cashes an amount of EUR 200 mln. The total value of the co-investment multiplied for AlpInvest by 200/50 = 4.0x.⁴ Moreover, AlpInvest earns an additional amount that is proportional to its share in Nordic Capital V. We present an overview of this investment structure in Figure 1.1.1 below.



Figure 1.1.1: AlpInvest invests both in fund Nordic Capital V and company Nycomed.

³ All numbers in this example are fictitious. A case study of this investment is provided at http://www.nordiccapital.com/about-us/case-studies/nycomed.aspx.

⁴ In fact, the entire investment of EUR 50 mln (EUR 30 mln from the fund and EUR 20 mln from the coinvestment) yielded a multiple of 4.0x. Therefore, the co-investment on itself yielded a multiple of 4.0x too.

Many private equity investments are undertaken by professional private equity managers (e.g., Nordic Capital) on behalf of institutional investors (e.g., AlpInvest and PGGM). A conventional organizational vehicle for this activity is a limited partnership with institutional investors as limited partners (LPs) and fund or investment managers as general partners (GPs) (Fenn *et al.*, 1995). In the example above, AlpInvest is the LP while Nordic Capital has the role of GP.⁵ Besides investing through limited partnerships (fund investments), institutional investors also invest directly in firms, or co-invest alongside GPs⁶ in firms.

The example above gives some insight into the investment structure of private equity. Many institutional investors find private equity an interesting asset class because of potential diversification benefits and higher expected risk-adjusted returns compared to other investments (Fenn *et al.*, 1995; Nielsen, 2008). In addition, the long-term focus of institutional investors may suit well with the illiquid characteristic of private equity investments and the long investment horizon (Franzoni, Nowak, & Phalippou, 2011).

PGGM used to allocate all of its private equity assets to AlpInvest. Recently, PGGM decided to increase its in-house private equity capacity, and at the same time decrease its private equity allocation to AlpInvest.⁷ This is in accordance with a trend that we observe in the market that institutional investors reduce their allocation to fund-of-funds managers.⁸ Obvious reasons to do this are to improve control over the investment policy (including environmental, social, and corporate governance), to have significant savings on agency costs, and to improve knowledge and understanding of the portfolio.

To support the implementation of the in-house private equity allocation, PGGM Private Equity⁹ is currently exploring (successful) investment strategies of institutional investors. Insights into successful investment strategies can be adopted by PGGM Private Equity in order to shape an appropriate investment strategy to correspond with their level of ambition and risk appetite. This study arises from their need.

⁵ Both PGGM and AlpInvest are institutional investors. In this case, AlpInvest acts as the limited partner (LP) as it makes the investment in to the fund of the GP.

⁶ We visualize the limited partnership structure and other products in Appendix II.

⁷ See for a press release about the sale of AlpInvest by PGGM:

http://www.pggm.nl/About_PGGM/Press/Press_releases_and_news_items/Press_releases_and_news_items/110 126_APGandPGGMAgreetoSellAlpInvestPartners.asp

⁸ Institutional investors may opt to invest in a fund-of-funds; a fund that takes equity positions in other funds. Katharine Lichtner, managing director of the large fund-of-funds firm Capital Dynamics, is convinced that there is still added value in fund-of-funds in her commentary 'Still life in the FoFs model' (2010).

⁹ PGGM Private Equity is the in-house department of PGGM that makes the private equity investments.

1.2 Problem identification

We observe that institutional investors adopt diverse private equity investment strategies. They differ for example with regard to focus (e.g., region, stage), 'products' (e.g., fund investments, direct investments, co-investments), and portfolio management (e.g., number of investments in funds of the same GP).

The diversity in investment strategies is also acknowledged by Lerner *et al.* (2007). This paper investigates the investment strategies across different types of institutional investors. The authors' study focuses at investment decisions made by institutions with respect to their fund investments. One of their findings is that significant differences in investment styles appear in the sample and that these investment styles are "significantly correlated with the performance differences between LPs" (Lerner *et al.*, 2007, p. 33).

The performance of institutional investors is hard to evaluate and compare for multiple reasons. First of all, most institutional investors do not publish performance or portfolio related information.¹⁰ Even if they disclose this information, there is no uniform, industry-wide manner to do so. To illustrate this, we find cases where performance is logged as net IRR, gross IRR, IRR since inception, 1-year IRR, 5-year IRR, 10-year IRR, (Total) Money Multiple, etcetera. Based on self-reported performance, we find strong differences between institutional investors.¹¹

Second, the main private equity databases Thomson One and Preqin do not publish how much capital the institutional investor actually invested in the fund. The only information available is the *committed* capital of the LP to the fund, which is not a relevant variable in performance calculations. Moreover, it is not mentioned *when* the capital is contributed or distributed. Furthermore, neither the databases nor institutional investors disclose under what terms and conditions they invest in the funds. For example, if the LP negotiates favorable management fees then its investment costs are lower and its net performance thus higher.

¹⁰ Only some US pension funds mention their fund portfolio on their website due to US legislation.

¹¹ In a sample of 25 large institutional investors, we find self-reported IRRs in 2010 between 10.9 and 26.7 percent. The self-reported IRRs since inception range between 8.3 and 18.5 percent. The 10-year IRR are between 0.3 and 17.4 percent. These IRRs are subject to different calculation methods. Most LPs do not publish any performance related figures.

Third, we find that the private equity databases suffer from inadequate, incomplete and unreliable information. To illustrate this, 39 fund investments (=12%) of CalPERS¹² are neither in Thomson One nor Preqin, while 622 fund investments (=67% of the total number of fund investments according to the two databases) are mentioned in these databases while they are not reported by CalPERS. We observe similar patterns for other US pension funds. In addition, Cyril Demaria, a private equity professional and lecturer, states that Preqin "aggregates heterogeneous data, and is not consistent in the treatment of the inputs".¹³ Moreover, Gresch & von Wyss (2011) mentions an upward bias in Preqin because some fund might not report their low performance funds to Preqin (selection bias). For above mentioned arguments we are suspicious to use investment data from public databases. Obviously, institutional investor's performance is hard to determine if the underlying data are misleading.

Finally, the information that *is* published on the websites of institutional investors and in the main private equity databases mainly contains *fund* investment data. In other words, there are hardly any data on other types of investments like direct (i.e., direct investments into companies) or co-investments. With regard to fund investments, Lerner *et al.* (2007) finds that returns of investments of institutional investors differ dramatically across institutions.¹⁴ However, we think it is dangerous to extrapolate this conclusion based on fund returns to the overall performance of LPs. Institutional investors could, for example, realize superior returns in the secondary market or inferior returns with their co-investment which could impact the overall performance significantly.

Due to the reasons mentioned above, it is currently difficult to evaluate the performance of institutional investors and the drivers of that performance. Therefore it is unknown what institutional investors' investment strategies are successful and what are not.

1.3 Research scope

Because of time and financial constraints, we restrict our study to a sample of institutional investors. Due to the difficulty of getting access to reliable data about the investments of institutional investors and the magnitude of most LPs¹⁵, assessing them thoroughly would be time

¹² CalPERS is a large pension fund in the US. Due to US or state regulation, CalPERS must disclose its fund investments.

¹³ See http://www.pefinance.eu/?p=66.

¹⁴ However, the authors' findings suggest that "LP-specific differences in investment styles are more important than differences between LP types in understanding the variation in LP performance" (Lerner *et al.*, 2007, p. 28).

¹⁵ The LPs in our sample have an average of private equity assets under management of approximately 87 bln USD.

consuming. Given the fact that there are over 2,500 LPs active in the private equity market¹⁶, assessing the entire market would demand too many resources. Therefore we decide to focus our attention to a selected sample of institutional investors. We analyze the universe of institutional investors and select 25 peers based on their size, reputation, and type. Next, we make a selection of a subsample of eight peers based on the availability of genuine investment data.¹⁷

Furthermore, we narrow down our study to *private equity investments* of institutional investors. This implies that investments in other asset classes (i.e., fixed income, cash equivalents, public equities, etc.) are outside the scope of our research. In accordance to, among others, Lerner *et al.* (2007) and Fraser-Sampson (2010), we also exclude real estate and infrastructure investments. The reason for this is that although these funds may be structured similarly to private equity investments, the nature of these investments is different. For example, infrastructure funds often have regular and predictable cash inflows so that the "cash flow pattern (...) more closely resembles a bond rather than a private equity fund" (Fraser-Sampson, 2010, p. 28).

Although we acknowledge the fact that risk is an important aspect in the performance evaluation of institutional investors, we choose not to investigate the risk component of the risk-return tradeoff in further detail. The reason for this is that risk measuring in private equity is more an art than a science, where strong assumptions have to be made. For example, some private equity practitioners use standard deviation as a measure of risk. To our opinion, this is hard to defend because the return distributions of private equity have fatter tails¹⁸ than the normal distribution, which implies that standard deviation does not fully capture the risk profile of an investment. Beta, another risk measure often adopted by (mostly) academics, estimates how sensitive private equity investments, actual returns are not known until the investment is fully realized. Therefore, the periodic returns upon which beta would be calculated consist of interim returns; partially realized investments and *estimations* of unrealized (book) values. Beta calculations are thus based on the assumption of these interim returns. Some academics try to mimic the returns in their models to estimate a beta for private equity. We find the above mentioned assumptions too large to

¹⁶ Thomson One mentions 2,735 LPs in their database while Preqin mentions 3,615 LPs.

¹⁷ See Chapter 3 for a description of the sample and subsample

¹⁸ Excess kurtosis, the more formal name for fat tails, leads to a distribution where both very high and very low returns are more likely than the normal distribution would predict. Most investors are concerned about the possibility of extreme negative outcomes and are likely to want a higher expected return from investments with excess kurtosis.

accurately measure risk in private equity, and hence we rather use returns as an indicator for the success of investment strategies.

Finally, in order to measure the returns of institutional investors we only look at funds and investments with a vintage year prior to and including 2006, since the performance metric is "unlikely to be very meaningful" for younger investments due to large unrealized value (Lerner *et al.*, 2007, p. 12).

1.4 Problem statement and research questions

As discussed above, it is currently difficult to estimate the performance of institutional investors and the factors that influence that performance. Therefore, for PGGM it is hard to determine what investment strategies are successful and what are not. Within the mentioned research scope of this thesis, we formulate our main research question as follows:

What private equity investment strategies of institutional investors have been successful and why?

We refer to successful in this thesis as 'having a higher performance than other investment strategies'. In Section 1.3 we explained why we focus on return and not risk in the performance evaluation. We discuss performance measurement in the next chapter.

The main research question consists of several aspects that should be known before we can solve it. We do this by answering the following research questions:

- 1. What does academic literature say about institutional investors' investment strategies and their performance?
 - a. What are institutional investors?
 - b. What are institutional investors' investment strategies?
 - c. How can we measure performance of private equity investments?
 - d. What factors contribute to the performance of institutional investors' investment strategies?
- 2. What are empirical findings of institutional investors' investment strategies and their performances?
 - a. What are the investment strategies of a selected sample of institutional investors?

- b. What is the performance of a selected sample of institutional investors and what factors contribute to that performance?
- 3. Assuming that they do¹⁹, why do co-investments yield higher returns than fund investments?
 - a. What are differences between fund and co-investments?
 - b. What potential drivers of co-investment performance can be identified?
 - c. What is the influence of management fees and carry on co-investment performance?
 - d. What other factors cause co-investments to perform better than fund investments?

1.5 Thesis outline

The remainder of the thesis is organized as follows. In Chapter 2 we use literature to decompose institutional investors' investment strategies and zoom in on the performance (determinants) of these strategy elements. We also discuss here the shortcomings of other literature on this topic. This would solve Question 1. In Chapter 3 we empirically analyze the performance of investment strategies of a sample of peers. We discuss the underlying methodology and the findings that answer Question 2 in this chapter as well. Co-investment strategies are then discussed in Chapter 4. The findings aim to solve Question 3. The conclusions of this study are presented in Chapter 5. Finally, we present the implications of the results of this study for PGGM and other institutional investors in Chapter 6, as well as a discussion and directions for future research.

¹⁹ According to Fenn et al. (1995) co-investment yield higher returns than fund investments.

2. Literature review

2.1 Institutional investors and private equity

Institutional investors are organizations such as a banks, investment companies, mutual funds, insurance companies, pension funds, or endowment funds, which professionally invest substantial assets in international capital markets (EVCA, 2012). Literature shows evidence that institutional investors are the main contributors to private equity funds (e.g., Fenn *et al.*, 1995; Gompers & Lerner, 2004; Nielsen, 2008). Investors seek priority access to equity returns in excess of public market returns, albeit "at the expense of liquidity and the privilege to rebalance portfolios at will (Cumming, Fleming, & Johan, 2011, p. 595). According to Fenn *et al.* (1997, p. 8) most institutional investors invest in private equity for strictly financial reasons, "specifically because they expect the risk-adjusted returns on private equity to be higher than the risk-adjusted returns on other investments and because of the potential benefits of diversification". ²⁰ Nevertheless, J.P. Morgan (2008) argues that diversification should not be the sole reason to invest in private equity, as other asset classes²¹ might offer higher diversification benefits.

According to Lerner *et al.* (2007), institutional investors differ widely in sophistication in their approach to private equity investments. A sophisticated investor is sufficiently knowledgeable with respect to financial matters that it can fend for itself in the purchase of securities (EVCA, 2012). The authors attribute these differences to (1) experience of the institutional investor and its access to the best funds, (2) governance (e.g., investment board composition), and (3) turnover and compensation levels. Public pensions are often regarded as being the least sophisticated investors on average while university and foundation endowments are considered the most (Lerner *et al.*, 2007).

Moreover, Fenn *et al.* (1995), Kaplan & Schoar (2005) and Lerner *et al.* (2007) state that the bulk²² of institutional investments in private equity is done through funds (or fund-of-funds) since institutions lack the intensive relationships and due diligence skills that are required to select appropriate direct investments. By investing through a fund rather than directly in issuing firms,

²⁰ This is confirmed by an empirical study among institutional investors in 2005 that is mentioned by Phalippou & Zollo (2005): "The main reason for investing in private equity is to boost returns, with diversification a secondary reason." The article is published in the Financial Times at http://www.ft.com/cms/s/1/b1de0c7a-2e2a-11da-aa88-00000e2511c8.html#axz21lt7aFYWr.

²¹ E.g., timber or funds of hedge funds.

²² According to Fenn *et al.* (1995), 80 percent of private equity investments and virtually all investments by intermediaries are done through limited partnerships (i.e., through funds) and approximately 20 percent are made *directly* by institutional investors.

"investors delegate to the general partners the labor-intensive responsibilities of selecting, structuring, managing, and eventually liquidating private equity investments" (Fenn *et al.*, 1995, p. 35). How the investment strategies of institutional investors differ and how this drives their performance, is discussed later in this chapter.

2.2 Institutional investors' investment strategies

Literature does not offer a framework to systematically analyze institutional investors' investment strategies. Therefore, we construct one ourselves consisting of elements of investment strategies that academics mentions. According to literature, there are three major elements in an investment strategy that institutional investor could decide on:

- 1. Product;
- 2. Region;
- 3. Stage.

Product²³ refers to the way that the investor invests; through funds, secondary investments, coinvestments, and direct investments. Region refers to the target location of the investment (e.g., US, global, emerging markets). Finally, stage refers to the maturity of the company in which the investor can ultimately invest (e.g., Venture, Buyout²⁴). Note that sector is not included in this list because we feel that it is of less importance in the formulation of an investment strategy by the institutional investor. Buyout investments are generally done in a wide range of sectors, and venture investments usually in IT & internet and life science companies. We think, after consultation with investment professionals, that sector choice is subordinate to the decision in which product(s), region(s), and stage(s) to invest. Nevertheless, differences in performance could be caused by sector influences.

We continue to describe the investment strategy of an institutional investor by the *combination* of the (sub-)elements product, region, and stage. For example, one investor could have the strategy to only invest through funds that invest in the US in buyout companies. Another investor could have the investment strategy to do venture and buyout fund and co-investments in developed markets only. Hence, we suggest to analyze investment strategies on these three elements; product, region, and stage. We discuss them in more detail in the remainder of this section.

²³ Also referred to as 'mode of investment' by Cumming & Johan (2007).

²⁴ We make a slight distinction between 'Buyout' and 'buyout' (i.e., capital letter or not). For the first, we refer to the category of buyout investments (e.g., Europe Buyout). For the latter, we refer to buyout as adjective (e.g., buyout investments, buyout funds, etc.). This also holds for Venture/venture and the other stages we mention in this thesis.

2.2.1 Products

From (among others) Fenn *et al.* (1995) we know that institutional investors do not only invest in funds, but also invest directly or co-invest alongside GPs into companies. According to past literature (e.g., Fenn *et al.*, 1995; Fraser-Sampson, 2010), product strategies of institutional investors include fund investments, fund-of-funds investments, co-investments, direct investments, and secondary investments, all with their own risk-return characteristics. In Appendix II we provide a visual overview of the investment structure of the products.

Fund investments

Institutional investors "frequently choose to invest in private businesses through funds" (Lerner *et al.*, 2007, p. 7). Most academic research hitherto focuses on the (drivers of) performance of private equity *funds* and, to a lesser extent, GPs^{25} even if the study aimed to identify the drivers of LP performance.

Fund-of-funds

A fund-of-funds aggregates capital from a number of limited partners, and then invests it in a variety of private equity funds (Lerner *et al.*, 2007). By doing so, it offers a diversified private equity portfolio by reducing unsystematic risk.

Co-investments

Müller (2008) indicates that sometimes fund managers offer their investors to co-invest alongside a fund directly in a specific company. This is often the case when the amount to be invested in the company exceeds the investment limit set by the partnership agreement. Co-investments offer fund investors the chance to get more exposure to certain assets.

Direct investments

Fenn *et al.* (1995) states that approximately 20 percent of the private equity investments are made directly²⁶ into companies. More recently, Cumming & Johan (2007) and Nielsen (2008) document that institutional investors make significant direct investments in private equity. However, due to the high level of investment activity, direct investing is not feasible for all institutional investors (Fenn *et al.*, 1995). Direct investments can yield high returns if the investee company is

²⁵ HEC Paris professor Gottschalg ranked private equity firms on their strategic 'fitness' and performance based on ten different empirically validated criteria respectively six performance indicators. The results and a concise description of the data analysis are presented in Gottschalg (2010a), (2010a) and (2011).

²⁶ In their report, Fenn et al. (1995) attribute co-investments to the category direct investments as well.

performing well (e.g., by a successful IPO²⁷), but if the company fails then there are no other firms in the fund to make up for the losses.

Secondary investments

Secondary investments (or 'secondaries') are 'second hand' private equity investments. They are the acquisitions of interests in private equity funds from another investor. The secondary investor replaces the current LP in the relationship between the LP and the GP. This is in contrast to primary interests²⁸, which are commitments by investors to *new* funds. Once the fund is operating (i.e., making investments) then the interest would become secondary (Fraser-Sampson, 2010).

The timing of when institutional investors decide to invest in either one of the products mentioned above is presented in Appendix III.

2.2.2 Regions

Besides the traditional private equity markets US and (Western) Europe, many emerging markets have evolved significantly in the process of private equity investing (Fraser-Sampson, 2010). Most academic research focuses on the developed markets though, as the availability of data is a main concern in private equity studies. Most academics divide the private equity markets into four main regions; developed America, Western Europe, developed Asia-Pacific, and emerging markets. Within emerging markets, IFC²⁹ uses the following distinction in regions:

- East Asia and the Pacific;
- Europe and Central Asia;
- Latin America and the Caribbean;
- Middle East and North Africa;
- South Asia;
- Sub-Saharan Africa.

Summarized, the private equity regions where institutional investors may opt to invest are:

 $^{^{27}}$ IPO stands for 'initial public offering', the first time a company issues common stock or shares to the public. 28 In this thesis referred to as 'fund investments'.

²⁹ IFC stands for International Finance Corporation and is member of the World Bank Group. See http://www1.ifc.org/wps/wcm/connect/region_ext_content/regions/regions/regions+landing+page for their region overview.

Region	Developed	Emerging
Africa & Middle Fast		Sub-Saharan Africa
Ainca & Middle East		Middle East and North Africa
America	Developed America	Latin America and the Caribbean
Europe & Central Asia	Western Europe	Central and Eastern Europe & Central Asia
South and East Asia & Pacific	Developed Asia-Pacific	South and East Asia & Pacific

Table 2.2.1: Private equity regions; developed and emerging.

For convenience reasons, we choose to use four regions in the remainder of this paper; 'US' (Developed America), 'Europe' (Western Europe), 'Asia-Pacific', and 'Rest of the world'.

2.2.3 Stages

Stages refer to the phase of the company where institutional investor ultimately (i.e., through a fund) invests in. The two major stages that literature acknowledges are Venture (early-stage companies) and Buyout (established private companies). Some academics (e.g., Lerner *et al.*, 2007) make distinction between early stage and later stage Venture. Furthermore, some papers mention other stages like Growth, Expansion, Development, Special Situations, and Distressed. Some stages are simply another name for the same concept (e.g., Growth and Expansion), while others have a large overlap. We choose to adopt the stages Venture, Buyout, Growth, Special Situations, and Other in the remainder of this study.

2.2.4 Framework

Based on literature review, we construct a framework that includes the three main dimensions of an institutional investment strategy; product, region, and stage. We define an investment strategy as the combination of these three (sub-)elements. Our framework looks as follows:

Product	Region	Stage
Fund investments	Asia-Pacific	Venture
Fund-of-funds investment	Europe	Buyout
Co-investment	US	Growth
Direct investment	Rest of the world	Special Situations
Secondary investment		Other

Table 2.2.2: Framework of an institutional investors' investment strategy.

This framework could be interpreted as follows. An institutional investor may choose one or more products, in one or more regions, in one or more stages. Moreover, the allocated capital may differ per product, region, and stage. The investment strategy is the mix of allocation to products, allocation to regions, and allocation to stages.

The more products, regions, and stages the investor chooses, the more complex its investment strategy gets. This is a way for institutional investors to diversify their portfolios by reducing unsystematic risk.

We use the above mentioned framework in our peer analysis in Chapter 3.

2.3 Performance measures in private equity

This section of the literature review is about performance assessment of private equity. Performance is often measured in an absolute manner and/ or relative to alternative investments. The latter is the performance of a private equity investment compared to the performance of an investment in the public market or benchmark. In this section we discuss both concepts.

2.3.1 Absolute performance

Because private equity is a cash flow business, where both the size and timing of the cash flows are uncertain, performance measures that are common in other financial asset classes are not relevant in private equity. In the private equity industry it is standard practice to report absolute performance either as the internal rate of return (IRR) – the annual yield on an investment – or as a ratio of cash proceeds over cash investments (Money Multiple³⁰) (Gottschalg, Loos, & Zollo, 2004; Kaserer & Diller, 2004; Grabenwarter & Weidig, 2005). The IRR has the important advantage that it considers the time value of money. The timing of the underlying cash flows has a great influence on its measurement (Gottschalg, Talmor, & Vasvari, 2010). The IRR of a certain cash flow stream CF₁ is a number IRR satisfying the equation (e.g., Lossen, 2006a and Gresch & von Wyss, 2011):

$$\sum_{\ell=0}^{I} \frac{CF_{\ell}}{(1+\mathrm{IRR})^{\ell}} = 0$$

³⁰ Sometimes referred to as 'investment multiple' or 'return multiple'.

Where, by convention, the initial investment CF_0 is a negative amount. At least one cash flow $(CF_1, CF_2, ..., CF_T)$ must be positive in order to find an IRR³¹. The higher the IRR, the more attractive the investment is.

As some papers acknowledge, measuring performance by IRR has some inherent drawbacks. For instance, the use of IRR to report private equity performance implicitly assumes that the interim cash proceeds have been reinvested at the same IRR percentage over the entire investment period (Lossen, 2006a; Gottschalg & Phalippou, 2007). To illustrate this, if a fund reports a respectable IRR of 30 percent and has returned cash early in its life, the cash was put to work again at an annual return of 30 percent. In reality, "investors are unlikely to find such an investment opportunity every time cash is distributed" (Gottschalg & Phalippou, 2007, p. 17). Therefore, the authors suggest using the modified-IRR (M-IRR) instead. The M-IRR is similar to the regular IRR, but rather than assuming reinvestments at the IRR rate, M-IRR makes an explicit assumption about the rate of return for investing (reinvestment rate) and borrowing (finance rate) for interim cash flows, which is more likely to correspond to reality (Dorsey, 2000). When Gottschalg & Phalippou (2007) compares the performance calculations of the M-IRR with the IRR, they find that some well performing funds (according to IRR) are not so well performing according to their M-IRR. The M-IRR formula (Lossen, 2006b)³² is mathematically presented below:

$$\text{M-IRR} = \sqrt[T]{\frac{\sum_{t=0}^{T} \left[CF_t \times (1+r_t)^{T-t} \times p_t \right]}{\sum_{t=0}^{T} \left[CF_t \times (1+r_t)^{-t} \times n_t \right]}} - 1$$

where

 CF_t denotes the cash flow at time t;

 r_r denotes the reinvestment rate for interim cash flows;

 r_{f} denotes the finance rate for interim cash flows;

$$p_t = \begin{cases} 1 & \text{if in period } t \ CF_t \ge 0 \\ 0 & \text{otherwise;} \end{cases}$$
$$n_t = \begin{cases} -1 & \text{if in period } t \ CF_t < 0 \\ 0 & \text{otherwise.} \end{cases}$$

³¹ IRR is thus the rate where the Net Present Value (NPV) of a cash flow stream is 0. If CF_0 is the only negative cash flow, then there is a single unique solution for IRR. If there are multiple negative cash flows (i.e., cash outflows), then there are more than one solutions to this equation. The interpretation of IRR is hence not that straightforward. Therefore we also use Money Multiple as an additional performance measure, as we explain later in this section.

³² We adjust two elements in the formula provided by Lossen (2006). First, we change '1' in '-1' for the possible values of n_r . This converts the negative cash flows into a positive number. Second, we subtract '1' from the left-hand side of the formula to find the M-IRR.

The M-IRR formula adds up the positive cash flows including the proceeds of reinvestment at the reinvestment rate to time T, adds up the negative cash flows after discounting them to time zero using the finance rate, and then works out what rate of return would cause the magnitude of the present value of the cash outflows at time zero to be equivalent to the future value of the cash inflows at time T.

Another way to interpret M-IRR is by assuming that the capital committed to a fund, financed at the firm's finance rate, is put on an 'account' that earns the reinvestment rate. The reinvestment rate could be set as the firm's cost of capital. The capital called by a fund is taken out of this account and capital distributed goes into this account. When the fund liquidates at time T, the M-IRR is computed as the amount on the account at liquidation divided by capital committed to the power one over duration (i.e., the T^{th} root). This basically "boils down to calculating NPV but give a per annum number" (Phalippou, 2009a, p. 9).

The M-IRR solves many of the pitfalls of IRR. For example, by putting the cash inflows at work at a more realistic reinvestment rate (e.g. the firm's cost of capital), it prevents providing severely distorted incentives for the timing of cash flows, and biasing upward volatility estimates (Phalippou, 2009a). Inherent disadvantages of the M-IRR are the assumptions with respect to the reinvestment rate r_r and finance rate r_r . These rates are chosen such that they reasonably match the real-life rates of (re)investing respectively financing investments. Although the logic behind M-IRR seems intuitive, we feel that M-IRR is a different, additional performance measure that transforms extreme IRRs to a percentage that is closer to the chosen values for r_r and r_f . Negative IRRs converge to zero under M-IRR because as r_r and r_f are equal to or larger than zero. On the other hand, IRRs that are larger than, say 20%, get closer to a more realistic r_r and r_f between five and fifteen percent. Therefore, the choice for the values of r_r and r_f has a crucial impact on the results, while it is hard to determine these values. For example, the historical values of the finance and reinvestment rate are difficult to establish, especially for other private equity companies. Assumptions thus need to be made for the calculation of M-IRR.

A popular alternative manner that is used by institutional investors to measure private equity performance is by calculating the Money Multiple. This multiple is the ratio 'investment proceeds' (capital distributed to the investor) over the absolute value of 'invested capital'. The formula simply is:

Money Multiple =
$$\frac{\Sigma \text{ investment proceeds}}{\Sigma \text{ invested capital}}$$

The interpretation is simple; if the investment is a complete write off, then the Money Multiple is zero, if the invested capital equals the investment proceeds, the Money Multiple is one, and if the fund doubles the investor's money on a deal, this corresponds to a Money Multiple of two (Gottschalg, Loos, & Zollo, 2004). The higher the Money Multiple, the more attractive the investment is.

The Money Multiple we just described is also called Total Value to Paid In (TVPI) (Fraser-Sampson, 2010). This multiple consists of two parts; the Distributed over Paid In (DPI) and Residual Value to Paid In (RVPI). The DPI shows how much of the capital that is paid in (i.e., invested to the company or fund) is distributed back to the investor, and thus is a realized return. The RVPI shows the multiple of the amount of money that is unrealized (i.e., Net Asset Value) divided by the amount of money paid in. The TVPI, or as we refer to as Money Multiple, is then:

Money Multiple = DPI + RVPI

Unlike IRRs, Money Multiples do not consider the time value of money or the length of the period that the money is invested (Gottschalg, Talmor, & Vasvari, 2010). It could have taken ten years do double the investor's money, but it could also have taken only one year. Both cases result in a Money Multiple of two, while the latter opportunity would clearly be more attractive (Gottschalg, Loos, & Zollo, 2004).

The three-way relation of holding period, IRR, and Money Multiple needs to be understood by institutional investors entering the private equity market (Fraser-Sampson, 2010). In general, the longer an investment is held, the lower the IRR is for a given Money Multiple, and vice versa. Often, IRRs and Money Multiples are used complementary by GPs and institutional investors to assess private equity performance.

Other performance measures such as RAROC or RORAC³³ are often applied in financial institutions such as banks. RAROC is calculated by dividing expected return by economic capital or value at risk. Economic capital is the amount of money which is needed to secure the survival

³³ RAROC (Risk-Adjusted Return On Capital) and RORAC (Return On Risk Adjusted Capital) are often used by financial institutions for analyzing risk-adjusted financial performance.

in a worst case scenario. RAROC makes it thus possible to compare returns on (usually) loans with a low risk profile to the returns on loans with a high risk profile. In private equity, the concept of economic capital is not applied in practice because investors do not keep economic capital as a worst case buffer. Instead, the 'capital at risk' of one individual investment is the total amount of committed or invested capital, because the investor has the chance of losing it all. It thus makes more sense to evaluate private equity performance based on invested capital and proceeds, as, among others, IRR and Money Multiple do.

Net Present Value (NPV) could also be used as a performance measure. NPV can be calculated by discounting all cash flows with discount rate *r* to its present value as follows:

$$\sum_{t=0}^{T} \frac{CF_t}{(1+t)^t}$$

According to Phalippou (2009a), there are two main reasons why NPV is not used in practice. First, practitioners find NPV an abstract value and scale dependent. The second reason is that they do not want to *assume* a cost of capital as the discount rate *r*, as its value is somewhat subjective. Although these obstacles are surmountable (see Phalippou, 2009a), we choose not to use NPV as a performance measure because we feel that its scale dependency makes it hard to compare performance, for example when different currencies are used across investors.

2.3.2 Relative to alternative investments

In some papers, the performance of private equity is compared with the performance of alternative investments. A common measure is the Public Market Equivalent (PME), which measures the return to private equity investments relative to public equities³⁴ (Kaplan & Schoar, 2005). A fund or investment with a PME greater than one outperformed the public market equivalent (net of all fees).

The Profitability Index (PI) is another way to benchmark performance and is proposed in Gottschalg, Loos, & Zollo (2004) and Phalippou & Zollo (2005). The authors suggest that institutional investors compare their performance with the performance of alternative investment options like stock markets or peers. PI equals the present value of cash inflows divided by the present value of cash outflows. By design, a PI of greater than one indicates a given option is

³⁴ Kaplan & Schoar (2005) use the S&P 500 as public market equivalent.

more attractive than the default option, and vice versa. The return of alternative investment opportunities (e.g., the public market index) is used as the discount rate to calculate the present values.

Phalippou & Zollo (2005) uses the return of the S&P 500 to discount both cash flows, hence a PI above one indicates a better performance than the S&P 500 index. Private equity funds in their sample have an average PI of 1.02 for buyout and 1.07 for venture funds, indicating a slight outperformance with respect to the S&P 500. Gottschalg *et al.* (2004) compares the added value of the investments of private equity fund managers. The authors calculate the PI by decomposing fund returns into four performance drivers; revenue growth, efficiency enhancements, multiple expansion, and leverage. Subsequently, they compare performance in each of these categories to the figures from similar public or private peers.

In our opinion, both PME and PI are a good performance measures to compare an investment's return to an alternative investment's return. Nevertheless, because we aim to find absolute performance in this study, we choose not to use PME or PI as a performance measure.

2.3.3 Conclusions

In accordance with most academic literature and standard practice, we choose to use IRR and Money Multiple as performance measures later in this paper. M-IRR would be a good alternative measure, as it assumes a more realistic reinvestment rate for cash inflows early in the fund's life. Nevertheless, we feel that the M-IRR is strongly dependent on assumptions with respect to the choice for the reinvestment and finance rate. We find it hard to defend them for our analysis of past investment data of peers since we do not know the actual reinvestment and finance rate, and we would only be able to make an estimate, as explained before. At the same time it is our opinion that for a large sample of funds and cash flows the drawbacks of IRR are well enough mitigated.

Public Market Equivalent (PME), Profitability Index (PI), or other measurements that are relative to the performance of alternative investments are less appropriate in this study because it is our goal to compare institutional investment strategies with each other, thus apart from public market or alternative investments' performances.

Furthermore we explained in this section why we do not use other performance measures such as RAROC and Net Present Value in our study.

2.4 Determinants of investment strategy performance

In Section 2.2 we discussed our framework consisting of three elements that construct an institutional investors' investment strategy; product, region, and stage. In this section we review literature to see what determinants of successful investment strategies other academics find. We structure this section by first analyzing the three elements that form the investment strategy (product, region, and stage) and then discussing the determinants of institutional investors as creators and executers of these investment strategies. Finally, we shortly present some other determinants that could influence the success of an investment strategy according to literature.

2.4.1 Product related determinants

Fund investments

Kaplan & Schoar (2005) investigates the performance of private equity funds based on data of individual fund returns and cash flows. The authors find a relationship between fund performance and fund size and the GP's experience; larger funds and higher sequence number³⁵ funds have a significantly higher performance. The relation with fund size is concave, suggesting decreasing returns to scale (when funds become very large, performance declines). In addition, Ljungqvist, Richardson, & Wolfenzon (2007) finds that younger buyout funds take larger risks than older funds. This can help explain the negative expected returns Kaplan & Schoar (2005) finds for first-time funds. Finally, Kaplan & Schoar (2005, p. 1821) presents some evidence that funds that are raised in boom times "are less likely to raise follow-on funds, suggesting that these funds perform worse".

Besides fund size and fund sequence, Phalippou & Zollo (2005) also includes other possible drivers of performance in their study, such as the proportion invested outside the US, the proportion invested in venture capital, the amount invested in high-tech industries, the average length of the investments, the fund's beta, and the amount of capital committed. Unlike Kaplan & Schoar (2005), the authors do not find evidence of a *concave* relationship between performance and fund size, but did find a *positive* relation between size and performance. Their paper points toward small and inexperienced funds as the main drivers of the documented low performance of private equity funds (Phalippou & Zollo, 2005).

Note that the drivers of performance mentioned in this section are based on *fund* investments, thus they do not strictly hold at the *institutional investor* level. They do provide input for the optimal investment strategies of institutional investors though.

³⁵ If a GP raises its first fund, than it has sequence number one. The second fund has sequence number two, etc.

Furthermore, Lerner *et al.* (2007) investigates whether variations in LP performance are due to the systematic differences in the risk profiles of the *funds* that the institutional investors choose. Therefore the authors control for a number of observable characteristics, such as the focus and maturity (Venture or Buyout) of the investments selected by the fund and the fund's location, fund's past performance – and in accordance with Kaplan & Schoar (2005) – the fund's size and sequence number. The main finding is that LPs that have higher (non risk-adjusted) performance "also tend to invest in smaller and slower growing funds and have a smaller fraction of GPs in the same geographic area as the LP" (Lerner *et al.*, 2007, p. 33).

Fund-of-funds investments

The fund-of-funds' diversification mechanism reduces both the positive and negative tails of the distribution of returns, as reported by fund-of-funds manager Capital Dynamics (2003). The reverse relationship between risk (indicated by standard deviation) and number of funds in the portfolio is also acknowledged in J.P. Morgan analysis (2008), stating that funds-of-funds have produced more consistent return streams than venture and buyout funds over time. Moreover, Weidig & Mathonet (2004) uses a sample of fund investments to simulate the returns of fund-of-funds as a managed portfolio of twenty funds. The authors report significant diversification effects relative to fund investments.

In addition, Capital Dynamics (2003) reports that diversification does not impact the *average return* but does impact the *standard deviation*, which decreases as the number of underlying funds increases. The underlying analysis is based on a Monte Carlo simulation, with which Capital Dynamics indicated a greater probability to achieve better performance in a fund-of-funds investment (characterized by 30 funds) than a single fund or low number of funds investment.

What is not mentioned in the Capital Dynamics paper above, is the fact that the fund-of-funds performances are gross of fees (i.e., no fees included). In other words, institutional investors that invest in private equity via fund-of-funds managers still have to pay management fees and carry to these managers. The net returns – i.e., the returns that the institutional investors yield – are therefore lower than the gross returns mentioned by the fund-of-funds managers. On the other hand, a fair comparison between investing in-house or through a fund-of-funds must also take into account the full costs of running an in-house private equity program (Lichtner, 2010). The comparison should include the level of sophistication in investment strategy and diversification, and the level of assets under management. Institutional investors with a low level of

sophistication and a large amount of assets under management are better off fee-wise running an internal team, according to this paper.

According to Gresch & von Wyss (2011), scarcity of data is a main reason that academic literature on fund-of-funds investments, and especially empirical research based on real fund-of-funds data, is rare. The authors use real data acquired from Preqin and find that buyout funds exhibit a more attractive risk-return profile than fund-of-funds and venture funds. However, when buyout and venture funds are aggregated, fund-of-funds outperform the fund investments. Intuitively this conclusion is in line with our expectations, although we criticize the use of Preqin data³⁶ and standard deviation as a measure of risk. The assumption that private equity returns, including fund-of-funds returns, are normally distributed is to our opinion too large and is not addressed in their paper. Therefore we argue that standard deviation is not a proper risk measure in private equity.

Co-investments

According to Capital Dynamics (2011), co-investments are interesting opportunities for institutional investors for three main reasons. First, it allows an LP to invest more capital with quality GPs without increasing the number of GP relationships. Second, an LP can build a portfolio of high-return investments if it can find a way to co-invest in the best opportunities that the GP offers. However, the selection of both the GP and the co-investment opportunity are of key importance for the LP's success, and in practice co-investment opportunities are limited and outside the control of institutional investors. Third, an LP often does not have to pay additional fees to the GP because co-investments are typically offered on a no-management fee and no-carry³⁷ basis (Fenn *et al.*, 1995).

Fenn *et al.* (1995) discusses another reason for institutional investors to do co-investments. The authors stress that institutional investors that (have plans to) invest directly into companies can use co-investments as a learning experience. Some institutional investors view co-investment as an entry to direct investing. Co-investments offer opportunities for institutional investors and give them the ability "to learn of these opportunities through their relationships with general partners" (Fenn *et al.*, 1995, p. 41).

³⁶ We feel supported in our criticism by Cyril Demaria, a private equity professional and lecturer. He states on http://www.pefinance.eu/?p=66 that Preqin as a source of data "is not really the top notch [...] [because it] aggregates heterogeneous data, and is not consistent in the treatment of the inputs".

³⁷ Carry or carried interest is the GPs' share (often 20%) of a partnership's profits.

Adverse selection issues in co-investing (e.g., deals offered to LPs may be inherently less attractive as GPs keep the best deals for themselves) are discussed in the papers of Capital Dynamics (2011) and Fenn *et al.* (1995). Partnership agreements can address these potential issues among other by limiting deal fees or restricting the ability of GPs and their associates to co-invest selectively in the partnership's deals. Furthermore, a co-investor can check the GP's historical track record, comparing it to the performance of investments where co-investments were offered and where not.

Fenn *et al.* (1995) observes that, *ceteris paribus*, expected returns on co-investments exceed expected returns on fund investments. The underlying support of this statement is not mentioned in their paper, nor do we find one in other academic papers.

Direct investments

There is not much academic literature about the performance of direct investments by institutional investors. The probable reason for this is the opaque and confidential nature of direct investing.

Secondary investments

Secondaries are said to reduce the illiquid character of private equity somewhat (Fenn *et al.*, 1995; Fraser-Sampson, 2010). The secondary market has evolved during the recent financial crisis, when there was need for more liquidity in the market. Investors make secondary investments for a wide range of purposes, including reducing the J-curve effects³⁸ and targeting exposure to earlier vintage years or a particular industry or geography. Both reduce the risk of the secondary buyer; the former because secondary investments avoid the initial period of negative as investors commit when the fund is fairly mature. The latter argument leads to portfolio diversification benefits. According to Fraser-Sampson (2010), secondary investors may experience a higher fund IRR than primary fund investments, but they enjoy it over a shorter period and thus receive less money in total.

LPs that *sell* secondary interests also have their reasons to do so. For example, a change of strategy (leaving private equity), unexpected need for cash, over-allocation to certain vintage years, industries, or geographies, or dissatisfaction with the GP may cause an LP to sell its interests on

³⁸ The J-curve is a well-known phenomenon in private equity. The 'J' corresponds to the shape of the cumulative cash flows of a private equity investment. For more information, see Fraser-Sampson (2010, pp. 31-36). See Appendix III for more information about the J-curve and the timing of secondary investments.

the secondary market (Fraser-Sampson, 2010). To illustrate, The Government of Singapore Investment Corporation (GIC) recently sold a chunk of its private equity portfolio on the secondary market. According to a news article of Private Equity International "[GIC wants] to scale down relationships that don't make sense for them anymore, or funds that have reached such an age that it doesn't make sense keeping them in the portfolio" (Witkowsky, 2012).

Not much academic attention has been dedicated so far to secondary investments and (the determinants of) their performance, presumably because of the relatively young and opaque nature of the secondary market.

2.4.2 Region related determinants

Although we do not find much academic research about (institutional) performance across regions, we notice that there are two types of region related research. The first is to look in which region the performance of the private equity investments are superior to other regions and why. The second is to analyze whether the geographical *proximity* of an investment correlates with its performance. For example, do funds managed by GPs closer to the LP yield higher returns than funds further away?

With respect to the first category, Kaplan, Martel, & Stromberg (2003) and Hege, Palomino, & Schwienbacher (2003) document that US private equity firms show a significantly higher performance on average than their European counterparts. They advance various reasons for this, such as institutional differences and the fact that the private equity industry outside the US is younger and thus at a lower point in the learning curve.

With regard to the proximity of the investment, Lerner *et al.* (2007, p. 33) states that LPs that have higher (non risk-adjusted) performance "have a smaller fraction of GPs in the same geographic area as the LP". This might suggest that LPs are willing to invest in funds with lower performance if they are in the same region. In their analysis, the authors only consider GPs in the US, and geographical areas within the US. Phalippou & Zollo (2005) includes the proportion invested outside the US as a possible characteristic that is related to performance. Their results show that there is a small (not significant) negative relationship for US investors between the proportion invested in Europe and performance.

2.4.3 Stage related determinants

Most papers study either buyout investments, venture investments, or both. Phalippou & Zollo (2005) states that the bulk of the money of private equity funds is invested in leveraged buyouts and the rest mainly in venture capital. According to Metrick & Yasuda (2010), about two-thirds of all private equity capital under management is managed by buyout funds.

Phalippou & Zollo (2005) finds that funds that invest more in venture funds witness a lower performance although it is not statistically significant. In accordance, Gresch & von Wyss (2011) shows that on a risk-adjusted basis, buyout funds exhibit a more attractive profile compared to venture fund and fund-of-funds. On the other hand, Lerner *et al.* (2007) argues that early and later stage venture funds in their sample has significantly higher performance than buyout funds (14 percent and 8 percent versus 0 percent, respectively). Kaplan & Schoar (2005) finds somewhat higher (Public Market Equivalent) returns for venture and buyout funds compared to Lerner *et al.* (2007).

The differences in performance between venture and buyout funds may reflect both the time period, as well as the differences in the mix of funds (Lerner *et al.*, 2007).

2.4.4 Institutional investor characteristics

Lerner *et al.* (2007) analyzes the investment styles and performance across several different classes of institutional investors. The authors study the influence of institutional investors' characteristics such as experience (indicated by LP vintage year) and size on the performance of their fund investments. The authors document that the coefficient of the experience of the LP is positive but insignificant. They argue that this positive relationship might be attributable to preferential access to funds of the LPs that have been in the industry for a long time. Furthermore, they describe that performance of LPs is not affected by their size (measured as the logarithm of committed capital).

With respect to the performance of fund investments per type of institutional investor, Lerner *et al.* (2007) finds that on average endowments' average annual returns are nearly 14% greater than the average investor. Furthermore, funds selected by investment advisors and banks lag sharply. Nevertheless, their findings suggest that LP-specific differences in investment styles are "more important than differences between LP types in understanding the variation in LP performance" Lerner *et al.* (2007, p. 28).

2.4.5 Other determinants

Besides the investment strategy and the characteristics of the institutional investor, other factors might also have an impact on its performance. In this section we shortly discuss the most important factors.

The findings of Phalippou & Zollo (2005, p. 15) suggest that there are five key determinants of fund performance: the level of corporate bond yield at the time of investments, the return of the public stock-market during the life of investments, the length of investments (between start and exit), the size of the fund, and the experience of the fund family (i.e., fund sequence). The authors find that the performance of private equity funds is "pro-cyclical as it positively co-varies with both the business cycles and public stock-markets" (2005, p. 15).

Many papers show private equity investment performance per vintage year and acknowledge it as determinant of investment performance. For example, Kaplan & Schoar (2005) shows that venture funds performed relatively poorly in much of the 1980s while large buyout (LBO) funds have substantial IRRs in the first half of the 1980s, followed by relatively poor performance in the first half of the 1990s.

2.5 Conclusions

Literature acknowledges the significant role of institutional investors in the private equity industry as being the largest fund investors. Institutional investors differ in sophistication and investment strategies, as Lerner *et al.* (2007) finds. Based on the literature review we find that investment strategies of private equity institutional investors roughly consist of three main elements: (1) product, (2) region, and (3) stage. We incorporate these three elements in our framework to analyze the investment strategies of institutional investors in Chapter 3.

The first element looks at the different products that an institutional investor can apply. Literature discusses fund investments, fund-of-funds investments, direct investments, co-investments, and secondary investments, all with different risk-return trade-offs. The second element covers the region where a fund or company is operating. In our literature review we distinguish four main regions: Asia-Pacific, Europe, US, and Rest of the world. Stage refers to the maturity of the company where the institutional invests in (whether or not through funds). We find five main stages: Venture, Buyout, Growth, Special Situations, and Other. This results in the following framework of elements and sub-elements that we introduced in Section 2.2.4:

Product	Region	Stage
Fund investments	Asia-Pacific	Venture
Fund-of-funds investment	Europe	Buyout
Co-investment	US	Growth
Direct investment	Rest of the world	Special Situations
Secondary investment		Other

Table 2.5.1: Framework of an institutional investors' investment strategy.

The combination of (sub-)elements in Table 2.5.1 is the investment strategy of an institutional investor.

We search literature per sub-element of Table 2.5.1 to find how it affects the performance of an institutional investor in private equity. We find a number of performance determinants. For example, academics suggest that investments in larger funds yield higher performance, venture funds witness a lower performance, and more experienced LPs do better (but not significantly). Nevertheless, literature mostly scrutinizes the performance (drivers) of private equity *funds* and institutional investors' *fund investments*. Not much academic attention has been dedicated to private equity strategies at *institutional level* that could help us to find the success of institutional investors' investment strategies. Therefore, we find it hard to draw strong conclusions about this based on literature. This paper aims to expand literature by assessing multiple elements of institutional investment strategies and their performance (determinants).

Although we acknowledge the fact that risk is an important aspect in the private equity performance evaluation of institutional investors, we choose not to investigate the risk component of the risk-return tradeoff in further detail due to its strong dependence on certain assumptions. To assess the performance of institutional investors, we adopt IRR and Money Multiple in our analysis, in accordance with most academic literature and standard practice.

We answered Question I in this chapter. We analyze the findings of this chapter empirically in the next chapter.

3. Performance of institutional investors' investment strategies: empirical evidence

To find the investment strategies of institutional investors and their performances, we first explain how we collect our data (Section 3.1). Next, we clarify how we analyze the data in Section 3.2. In Section 3.3 we present our findings.

3.1 Research design and data collection

In this chapter we analyze the investment strategies of a number of institutional private equity investors ('peers' of PGGM). We discuss our research design and data collection in this section.

At first, we analyze the universe of institutional investors and select – in consultation with PGGMs investment managers – 25 peers of PGGM Private Equity based on their size of private equity assets under management, reputation, and type. We select peers that are of equal size and peers of larger size that have a good reputation in the market. We seek a balance between the different types of institutional investors in the peer group (i.e., to include fund-of-funds, pension funds, asset managers, sovereign wealth funds, (university) endowments, insurance companies, bank related investors, and other investors).

Subsequently, we perform a qualitative analysis with regard to the investment strategies of the selected peers. We use a multi-source approach for this, where information is extracted from:

- Websites of the institutional investors, including peers' own research publications;
- Other internet sources such as Bloomberg and reputable private equity related (news) sites;
- Qualitative company information in Preqin³⁹;
- Presentations and investment memoranda (if available⁴⁰).

In Section 3.2 we provide an overview of the qualitative analysis and later we discuss some trends we observe in the market.

³⁹ This information on Preqin is modified by the companies themselves so we have the assumption that it is accurate. ⁴⁰ Some fund-of-funds managers pitched for PGGM. The information they shared in that presentations and memoranda is included in our analysis.

Next, we select a subsample of eight peers to base our quantitative analysis on. The selection of this subsample is chosen with respect to the availability of – or possibility to acquire – genuine investment data. For example, some US pension funds are obliged to share their investment data with respect to their fund investments.

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3.2 Data analysis

3.2.1 Qualitative analysis

The first part of our data analysis is qualitative. We analyze 25 peers on a number of factors, including type, location of headquarters, years of experience, assets under managements, and their allocation to private equity. Descriptive sample statistics are presented in Appendix V. Based on these statistics we conclude that most peers are fund-of-funds managers and have their headquarters in the US. The allocation to private equity is largest for fund-of-funds managers in both absolute and relative (to total assets under management) terms.

Furthermore, we aim to identify the peers' investment strategies by analyzing the qualitative sources mentioned in the previous section. Based on our findings, we formulate trends that we observe among the peers. We present these trends in Section 3.3.1.

As we explained in Section 1.2, we find performance or investment related data from public databases like Preqin and Thomson One inadequate, incomplete and unreliable. Hence we do not want to use any performance or investment related data other than the statistics we present in Appendix V. We decide not to use the data of these databases for our quantitative analysis to find relationships between investment strategy elements and performance. We continue our quantitative analysis by focusing on a selected subsample of eight peers, and using the comprehensive and confidential datasets that these peers send us.

3.2.2 Quantitative analysis

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Not all eight peers fully cater to our requested data due to its confidential nature. For example, some peers only disclose their investments on fund level (i.e., what is the performance of their fund investment) and not on cash flow level. We prefer data on cash flow level because that allows us to do our own analysis and provides us with more analysis options. We summarize the
datasets that we have at our disposal in Appendix VII. The number of investments that we have per peer, per type, and per region is displayed in Appendix VIII.

The first step in the quantitative data analysis is to understand the formats of the datasets that peers send us. Although we construct a template⁴¹ to acquire data in a uniform way, most institutional investors send us the data in their own format. We first check whether all requested data are included. We then sort the data in four main tabs that indicate the product type; funds, direct, secondary and co-investment. These tabs are the basis for the next parts of the analysis, including the co-investment analysis that we describe in Chapter 4.

An important assumption that we make in our analysis with regard to performance estimations is that we consider the residual values of unrealized investments as accurately reflecting the net present value of these investments. The peers report these residual values as the Net Asset Value (NAV). We insert the NAVs as a final cash inflow as of the reporting date for the performance calculations.

Whereas the true performance of a private equity investment can only be known when the investment is fully liquidated (i.e., exited), the NAV gives GPs (and LPs) the possibility to calculate the performance of an investment during the holding period of that investment. Often, the NAV of an investment is kept at the cost of the investment (i.e., with Money Multiple 1.0x) during the first two years. After that, the NAV is calculated based on the Fair Market Value (FMV) of the underlying investment. The influence of the NAV on performance is therefore largest in the first years of the investment and decreases over the holding period as parts or all of the underlying investment is liquidated (i.e., a cash distribution to the LP) or if the underlying investment is depreciated. To mitigate the influence of NAV, we therefore exclude investments with a vintage year after 2006. This is in line with the recommendation of Lerner *et al.* (2007), in which the authors state that performance is unlikely to be very meaningful for younger investments due to large unrealized value.

We then calculate both IRR and Money Multiple performance of different product types, regions, and stages per peer. We calculate IRR based on the net of fees cash inflows and outflows⁴².

⁴¹ See Appendix IV for the template of our request for information.

⁴² Due to the fact that the cash flows are reported at irregular intervals, we compute IRR by using the Excel built-in function 'XIRR'.

Further on, we compute Money Multiple by simply summing up the cash inflows and dividing them by the total value of the cash outflows.

3.3 Findings

3.3.1 Trends observed in the market

When conducting our qualitative analysis, we observe some trends in the market of institutional private equity investors. In this section we discuss the main trends based on current or future investment strategies compared to past investment strategies:

- Institutional investors increase their exposure to emerging markets;
- Institutional investors increase their exposure to buyout funds;
- The number of GPs in an institutional investor's portfolio is decreasing.

Finally, we make some remarks about how institutional investors judge the outlook of private equity in the future.

First, we analyze how peers think about committing more to emerging markets. We find evidence that most institutional investors tend to invest more in emerging markets and especially the BRIC⁴³ countries compared to the past. The growth of the economies in emerging markets offers interesting private equity opportunities. Table 3.3.1 shows an overview of the peers that mention something about investing more or less in emerging markets. Most peers state that they will increase their investments in emerging economies. Therefore we conclude that institutional investors increase their exposure to emerging markets.

Second, we look at the peer statements about their exposure to buyout or venture funds. We summarize our findings in Table 3.3.2. We find that most peers state that they will invest more in buyout funds because of "strategic reasons" and arguments of scale. Both Partners Group and Government of Singapore Investment Corporation mention that they focus more on mid-market Buyout than large cap due to price reasons or the financial crisis which causes a decrease in (investment wise interesting) large cap deals. Overall we conclude that institutional investors increase their exposure to buyout funds.

⁴³ BRIC stands for Brazil, Russia, India, and China; four of the most emerging markets in the world.

Third, we present in Table 3.3.3 statement of peers about the number of GP relationships that they want to maintain. Institutional investors invest in multiple GPs for diversification purposes, but too many relationships ask for a large amount of resources and could influence the quality of the relationship. To illustrate, investors with a large share in the GPs fund have for example better fee terms or the first right to receive a co-investment opportunity. It is this trade-off that we investigate among the peers. We find that all peers that mention something about the number of GP relationship state that they will decrease the number of relationships. Therefore we conclude that the number of GPs in an institutional investor's portfolio is decreasing.⁴⁴

⁴⁴ Fimeris, a private equity advisory company, finds in a survey among 113 institutional investors that LPs *increased* the number of GP relationships in 2011 (Fimeris, 2011). An explanation for the fact that our conclusion is opposite of to theirs could be the different sample of investors analyzed. The institutional investors in our sample are in business for quite some years (on average 24), while the sample of Fimeris also include institutional investors that have allocated to private equity for a smaller number of years and might still have been building up their portfolios in 2011. This could cause an increase in the number of GP relationships.

Investing in Emerging Markets	Remarks (if any)
More in Emerging Markets	
Government of Singapore Investment	"GIC SI predicted slower growth of mature economies in the next ten years, and so would be looking to increase its investments in
Corporation	emerging economies [such as China, India and South America]"
AXA Private Equity	
ATP Private Equity Partners	
Adams Street Partners	
Partners Group	"With regards to Asia and the emerging markets, Partners Group retains a positive outlook on family-backed small- and medium-sized
	businesses with a special emphasis on Latin America due to attractive valuations and growing demand for private equity."
CPP Investment Board	"In Q2 2008, CPPIB announced that it was looking to increase its exposure to Asia and planned to begin making private equity
	investments in India."
CalPERS	"[] keen to gain increased exposure to the Indian private equity market."
CalSTRS	"[] looking to increase investments into emerging markets more generally."
Harvard Management Company	
Hamilton Lane	The firm developed a new strategy for Asia Pacific investments in 2006 in order to increase its exposure to the region. In September
	2011, Hamilton Lane announced that it was planning to open a new office in Rio de Janeiro, Brazil.
More in Developed Markets	
Princeton University Investment Company	"[] disappointed by the returns generated by investment in Latin America in 2008 and consequently is cautious of investing in that
	region"
	Invests predominantly in Venture and Buyout in US, increasingly European Buyouts, Asian Venture, no Africa. Yale dropped out of a
Yale University Endowment	Venture GP because "Yale had complained that the venture firm had been placing pressure on some of its returning LPs to invest in its
	funds focusing on emerging markets."
CDP Capital - Private Equity Group	"[] expected to hire up to 10 new staff members in the coming year as it was looking to increase its investments in the local (i.e., US)
	region."
Northwestern Mutual Life Insurance Company	"[] unlikely to invest in regions such as Latin America, Africa, and the Middle East."

Table 3.3.1: Overview of institutional investors investing more or less in emerging markets.

Investing in buyout funds	Remarks (if any)
More in buyout funds	
AXA Private Equity	
ATP Private Equity Partners	
Partners Group	"[] price-wise, the mid-market is more attractive than the large cap end of the market."
HarbourVest Partners	
CPP Investment Board	"Given our scale, fund investments are primarily in large and mid-market buyouts rather than early stage or venture capital."
Government of Singapore Investment	"[] due to strategic reasons it would avoid venture." "Due to the financial crisis it would be committing less to mega-cap buyout
Corporation	funds."
Kuwait Investment Authority	
Hamilton Lane	"Hamilton Lane has typically had a primary focus on buyout funds; it has a strong preference for these and invests around 80% of its
	total assets under management within this fund type."
Less in buyout/ More in venture funds	
Princeton University Investment Company	

Table 3.3.2: Overview of institutional investors investing more or less in buyout funds.

Number of GP relationships	Remarks (if any)
More GP relationships	
N/A	
Less GP relationships	
Harvard Management Company	"[] more selective in its future private equity investments"
Princeton University Investment Company	"[] this will enable it to create better, stronger relationships with relatively fewer managers."
Yale University Endowment	"[] expects to make several investments with the same fund manager."
CalPERS	"[] concentrate on investments with the best performing managers in its portfolio and also seek to streamline its portfolio. Its number of GP relationships until mid 2012 is expected to remain the same." In July 2011 CalPERS "planned to reduce the number of funds it invests in."
CalSTRS	"[] reduce the number of active GP relationships it held but would remain open to new and perhaps less traditional investment opportunities."
Government of Singapore Investment Corporation	"Despite maintaining its interest in private equity, it anticipated decreasing its pool of GP relationships by 2012."

Table 3.3.3: Overview of institutional investors increasing or decreasing the number of GP relationships.

Finally we come across statements of peers about the outlook of private equity as an asset class. Yale University Endowment is positive: "It feels that private equity is an integral part of its investment policy and as such it will be looking to invest further in the asset class when opportunities arise". South Carolina Retirement Systems and Kuwait Investment Authority state that they will increase their allocation to private equity.

Harvard Management Company is less positive about private equity: "We have reservations about the asset class. Our expectations for private equity are that returns will be more muted going forward, and we are even more committed to holding our fire for the best-in-class opportunities". MetLife insurance company plans to continue to actively invest in private equity vehicles, but "put greater emphasis on due diligence when investing". CalSTRS plans to gradually decrease its allocation to private equity, "following the financial crisis and the denominator effect pushing CalSTRS to be over allocated to the asset class". In addition, Princeton University Investment Company also plans to decrease its allocation to private equity.

We conclude that the outlook for private equity differs per peer. The financial crisis puts more pressure on LPs to make wise long term investment decisions. Apparently, there is no uniform investment strategy to react to the crisis. Some peers react by allocating less to private equity and more to less risky investments, while others belief in the long term performance of private equity and maintain or even increase their allocation to it.

3.3.2 Private equity performance of institutional investors per product

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3.3.3 Private equity performance of institutional investors per region and stage

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3.4 Conclusions

In Chapter 3 we analyzed peers of PGGM PE. We split our peer analysis in two parts. In the first part we analyze the investment strategies of 25 other institutional investors in a qualitative way. The second part is a more thorough quantitative analysis of a subsample of eight peers. These peers sent us their investment data from their first investment to (and including) vintage year 2006. We analyzed this data to find the performance per product, region, and stage.

Although the outlook of private equity differs across institutional investors, we observe three trends among peers; (1) institutional investors increase their exposure to emerging markets, (2)

institutional investors increase their exposure to buyout funds, (3) the number of GPs in an institutional investor's portfolio is decreasing.

With regard to product strategy, we see that for a subsample of eight peers fund investment performance is more or less equal across institutional investors whereas the direct and co-investment performance differs more from peer to peer. The secondary investment performance is overall the highest and stable across peers. These results imply that fund investment contribute to a successful investment strategy for long term private equity investors, as the performance is fairly stable across peers. Direct and co-investments vary across peers, implying that selection skills are required in order to invest in the best opportunities. Expertise and good relationships to source the best deals are key issues. If those are in place, direct and co-investments could potentially yield high returns. Secondary investments are high and stable, and could therefore contribute to a successful investment strategy. Nevertheless, secondary investments are according to literature and private equity experts complex and require expertise and experience. This might explain why not all institutional investors in our sample include secondaries in their investment strategy.

With regard to which region and stage the peers make their investments in, we see that the European peers commit more to European funds than their US counterpart. In general, buyout fund investments yield higher returns than venture fund investments. We find that Europe Buyout, US Buyout, and US Venture contribute most to the overall fund performance of the peers.

We do want to stress that we only assessed the *returns* of the other institutional investors. In other words, we have disregarded the risk component of the risk-return tradeoff. This has impact on the interpretation of the results. For example, for some peers co-investment returns exceed their fund returns. Should institutional investors thus focus on co-investments? It could be the case (see Section 4.4.2) that co-investments are riskier than fund investments. Maybe, the risk-adjusted return of fund investments is more attractive than of co-investments. Similarly, secondary investments are quite stable across peers. Did they do equally well? It could be the case that one peer took more risk to achieve the same performance. In that case, risk-averse investors would not prefer that peer's strategy based on the risk-return tradeoff. Since we only measure return in this thesis, we have to be cautious in our conclusions concerning performance.

In this chapter we presented our empirical findings of institutional investors' investment strategies and their performance. We therefore answered our Question 2 here.

4. Co-investment strategies

In Chapter 3 we observed that the performance of co-investments exceeded the performance of fund investments. In this chapter we want to find out why. Unlike for fund investments, institutional investors usually do not have to pay any management fees or carried interest for co-investment. If an institutional investor does not have to pay these fees, then it has fewer costs and more profits, resulting in higher returns on investment. Therefore, we test in this chapter whether management fees explain the difference between fund and co-investment performance and to what extent.

We do this by modeling cash flows and adding artificial fees to them. In Section 4.2 we present our model with hypothetical, plain cash flows. In Section 4.3 we show the same model but now with the real-life cash flows. Finally, in Section 4.4 we test whether two other factors – management selection and risk premium – contribute to the difference between fund and coinvestments performance.

First, we show in Section 4.1 in more detail what the differences are between co-investment and fund investments based on descriptive statistics. This offers insights into why co-investments perform better than fund investments, before we analyze what the impact of management fees is on co-investment performance.

4.1 Co-investment versus fund investment performance

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4.1.1 The impact of co-investments

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Concluding, the performance of the funds with co-investments is higher than of the funds without co-investments. Co-investments hence have a positive impact on the combination of fund and co-investment performance. In the rest of this chapter we analyze possible explanations for the fact that co-investments yield higher returns than fund investments.

4.1.2 Invested capital versus proceeds

Another interesting aspect to analyze is the ratio of invested capital versus proceeds (gained capital) for co-investments. Proceeds are the cash distributions to an investor. We find an answer to the question "what percentage of the capital invested yields the top x % of the proceeds?". We

compare this with the ratio for funds investments in order to formulate a view about selecting the 'winners' or avoiding the 'losers' for co-investments. Appendix XI provides some more tables and support for the analysis in this section.

Literature suggests that in direct venture capital investments, a fraction of capital invested realizes a significant percent of the proceeds (Brandis, 2010). Hence, venture capital is about selecting the winners. We want to test if this also holds for co-investments. Therefore, we analyze the invested capital and proceeds of co-investments as follows. First, we make eleven performance categories: '0-1x', '1-2x', ..., '9-10x', '>10x'. We then assign the co-investments to a category based on the Money Multiple of the co-investment. For example, we assign a co-investment with Money Multiple 1.45x to category '1-2x'. Next, we sum per category the invested capital and the proceeds, and calculate their relative weight and cumulative value.

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4.1.3 Conclusion

In this section we compared the performance of fund investments with co-investments.

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Next, we looked at the ratio between invested capital and proceeds. We found that coinvestments have a large downside risk while their high upside potential is limited. Hence, we conclude that for co-investments it is preferable to avoid losers more than to select winners.

4.2 Management fees: the model

In the remainder of Chapter 4 we test how the difference between co-investments and fund investments could be explained, and to what extent. We use the findings to answer our Question 3.

An obvious difference between fund investment and co-investment performance is driven by the lack of fees for co-investments. In most cases, the LP does not have to pay management fees or carry to the GP for co-investments (Fenn *et al.*, 1995).

We apply a two-step method in order to determine the impact of fees on co-investment performance. First, we make a fee model to find out how relevant parameters influence the difference between gross and net (of fees) performance.⁴⁵ This model is constructed as a hypothetical approach using fee and carry assumptions that are common for fund investments. We use the model to see what would happen with the co-investment performance if we add for example a management fee of 2.0%. We run several scenarios to find out the sensitivity of the difference between gross and net performance.

The second step is to include a standard waterfall structure in a sample of real-life co-investments. In this way, we could see how fees affect actual co-investment performance. We present our findings of actual cash flows in Section 4.3.

Another way of analyzing the differences between fund and co-investment performance would be to extract fees of fund investments and compare gross fund performance with gross coinvestment performance. However, we feel that comparing net-net by adding fees to coinvestments is the better alternative. Extracting fees of fund investments would be complex due to the carry payments. Carry is dependent of being in or out of the money (because of the hurdle rate) and is therefore hard to determine with hindsight for available data.

4.2.1 Input parameters

In our model we use parameters that are common practice for compensation in fund investments. Both academics (e.g., Gompers & Lerner, 1999; Cheffins & Armour, 2007; Lerner *et al.*, 2007 and Phalippou, 2009b) and practitioners (e.g., Watson Wyatt, 2009; The Economist, 2011) mention typical management fees of 2% and performance fees ("carry") of 20% above a target of 8% IRR. These values are part of a so-called 'standard waterfall structure'. The term 'waterfall' refers to the sequence in which proceeds from the sale of portfolio companies are distributed. We explain the waterfall structure in more detail in Appendix XII.⁴⁶

Our model allows us to tune the relevant parameters in order to investigate the influence on the difference between gross and net performance. After setting the parameters, the model automatically calculates the gross and net IRR and gross and net Money Multiples. The model does this by (in succession) calculating the invested capital, management fees, discount factor, carry after IRR hurdle, catch up, and eventually IRRs and Money Multiples. Table 4.2.1 presents the parameters that we use to model the hypothetical cash flows.

⁴⁵ 'Gross of fees' means excluding the fees, whereas 'net of fees' means including the fees.

⁴⁶ For more information about the compensation structure in private equity, we would like to refer to Phalippou (2009b, pp. 471-472), which presents a comprehensive overview of the typical terms and conditions in a private equity limited partnership agreement.

Parameter	Value used	Formula used
Committed capital	25,000	
% of commitment invested	100%	
Invested capital	25,000	= 25,000 * 100%
No of deals	1	
Invested per deal	25,000	= 25,000 / 1
Exit amount	< <confidential>></confidential>	
IRR		
Holding period	5 years	
Other costs	0	
Carry	20.0%	
Hurdle	8.0%	
Catch up (yes/no)	yes	
Catch up rate	100%	
Management fee	2.0%	

Table 4.2.1: The parameters and values used as standard values for the sensitivity analysis.

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The management fees are 2.0% over the entire period. Furthermore, the carry is 20%, with a catch up⁴⁷ rate of 100% if the investment yields an IRR higher than the hurdle rate of 8%. We set other costs to zero but could include administrative costs, for example during due diligence.

4.2.2 Model assumptions

Our model assumes a simplified cash flow structure; one cash outflow and one cash inflow. Both cash flows occurred at the first day of the year, and there is exactly five years between them. There are no other cash flows involved and there is only one exit. We use an initial cash outflow of 25,000 although the exact amount does not influence performance (therefore no currency needed to be added).

In co-investments, it is not common practice to *commit* capital. Instead, capital is directly invested. Therefore, we set that committed capital is equal to invested capital (in other words, 100% of

⁴⁷ Once the GP provides its LPs with their preferred return (i.e., the hurdle rate), if any, it then typically enters a catch up period in which the GP receives the majority or all (in case of a catch-up rate of 100%) of the profits until the agreed upon profit-split, the carry, is restored.

committed capital is invested). In order to calculate committed capital and invested capital, we sum all cash outflows over the entire period.

We calculate the carry in this model based on one investment. This is in practice often referred to as 'American waterfall' (Watson Wyatt, 2009; Fraser-Sampson, 2010). For the purpose of better aligning the interest of LP and GP, the European waterfall is an alternative (Watson Wyatt, 2009). In a European waterfall, all invested capital in a fund (from all company investments) and preferred return (hurdle rate) should be first returned to the LP, before the GP receives carry over the excess profits. In the American waterfall the GP can earn carry when one investment did well and hit the hurdle rate, irrespective of the performance of its other investments. As we include only one investment in our model, we inherently apply the American waterfall.

4.2.3 Output

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4.2.4 Conclusion

The results of the sensitivity analysis show that although management fees have a proportional contribution to the wedge, carry has a large impact on the wedge between gross and net IRR, especially when the investment has a high gross IRR. In the next section we add standard waterfall terms to the actual co-investments. Therefore we expect that co-investments with a large gross performance would be influenced most by the inclusion of management fees and carry.

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4.3 Management fees: real-life cases

In this section we explain how we apply the standard waterfall structure to actual, real-life coinvestment cash flows of Investor. For this we use the same model as discussed in Section 4.2, but now we replace the hypothetical plain cash flows for actual cash flows. In this way, we could see how fees affect actual co-investment performance.

4.3.1 Input parameters

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4.3.2 Model assumptions

An inherent drawback of this method is that it is based on a number of assumptions that we have to make. For example, the cash outflows that we have at our disposal do not show whether they are costs (e.g., fees for the GP) or investments into underlying companies. We assume that all coinvestment cash flows are investments, and that no management fees have been paid for the coinvestment. This is in line with our earlier statement that LPs usually do not have to pay management fees or carry to GPs for co-investments. If, however, some cash outflows do represent costs or fees instead of investments, we underestimate the gross performance in our model. The 'true' gross performance would then be higher because fees which are now included would then be excluded, resulting in a higher gross performance figure. This would also result in a larger wedge between gross and net performance, because the wedge increases as gross performance increases (see Section 4.2).

Whereas the cash flows that we modeled in Section 4.2 were hypothetical and plain, actual cash flows are more complicated. For example, real cash flows do not occur every first day of the year but continuously throughout the year. Therefore, the timing of when to add management fees is complex. Furthermore, for co-investments there is often not one cash outflow and one cash inflow (as we modeled) but multiple cash in- and outflows. LPs for example might invest the capital in tranches at certain milestones to spread risks. In addition, cash inflows can also be dividend that is distributed to the investors.

We adjust our model to address these issues. For example, we need to allocate management fees to existing cash flows because the alternative (create new cash flow dates for management fees) would be too time consuming and error-prone. Therefore, we decide to allocate management fees to the first cash flow and thereafter to the cash flow closest to the first cash flow plus one year etc. If no cash flow occurs for n years, then n management fees are added to the last cash flow before the 'gap'. This could overestimate the impact of management fees on IRR. Furthermore, we decide to calculate management fees as a percentage of committed capital for the entire investment period. This is in contrast with the standard waterfall that calculates management fees for the divestment period (after five years) as:

management fees_{divestment_period} = *min*{fee percentage * committed capital; fee percentage * invested capital}

Because for co-investments we assume that committed capital is equal to invested capital (see Table 4.3.1), the adjustment above does not differ much from our hypothetical model. The only difference occurs when additional capital is invested *after* the investment period (i.e., in the

divestment period). If that is the case, then we add a too large amount of fees in our real-life model. This implies a slight overestimation of the wedge between gross and net performance. However, we do not find many investments in which this was the case because most co-investments are exited within five years.

The American waterfall that we discussed in Section 4.2 is also applied to the real-life cases model. Also the calculation of committed capital (sum of all cash outflows) is the same as we did in Section 4.2.

Another drawback, which is already discussed in Chapter 2, is the estimation of the Net Asset Value (NAV) of the unrealized investments. If the NAV would be overestimated by Investor, the gross IRR would be lower resulting in a smaller wedge. The opposite holds if the NAV would be underestimated. To mitigate this drawback, we include only co-investments in and before vintage year 2006, so that the influence of NAV on total performance is smaller.

4.3.3 Output

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4.3.5 Conclusion

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Therefore we conclude that management fees and carry explain the difference in performance between fund and co-investments.

4.4 Other factors

4.4.1 Management selection

In the previous section we stated that the inclusion of fees in co-investments entirely explained the difference between fund and co-investment performance. In this section we qualitatively explore two other factors that could contribute to this difference in performance.

First, co-investments could perform better than fund investments because the LP is able to select the top co-investments. We call this factor 'management selection'. It could be that the team that does the co-investments makes better investment selections than the fund investment team.

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Because we do not find significant differences in management selection for fund and coinvestments, we conclude that management selection does not have a large contribution to the difference between fund and co-investment performance. Future research could study management selection quality in more depth, for example by comparing the performance of investments that the LP accepted and refused.

4.4.2 Risk premium

The second factor that could contribute to this difference in performance between fund and coinvestments is risk premium. Risk premium is the amount by which the risky asset's expected return must exceed the risk-free return in order to make the risky and risk-free assets equally attractive. The riskier the asset, the higher the expected return has to be in order to induce investors to hold that asset (Varian, 1992). Let R_a denote the return on asset *a* and R_0 the risk-free return. The risk premium for asset *a* is then defined as (Varian, 1992):

risk premium for asset $a = \overline{R_a} - R_0$

The right-hand side of the equation is generally defined as the excess return, where $\overline{R_a}$ is the expected return on asset *a*.

Many academic papers about (risk) premium compare private equity to public equity and hence do not scrutinize the difference in risk premium within private equity (e.g., the difference in risk premium for fund and co-investments). For example, Moskowitz & Vissing-Jørgenson (2002, p. 746) states that the higher risk from a lack of diversification of private equity "should lead to a higher private equity premium than that on public equity". Based on their literature review, the authors cite (for simplicity) ten percent as the premium required to induce investors to hold private equity. In addition, Ljungqvist & Richardson (2003) uses Fama and French's five-year CAPM estimates of industry betas and industry risk premia⁴⁸ to estimate funds' portfolio betas and portfolio risk premia. The authors find that private equity generates excess returns on the order of five plus percent per annum relative to the aggregate public equity market.

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⁴⁸ Industry risk premia are industry betas times the equity risk premium

To conclude, we state that the risk premium for co-investments is higher than for fund investments. Assuming that the risk-free rate is equal for fund and co-investments, and given the equation above, we argue that the risk premium contributes to the higher average return of co-investments, although we do not know to what extent.

4.5 Conclusions

Chapter 4 focused on the difference in return between fund and co-investments. In this chapter we aimed to solve Question 3.

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We subsequently test three factors that could explain this difference; (1) (the lack of) management fees and carry for co-investments, (2) management selection, and (3) risk premium.

To test the impact of hypothetical management fees on the performance of co-investments, we first construct a model. We insert standard management fees and carry in plain cash flows to see how it affects IRR and Money Multiple. Our model allows us to tune a set of parameters, such as the gross IRR, management fee percentage, and carry percentage. We run analyses to test the sensitivity of these parameters. We find that gross performance and carry are of major influence on the difference between gross and net performance ('the wedge').

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We then insert artificial management fees and carry to real-life Investor cash flows in our model. After this, we calculate the performance of the co-investments, but now with fees.

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We conclude that management fees explain the difference between fund and co-investment performance. However, it is hard to determine the precise difference because it is not (exactly) known if and how much fees are paid for co-investments Furthermore, the used model assumption could have biased the difference somewhat.

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Other factors also contribute to the difference between fund and co-investment performance. Based on our analysis, we assume that management selection (i.e., selecting the best coinvestments) contributes to the difference. Furthermore, we have reasons to believe that coinvestments are riskier than fund investments. Hence we argue that the risk premium for coinvestment is higher than for fund investments, which in turn contributes to the difference between fund and co-investment performance.

In this section we mentioned a number of explanations why co-investments yield higher returns that fund investments. Therefore, we answered our Question 3 here.

5. Conclusions

This thesis aims to find what institutional investors' investment strategies have been successful and why. Insights into successful investment strategies can be adopted by PGGM PE in order to shape an appropriate investment strategy to correspond with their level of ambition and risk appetite. We answer our research questions in three parts. First, we investigated academic literature to find what other researchers conclude about the institutional investors' investment strategies and their performance. Second, we analyzed the investment data of peers of PGGM PE empirically to find what investment strategies have been successful. Third, we zoomed in on the co-investment strategies to explore why co-investments yield higher returns than fund investments.

5.1 Literature conclusion

Literature acknowledges the significant role of institutional investors in the private equity industry as being the largest fund investors. Institutional investors, like banks, pension funds, endowment funds, and investment companies, differ in sophistication and investment strategies. Based on our literature review, investment strategies of private equity institutional investors roughly consist of a combination of three elements: (1) product, (2) region, and (3) stage, as is shown in Table 5.1.1. Product refers to the way that the investor invests, region refers to the target location of the investment, and stage refers to the maturity of the company in which the investor can ultimately invest.

Product	Region	Stage
Fund investments	Asia-Pacific	Venture
Fund-of-funds investment	Europe	Buyout
Co-investment	US	Growth
Direct investment	Rest of the world	Special Situations
Secondary investment		Other

Table 5.1.1: Framework of an institutional investors' investment strategy.

We search literature per sub-element of Table 5.1.1 to find out how it affects the performance of an institutional investor in private equity. We find a number of performance determinants. For example, literature suggests that investments in larger funds yield higher performance, venture funds witness a lower performance, and more experienced investors do better (but not significantly). Nevertheless, literature mostly scrutinizes the performance (drivers) of private equity *funds* and institutional investors' *fund investments*. Not much academic attention has been dedicated to private equity strategies at *institutional level* that could help us to find the success of institutional investors' investment strategies. Therefore, we find it hard to draw strong conclusions about this based on literature. This paper aims to expand literature by evaluating multiple elements of institutional investment strategies and their performance (determinants).

Although we acknowledge the fact that risk is an important aspect in the private equity performance evaluation of institutional investors, we choose not to investigate the risk component of the risk-return tradeoff in further detail due to its strong dependence on certain assumptions. To assess the performance of institutional investors, we adopt IRR and Money Multiple in our analysis, in accordance with most academic literature and standard practice.

5.2 Peer analysis conclusion

In order to find institutional investors' investment strategies and their performance, we split our peer analysis in two parts. In the first part we analyzed the investment strategies of 25 other institutional investors in a qualitative way. The second part is a more thorough quantitative analysis of a subsample of eight peers. At our request, these peers sent us their comprehensive investment data from their first investment to (and including) vintage year 2006.

Although the outlook of private equity differs across Limited Partners (LPs), we observe three trends among peers; (1) institutional investors increase their exposure to emerging markets, (2) institutional investors increase their exposure to buyout funds, (3) the number of General Partners (GPs) in an institutional investor's portfolio is decreasing.

Furthermore we see that for our subsample of peers, fund investment performance is more or less equal across LPs whereas the direct and co-investment performance differs more from peer to peer. The secondary investment performance is overall the highest and stable across peers.

With regard to in which region and stage the peers make their investments, we see that the European peers commit more to European funds than their US counterpart. In general, buyout fund investments yield higher returns than venture fund investments. We conclude that Europe Buyout, US Buyout, and US Venture contribute most to the overall fund performance of the peers.

5.3 Co-investment strategies conclusion

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We subsequently test three factors that could explain this difference; (1) (the lack of) management fees and carry for co-investments, (2) management selection, and (3) risk premium.

To test the impact of management fees on the performance of co-investments, we first construct a model. We insert standard management fees and carry in plain, hypothetical cash flows to see what happens to the IRR and Money Multiple. We find that gross performance and carry are of major influence on the difference between gross and net performance.

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We subsequently insert artificial, standard management fees and carry to *real-life* cash flows in our model. After this, we calculate the performance of the co-investments, but now with fees.

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To conclude, we find that the difference between gross (without fees) and net (with fees) coinvestment performance is grosso modo the difference between fund and co-investment performance. Hence we conclude that management fees explain the difference between fund and co-investment performance. However, it is hard to determine the precise difference because it is not (exactly) known if and how much fees are paid for co-investments. Furthermore, the used model assumption could have biased the difference somewhat.

Other factors also contribute to the difference between fund and co-investment performance. Based on our analysis, we assume that management selection (i.e., selecting the best coinvestments) contributes to the difference. Furthermore, we have reasons to believe that coinvestments are riskier than fund investments. Hence we argue that the risk premium for coinvestment is higher than for fund investments, which in turn contributes to the difference between fund and co-investment performance.

6. Discussion and interpretation

Based on our findings and conclusions, we formulate some theoretical and managerial implication.

6.1 Theoretical implications

Our paper extends literature for a number of reasons. We are the first academics – as far as we could verify – that construct and analyze a dataset consisting of private equity investment data of multiple institutional investors for other products than fund investments. This dataset gives us the opportunity to analyze the investment strategies of a number of peers. Second, our analysis is based on real investment data as opposed to simulated returns or private equity database data. One major advantage of our dataset is that we do not have to rely on simulation assumptions or data derived from databases that demonstrably disclose incomplete and incorrect data about past investments. Instead, we have the *actual investment data* under the condition of confidentiality, thus we believe that the data are complete and correct, and selection bias is limited. Third, our dataset includes detailed cash flow information which allows for the calculation of a number of different performance measures and a combination of different cash flows (e.g., co-investment cash flows combined with fund investment cash flows).

In order to find the difference between fund and co-investment performance, we compare net fund investment performance to net co-investment performance. The latter we model ourselves by adding management fees according to the standard waterfall structure to the gross coinvestment cash flows. We make two assumptions here; (1) the gross co-investment cash flows are actually gross (i.e., no management fees or carry have been paid) and (2) the standard waterfall fee structure has actually been applied to the fund investments as well. Only if these two assumptions hold, we can make a fair comparison between net fund investment and net coinvestment performance. A method to resolve this issue would be to compare gross fund investment performance to gross co-investment performance. In this case, one does not compare the return an institutional investor actually gains (because the investor still has to pay management fee and carry) but what the gross performance of the investment is at GP level. A disadvantage of this method is that one does not know what fee structure is actually applied to the fund investments (and perhaps to the co-investments) and thus do not know how much of gross distributions remain in net distributions. It would be better to have a combination of gross and net cash flows to mitigate the issues addressed above. Since we do not have gross cash flows, we feel that our best way forward is to use net cash flows and add standard management fees to

them to find the net cash flows and net performance. Future research could make a gross-togross comparison between fund and co-investment performance.

In Section 4.4.1 we discussed management selection as a contributor of the difference between fund and co-investment performance. Although we showed what the committed capital of Investor is per co-investment performance quartile, it would be more interesting to see which coinvestment opportunities Investor refused. However, we do only have insight in the coinvestments that Investor accepted (i.e., invested in) and do not know which opportunities they declined. If we would also have that information, than we could make a comparison between the performances of the co-investments they made and of the co-investments they refused. If the former is significantly larger than the latter, we could conclude that Investor has the ability to select the better performing co-investments. Future research could investigate this, although it would be difficult to know which specific co-investments investors declined and how they eventually have performed.

Lossen (2006b), which investigates the portfolio strategies of GPs, also analyzes a number of external factors that influence the expectations and preferences of GPs during fund formation. The author discusses the rate of return of the MSCI World Index during fundraising, annual rate of return of the MSCI World Index during investment period, new funds raised in vintage year, firm internationalization, firm experience, fund size, location of GP's headquarters, and fund type as external factors. Not all factors are also relevant for institutional investors, but future research could analyze what the impact of external factors is on decision making with respect to investment strategy.

In our study we excluded vintage years after 2006 because otherwise the performance of investment would be biased by the significant amount of Net Asset Value.⁴⁹ In the future, our analysis could be repeated for later vintage years as well. We expect that the overall performance of private equity would be lower compared to our findings, because we think that the current financial crisis negatively impact private equity performance.⁵⁰

⁴⁹ Similarly, as we explained in Section 2.2.1, the Residual Value to Paid In substantially corresponds to the Money Multiple in the equation Money Multiple = (Distributed to Paid In) + (Residual Value to Paid In).

⁵⁰ As we explained in Section 2.5.1, literature suggests that private equity returns have correlation with public market return (since historic private equity beta is close to one). Because the public markets after vintage year 2006 are performing badly, we think that the same hold for private equity.

Furthermore, it would be interesting to explore the generality of our results. Other institutional investors (both in name and type) could be analyzed in order to increase the sample size and find more and stronger evidence for the success of institutional investors' investment strategies.

6.2 Managerial implications

Our findings and conclusions have several implications for PGGM PE, the principal of our research, and other institutional investors. First, because of the confidential nature of private equity peer analysis on institutional level is scarce. This study presents a number of findings about the investment strategies of peers which can be used by institutional investors to benchmark themselves against their peers.

First, it is important to realize that we only evaluated the return side of performance. In other words, we have disregarded the risk component of the risk-return tradeoff. This has impact on the interpretation of the results presented in this thesis. For example, for some peers co-investment returns exceed their fund returns. Should institutional investors thus focus on co-investments? It could be the case (see Section 4.4.2) that co-investments are riskier than fund investments. Maybe, the risk-adjusted return of fund investments is more attractive than of co-investments. Similarly, secondary investments are quite stable across peers. Did they do equally well? It could be the case that one peer took more risk to achieve the same performance. In that case, risk-averse investors would not prefer that peer's strategy based on the risk-return tradeoff. Since we only measure return in this thesis, we have to be cautious in our conclusions concerning performance.

In this paper we also show that co-investments yield higher returns on average than fund investments.

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Based on this, we expect that institutional investors are eager to co-invest alongside a GP. We also find that the net performance of co-investments is roughly equal to the net performance of fund investments. Therefore we conclude that the difference between fund and co-investments can be explained by the lack of management fees and carry in the case of co-investments. This implies for institutional investors that performance wise they should negotiate to co-invest alongside the GP only if the co-investment is on a no-fee no-carry basis.

In Section 4.1.2 we showed that co-investments have a large downside risk while their upside potential is limited. Hence, we conclude that for co-investments it is preferable to avoid 'losers' more than to select 'winners'. However, we could not find significant evidence for a common denominator of loser co-investments, so we cannot draw any conclusions about how to avoid losers in general. We therefore recommend PGGM PE to put extra emphasis on this issue during their due diligence on the co-investment opportunity.

We also observe a trend among institutional private equity investors that they will decrease the number of GP relationships in the future. Assuming that they maintain their absolute allocation to private equity⁵¹, this implies that they will increase their commitment per GP. If an institutional investor has a larger share in a fund because of its larger commitment (assuming average fund size stays equal), it is likely to have more co-investments rights. The number of co-investments that arise from a fund is limited. In general, the GP contacts the institutional investor with the highest stake in the fund first if a co-investment opportunity arises. If peers commit more to one fund and one investor does not, then its share in the fund relative to other investors decreases (ceteris paribus). The result might be that that investor has lesser co-investment rights, hence (1) has less often the opportunity to co-invest and (2) gets offered lower quality co-investments because the better ones are already claimed by other investors who are higher in 'hierarchy'. We therefore argue that institutional investors who are keen to make co-investments should keep track of their co-investment rights compared to other investors in the fund.

Finally, with regard to the products of institutional investors, we see that fund investment performance is more or less equal across institutional investors whereas the direct and co-investment performance differs more from peer to peer. The secondary investment performance is overall the highest. These results imply that fund investment contribute to a successful investment strategy for long term private equity investors, as the performance is fairly stable across peers. Direct and co-investments vary across peers, implying that selection skills are required in order to invest in the best opportunities. Expertise and good relationships to source the best deals are key issues. If those are in place, direct and co-investments could potentially yield high returns. Secondary investments are high and stable, and could therefore contribute to a successful investment strategy. Nevertheless, secondary investments are according to literature and private equity experts complex and require expertise and experience. This might explain why

⁵¹ In our sample, we find that a majority of the LPs is likely to maintain or increase its private equity allocation (see Section 3.3.1)

not all institutional investors in our sample include secondary investments in their investment strategy.

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Appendix I: Glossary of used terms

In this section we provide definitions of the key concepts that are used in this thesis. Less frequently used terms are explained in footnotes throughout the thesis. We gratefully use many definitions provided by the European Venture Capital Association (EVCA).

Asset class

A category of investment, which is defined by the main characteristics of risk, liquidity and return (EVCA, 2012).

Buyout

A buyout is a transaction financed by a mix of debt and equity, in which a business, a business unit or a company is acquired with the help of a financial investor from the current shareholders (the vendor) (EVCA, 2012).

Buyout fund

Funds whose strategy is to acquire other businesses; this may also include mezzanine debt funds which provide (generally subordinated) debt to facilitate financing buyouts, frequently alongside a right to some of the equity upside (EVCA, 2012).

Carried interest

A share of the profit accruing to an investment fund management company or individual members of the fund management team, as a compensation for the own capital invested and their risk taken. Carried interest (typically up to 20% of the profits of the fund) becomes payable once the limited partners have achieved repayment of their original investment in the fund plus a defined hurdle rate (EVCA, 2012).

Co-investment

Private equity co-investment is the process of simultaneous investment in portfolio companies by a limited partner (LP) alongside funds managed by a general partner (GP). Hence an LP has not only a commitment to the GP's fund but also a direct investment in a portfolio company on the same terms as the GP's fund. (Beaton, A. & Smith, D., Capital Dynamics, 2011) Thus, in this definition co-investment is not directly investing with other investors but alongside the GP of the fund already invested in.

Commitment

A limited partner's obligation to provide a certain amount of capital to a private equity fund when the general partner asks for capital (EVCA, 2012).

Direct investment

Investment in an investee company.

Distribution

The amount disbursed to the limited partners in a private equity fund (EVCA, 2012). Also referred to as proceeds.

Fund investment

Commitment by an investor to new funds (Fraser-Sampson, 2010). A private equity investment fund is a vehicle for enabling pooled investment by a number of investors in equity and equity-related securities of companies (investee companies). These are generally private companies whose shares are not quoted on any stock exchange. The fund can take the form either of a company or of an unincorporated arrangement such as a limited partnership (EVCA, 2012).

Fund-of-funds investment

Commitment by an investor to a fund that takes equity positions in other funds (EVCA, 2012).

Fund size

The total amount of capital committed by the limited and general partners of a fund (EVCA, 2012).

General Partner (GP)

A partner in a private equity management company who has unlimited personal liability for the debts and obligations of the limited partnership and the right to participate in its management (EVCA, 2012).

Hurdle rate

A return ceiling that a private equity fund management company needs to return to the fund's investors in addition to the repayment of their initial commitment, before fund managers become entitled to carried interest payments from the fund (EVCA, 2012).

Inception

The starting point at which IRR calculations for a fund are calculated; the vintage year or date of first capital drawdown (EVCA, 2012).

Institutional investor

Institutional investors act as specialized investors on behalf of others. They pool large sums of money and invest those sums in investment assets, including private equity. Examples of institutional investors are pension funds, endowment funds, investment banks, insurance companies, and sovereign wealth funds (Fenn *et al.*, 1995; Gompers & Metrick, 2001). Fund-of-funds managers are with respect to this thesis regarded as institutional investors as well.

Internal Rate of Return (IRR)

In a private equity fund, the net return earned by investors from the fund's activity from inception to a stated date. The IRR is calculated as an annualised effective compounded rate of return, using monthly cash flows and annual valuations (EVCA, 2012).

Investment strategy

Plan of action consisting of strategic investment decisions designed to achieve a certain goal.

J-curve

The curve generated by plotting the returns generated by a private equity fund against time (from inception to termination). The common practice of paying the management fee and start-up costs out of the first drawdowns does not produce an equivalent book value. As a result, a private equity fund will initially show a negative return. When the first realisations are made, the fund returns start to rise quite steeply. After about three to five years the interim IRR will give a reasonable indication of the definitive IRR. This period is generally shorter for buyout funds than for early stage and expansion funds (EVCA, 2012).

Limited Partner (LP)

An investor in a limited partnership (i.e., private equity fund) (EVCA, 2012).

Limited partnership

The legal structure used by most venture and private equity funds. The partnership is usually a fixed-life investment vehicle, and consists of a general partner (the management firm, which has unlimited liability) and limited partners (the investors, who have limited liability and are not involved with the day-to-day operations). The general partner receives a management fee and a percentage of the profits. The limited partners receive income, capital gains, and tax benefits. The general partner (management firm) manages the partnership using policy laid down in a Partnership Agreement. The agreement also covers, terms, fees, structures and other items agreed between the limited partners and the general partner (EVCA, 2012).

Management fees

Fee received by a private equity fund management company from its limited partners, to cover the fund's overhead costs, allowing for the proper management of the company. This annual management charge is equal to a certain percentage of the investors' commitments to the fund (EVCA, 2012).

Private equity

Private equity provides equity capital to enterprises not quoted on a stock market in exchange for shares in the invested company. Private equity can be used to develop new products and technologies (also called venture capital), to expand working capital, to make acquisitions, or to strengthen a company's balance sheet. It can also resolve ownership and management issues. A succession in family-owned companies, or the buyout and buyin of a business by experienced managers may be achieved by using private equity funding (EVCA, 2012).

Money Multiple

A realisation ratio which is the sum of distributions to paid-in capital (D/PI) and residual value to paid-in capital (RV/PI). Money Multiple (also referred to as Total Value to Paid In) is net of fees and carried interest (EVCA, 2012).

Secondary investment

Ownership position in an existing fund which may or may not be fully invested, but has not been fully exited (Fraser-Sampson, 2010). An investment where a fund buys either, a portfolio of direct investments of an existing private equity fund or limited partner's positions in these funds. A secondary deal involving a funds' portfolio of companies that are relatively mature (five to seven

years old), with some exits already realized, but not all capital drawn down. The main interest for the buyer is to negotiate a potential discount on the fund portfolio (EVCA, 2012).

Venture capital

Professional equity co-invested with the entrepreneur to fund an early-stage (seed and start-up) or expansion venture. Offsetting the high risk the investor takes is the expectation of higher than average return on the investment. Venture capital is a subset of private equity (EVCA, 2012).

Vintage year

The year of fund formation and first drawdown of capital (EVCA, 2012).
Appendix II: Product overview



Figure II.1: Fund investment structure. This is often referred to as limited partnership structure. The Limited Partner (LP) invests in the fund that is managed by the General Partner (GP).



Figure II.2: Co-investment structure. The Limited Partner (LP) invests both in the fund and the company.



Figure II.3: Fund-of-funds investment structure. An investor invests in one or more funds of funds, that subsequently operate as Limited Partners themselves.



Figure II.4: Direct investment structure.



Figure II.5: Secondary investment structure. One Limited Partner (LP, see left-hand side) buys the shares in a fund from another LP.

Appendix III: Private equity product timing

The figure below shows an average fund life. In the first years, there are mainly investments (drawdowns) whereas in the last years there are mainly distributions. The cumulative cash flow has the shape of a "J"; the J-curve.

Point "A" indicates the point in time from when co-investments are offered to the institutional investors. The main reason then is that the ticket size (the investment size in the company) exceeds the maximum ticket size that the GP agreed with its investors. The additional capital is obtained from institutional investor who then co-invests along the GP.

Point "B" shows the point in time from when secondary investments are offered. Most of the investments have been done. For whatever reason (need for liquidity, over allocated to a certain region), an institutional investor wants to sell its interest in the fund to another private equity investor. The institutional investor needs to make an estimation for the value of the unrealized value in the fund and the amount it has to pay to acquire the secondary deal. Often a discount is offered to the acquirer.

Point "C" indicates another point in time where co-investments are offered to the institutional investors. In this case, the ticket size is larger than the capital left in the fund. If the GP wants to do the investments, he needs a co-investing institutional investor to collect the investment amount.



Figure III.1: An overview of a fund live.

Co-investments and secondary investments are offered to the institutional investors and therefore are 'passive' in the way that it is hard for the institutional investor to predict the opportunities and timing. Direct and fund-of-funds investments do not appear in Figure III.1 because the decision to do these investments can be made independent of a fund's life. Their timing of when to invest can be influenced by the institutional investor.

Appendix IV: Request for information

Your format may differ from the one below.

Part 1: cash flow level

Investment type	GP name	Fund name	Vintage year	Deal ID	Company name	Private/public	Cash in/ (out) (in currency)	Type of cash flow	[Liquidation date]	Date
	GP 1	Fund W	1985	F1985W- Q F1985W-	Company Q	Private	-6.251.000	Investment		1-1-1985
Fund investments	GP 1	Fund W	1985	R	Company R	Private	-1.687.670	Management fee		1-3-1985
	GP 2	Fund Y	1985	F1985Y-S	Company S	Public	-3.914.610	Carried interest		1-2-1985
	GP 3	Fund Z	1990	F1990Z-T	Company T	Private	4.957.062	Distribution		1-1-1990
	GP 4	Fund A	1993	S1993A-U	Company U	Private	4.170.645	Distribution		1-1-1993
Secondary investments	GP 5	Fund B	1998	S1998B-V	Company V	Private	14.828.458	Distribution		1-1-1998
secondary investments	GP 5	Fund B	1998	S1998B-V	Company V	Private	-618.813	Other		1-2-1998
	GP 6	Fund D	2003	S2003	N/A	Private	-937.600	Investment		1-1-2003
	N/A	N/A	N/A	D-W	Company W	Private	4.564.116	Distribution		1-1-1995
Disset investments	N/A	N/A	N/A	D-X	Company X	Private	9.295.703	Dividend		1-2-1995
Direct investments	N/A	N/A	N/A	D-X	Company X	Private	6.724.183	Other		1-3-1995
	N/A	N/A	N/A	D-X	Company X	Private	5.086.574	Rebalancing		1-4-1995
	GP 1	Fund W	1985	C1985W- Q	Company Q	Private	4.400.588	Dividend		1-2-1985
Co-investments	GP 8	Fund Q	1990	C1990Q-B	Company B	Private	22.041.553	Distribution		1-1-1990
	GP 9	Fund R	2000	C2000R-C	Company C	Private	-741.062	Management fee		1-1-2000
	GP 10	Fund S	2000	C2000S-D	Company D	Private	6.888.825	Distribution		1-2-2000

Investment type	GP name	Fund/ company name	Vintage year	Deal ID	Private/public	GP fund size or fund exposure	Capital committed
Fund investment	GP 1	Fund W	1985	F1985W-Q	Private	EUR/USD or %	EUR/USD
Fund investment	GP 2	Fund Y	1985	F1985Y-S	Public	EUR/USD or %	EUR/USD
Fund investment	GP 3	Fund Z	1990	F1990Z-T	Private	EUR/USD or %	EUR/USD
Secondary investment	GP 4	Fund A	1993	S1993A-U	Private	EUR/USD or %	EUR/USD
Secondary investment	GP 5	Fund B	1998	S1998B-V	Private	EUR/USD or %	EUR/USD
Secondary investment	GP 6	Fund D	2003	S2003	Private	EUR/USD or %	EUR/USD
Direct investment	N/A	Company W	N/A	D-W	Private	EUR/USD or %	EUR/USD
Direct investment	N/A	Company X	N/A	D-X	Private	EUR/USD or %	EUR/USD
Co-investment	GP 1	Company Q	1985	C1985W-Q	Private	EUR/USD or %	EUR/USD
Co-investment	GP 8	Company B	1990	C1990Q-B	Private	EUR/USD or %	EUR/USD
Co-investment	GP 9	Company C	2000	C2000R-C	Private	EUR/USD or %	EUR/USD
Co-investment	GP 10	Company D	2000	C2000S-D	Private	EUR/USD or %	EUR/USD

Part 2: aggregated fund level (/ company level in case of direct or co-investment)

Part 2: Continued

Invested capital gross	Total proceeds	Invested capital net	Unrealized value (FMV as of 30-6-2011))	Net IRR	Total Money Multiple	Stage	Region
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Venture Capital	US
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Buyout	Rest of World
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Other	Europe
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Buyout	Europe
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Special Situations	Europe
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Other	US
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	X	Venture Capital	US
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Buyout	Rest of World
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Buyout	Rest of World
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	х	Buyout	US
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	х	Other	Europe
EUR/USD	EUR/USD	EUR/USD	EUR/USD	%	x	Venture Capital	Europe

Appendix V: Sample statistics of total sample (N=25)

The total sample consists of the 25 peers that are presented in Table V.1. The distributions of the peers (in percentage of total peers) with respect to type and location of their headquarters are presented in Figure V.1 and Figure V.2. Most peers are fund-of-funds managers and have their headquarters in the US.



Figure V.1: Peers per type of investor.

Figure V.2: Peers per location of headquarter.

We present more statistics of the sample of peers in Table V.2 and V.3. Fund-of-funds have by definition a 100% allocation to private equity, otherwise they would be asset managers. Therefore, we do not include fund-of-funds allocation percentages to private equity in column 'Allocation to PE' in Table V.2. In addition, the table shows large differences between the minimal and maximal amount of assets under management and allocation to private equity.

Туре	Peers			
Endowment plan	Harvard Management Company, Princeton University Investment Company, Yale University Endowment			
Fund-of-Funds Manager	AlpInvest Partners, HarbourVest Partners, Goldman Sachs Private Equity Group, Credit Suisse Customized Fund Investment Group,			
	AXA Private Equity, Partners Group, Pantheon Ventures, Adams Street Partners, Capital Dynamics, ATP Private Equity Partners,			
	Hamilton Lane			
Public pension fund	CalPERS, CPP Investment Board, CalSTRS, Ontario Teachers' Pension Plan, WSIB, South Carolina RS			
Sovereign Wealth Fund	Government of Singapore Investment Corporation, Kuwait Investment Authority			
Insurance Company	Northwestern Mutual Life Insurance Company, MetLife Insurance Company			
Asset Manager	CDP Capital - Private Equity Group,			

Table V.1: Peer per type.

	Years of PE experience (as of 2011)	Assets under management (mln USD)	Allocation to PE (mln USD)	Allocation to PE (%)	Maximal ticket size (mln USD)	Minimal ticket size (mln USD)	Number of offices
Mean	22	87,512	17,644	13.8	248.5	29.4	3.8
Median	20	34,000	20,280	12.6	100	23	3
Max	39	355,300	45,615	29.3	1,000	105	14
Min	5	8,332	2,363	1.3	10	1	1

Table V.2: Characteristics of the peer sample. The 'Allocation to PE' columns do not include the allocation percentage of the 11 fund-of-funds. The ticket size columns show statistics about the maximal and minimal ticket size that the peers report.

Product strategy	Yes (%)	No (%)	Unknown (%)
Fund-of-funds investments	16	4	80
Fund investments	88	0	12
Direct investments	56	0	44
Co-investment	68	0	32
Secondary investments	60	0	40
First time funds	84	12	4

Table V.3: Product strategy and first time fund strategy of peer sample.

In order to see the difference in allocation to private equity between the different investor types, we plot the average allocation amount in Figure V.3.



Figure V.3: Average allocation to private equity (in bln USD) per investor type.

One can see that the three endowment funds of Harvard, Yale, and Princeton, which are reputable in the market, allocate on average 23.5% of their assets under management to private equity. This percentage is high compared to the other investor types, except fund-of-funds. Nevertheless, their absolute allocation (in bln USD) is with an average amount of 4.7 bln the lowest of all investor types. In fact, it is only 1/5 of the average allocation of the eleven fund-of-funds.

Table V.3 shows that, as far as we know, not one peers does not do fund investments. Also, a majority of the peers state that they do secondary and co-investments. Five of the peers that invest in first time funds state that they only consider spin-offs. Spin-offs are GPs that have worked together, but under a different name or company, and raise a new fund.

Appendix VI: Sample statistics of subsample (N=8)

Appendix VII: Disclosed data of peers

Disclosed data
Investment products
Fund investments
Co-investments
Secondary investments
Direct investments
Cash flow level data
Aggregated level data
GP names
Investment names
Co-investments linked to
fund
Currency
NAV date
First cash flow vintage
Last cash flow vintage

Table VII.1: Disclosed data that peers provided us. The row 'Co-investments linked to fund' shows for the peers that disclosed co-investment data whether the co-investments are linked to their corresponding fund from which they arose.

Appendix VIII: Sample statistics: the number of investments per product and region

Appendix IX: Contribution to performance

Appendix X: Impact of co-investments

In Section 4.1.1, we shortly presented the impact of co-investments on the fund performance without co-investments. In this appendix, we analyze the impact of co-investment in more detail. We do this in three steps:

- 1. One co-investment with the corresponding fund;
- 2. All co-investments with the corresponding fund;
- 3. All co-investments with all corresponding funds of one GP.

In order to find the combined performance of a fund with co-investments as mentioned above, we undertake the following steps. First, we isolate the comfort zone co-investments. Next, we combine the cash flows of one fund with one corresponding co-investment to see what the impact is on the performance (Step 1). As some funds have multiple co-investments, we subsequently add all co-investment cash flows that correspond to one fund with the cash flows of that fund. Then we calculate the performance (both IRR and Money Multiple) of the combination of cash flows (Step 2). Finally, we add all cash flows of one GP (thus all fund and co-investment cash flows) and calculate the GPs' performance (Step 3).

Appendix XI: Invested capital versus proceeds

This appendix offers some more support for our analysis in Section 4.1.2. We analyze the invested capital and proceeds of co-investments as follows. First, we make eleven performance categories: '0-1x', '1-2x', ..., '9-10x', '>10x'. We then assign the co-investments to a category based on the Money Multiple of the co-investment. For example, we assign a co-investment with Money Multiple 1.45x to category '1-2x'. Next, we sum per category the invested capital and the proceeds, and calculate their relative weight and cumulative value.

Appendix XIII: Standard waterfall fee structure

Management fees

The management fee is an annual fee from the LP to the GP. The fee is typically based on a fixed percentage:

- 2.0% of committed capital in the investment period (first five years);
- 1.0 to 1.5% of invested capital or min{committed capital, invested capital} after the investment period.

Committed capital is the capital that the LP commits to the fund of the GP. Invested capital is the capital that the GP invests into companies. To prevent the GP from not investing (and being satisfied with just management fees), the management fee after the investment period is often calculated based on the lowest of committed and invested capital.

In the management fee model (see Section 4.2 and Section 4.3) we use for simplicity reasons a management fee of 2.0% of committed capital in the investment period and 2.0% (instead of 1.0 to 1.5%) of min{committed capital, invested capital} after the investment period. Because most co-investments have a total period smaller than five years, this adjustment has little influence.

Carry

Carry, or carrier interest, is the bonus of the GP if the cumulative distributions yield a return higher than the hurdle rate. Carry is most often the sum of:

- 100% of 20% of the net profits below the hurdle rate if there is a 100% catch-up;
- 20% of the net profits above the hurdle rate.

Carry can be seen as a call option with a strike price equal to the hurdle rate. If the investment⁵² is in-the-money (i.e., the cumulative distributions hit the hurdle rate) then the GP earns 20% of the (excess) net profit. The size of the carry is thus dependent of the performance of the investment and stimulates the GP to perform well.

 $^{^{52}}$ In an American waterfall the investment is one company, in the European waterfall the investment is the entire fund.

Hurdle rate

As said above, the hurdle rate is the strike price of the carry call option since it must be achieved before the GP gets carry. It reflects the preferred or minimal rate of return of the LP. The industry standard of the hurdle rate is 8% (IRR).

Figure XII.1 presents an overview of the waterfall terms discussed above. In the investment period, the first five years, the management fee is 2.0% of committed capital. After that, the management fee is 1.5% of the lowest of committed and invested capital. This figure assumes that the hurdle rate is hit in year 8. Therefore, from year 8 on the LP pays carry of 20% to the GP. In Figure XII.1, we assume a fund period of in total 12 years.



Figure XII.1: The standard waterfall structure.

For more (detailed) information about the fee and term structure between LP and GP, we refer to the appendix of Phalippou (2009b).

Appendix XII: Co-investment fee analysis of peers

In this appendix, we run more co-investment fee analyses.