An evaluation of the potential for GPFG to achieve above average returns from investments in private equity and recommendations regarding benchmarking

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Preface

It is a great honor for me to be chosen to evaluate the opportunity for the GPFG to invest in private equity and provide guidance in terms of benchmarking. I have strived to provide the most up-to-date, objective and comprehensive evidence available in order for the Ministry of Finance and the Norwegian parliament to make the most informed decision possible.

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Mandate

The Norwegian Ministry of Finance has given an assignment to analyze the potential for the GPFG to earn an above average return from investments in private equity, given the characteristics of the GPFG, such as the large size and the long investment horizon.

The market value of the GPFG was 2,792 billion kroner (approximately 465 billion USD) at the end of June 2010. Inflows of new capital to the GPFG will fluctuate over the coming years, but will be approximately 15 billion USD per year. If 3 to 5 percent of this capital will be invested in private equity, this would be equivalent to 14 to 23 billion USD per year. The GPFG, therefore, has a large pool of capital available to invest in private equity funds. This could place some limitations on the ability to achieve returns that substantially exceed the average return from the asset class.

The Norwegian Ministry of Finance has entered into an agreement with Dr. L. Phalippou for the preparation of a report that should assess the following three areas:

- Risk and return drivers. Discuss the variation in investors' return when investing in private equity, and the extent to which this variation is explained by investor characteristics. Evaluate the investor characteristics that can contribute to obtaining above average returns in private equity.
- GPFG's advantages. Given the characteristics of the GPFG, analyze to what extent the GPFG should be able to obtain above average returns in private equity, for both leveraged buyout funds and venture capital.
- Discuss how much the return can be expected to deviate from the average return in the asset class for such an investor.
- Benchmarks. Evaluate the systematic risk premia that private equity gives exposure to and discuss the extent to which private equity is sensitive to these risk factors. Analyze and present a recommendation for benchmarks for broad global mandates to our operational manager Norges Bank for investments in private equity (leveraged buyouts and venture capital).

Summary of the report

The first two sections of this report offer an overview of the past returns of private equity funds. Measuring these returns is difficult because sufficiently comprehensive and detailed datasets are seldom available. In addition, common approaches to measuring performance are usually misleading. I first analyze the performance of Calpers, the largest US pension fund and one of the largest investors in private equity. Although the lack of detailed data precludes any definite conclusions, the return of Calpers in private equity seems close to the return of public equity. This is interesting for the GPFG because Calpers has a similar size as the GPFG and size is an important determinant of performance in private equity. Some academic studies have used more extensive datasets and find that buyout funds have, after fees, returned less than public equity, while the result for venture capital funds is ambiguous.

Given that data quality is an issue, I also analyze several large and recent datasets. Although we need to bear in mind that issues with data quality prevents definite conclusions, these datasets invariably indicate that neither the average buyout fund nor the average venture capital fund has significantly outperformed public equity. These observations are consistent with the experience of Calpers as mentioned above and the assertion of some prominent private equity investors.

This conclusion, however, holds for the average fund and some investors have naturally obtained higher returns. In addition, the future may be different from the past. For example, at the moment, European venture capital funds receive little capital. This situation is usually attributed to the poor returns experienced by investors. Historically, when little capital is allocated to a private equity segment (e.g. venture capital) expected returns are high, probably because there is always a steady flow of future Googles and Starbucks out there awaiting venture capitalists. Thus, while knowledge of past returns is apposite, these past returns should not be too naively extrapolated into the future.

In the third section, I assess the fees charged by private equity funds. I show that a buyout fund with a return after fees equal to the historical average return of the US stock market (over the last 30 years, i.e. 11% per annum) would charge 6% fee per year. Obviously, low fees should not be an objective per se. It is preferable to invest with a 12%-fee fund delivering 38% than with a 5%-fee fund delivering 15%, all else being equal. Yet, three points are worth noting. First, fees are not a function of public equity returns. This means that high fees can be charged for high returns even though these returns are inferior to those of public equity. Second, the fixed component of the fees is large. It means that an investor can be charged 3% per year even though the fund has negative returns, a situation that can also be encountered with certain mutual funds or hedge funds. Third, a large portion of the fees in

buyout funds comes from portfolio company fees, which are the consulting and advisory fees that the fund might charge to the portfolio company. These fees are not directly visible for investors, are mainly at the discretion of the fund and can be quite substantial.

There are large differences in how much funds charge despite the apparent uniform use of the 2%-20% fee contract. A mandate restricted to funds with low fixed fees and no portfolio company fees could be given. The cost is that such a mandate limits the set of funds that are eligible for investment and this could mean that the abnormal return will be lower than otherwise. However, excluding the funds that have significant portfolio-company fees and/or significant fixed fees could lead to a better selection of funds. The selected funds may have fewer conflicting interests and steeper incentives to generate high returns; but unfortunately, there is no hard evidence on this issue. Note also that, if an investor such as the GPFG refuses certain types of fees and contracts, it may influence the industry standards. There is already strong pressure by investors, especially large ones, to modify the compensation contracts. If the GPFG were to join in, it would probably intensify this pressure.

In the fourth section I assess the possibility for a given private equity investor to earn an alpha (i.e. earn a return superior to the best equally risky alternative). For the private equity market to offer an alpha, there needs to be a number of conditions satisfied. First, the private equity fund managers need to generate an alpha. It is generally accepted that private equity funds increase the profitability of the companies they buy. However, funds face high transaction costs when buying a company. In addition, the sellers of the companies may charge high prices because they know that private equity funds can increase profitability. It is likely that some funds, however, generate an alpha. If this holds, the second condition is that these funds do not capture this entire alpha in higher fees. Some researchers argue that incumbent investors could threaten not to re-invest with a private equity firm if the investors do not obtain part of the alpha. To avoid damaging their reputation, funds give in. Thus, investors could earn part of the alpha.

Investors can also earn an alpha by timing the market well and/or selecting the right funds. It has been argued that earning an alpha through market timing is feasible in private equity because, in times when there is less capital invested in private equity funds, the funds that are raised in this period generate higher returns. In practice, a number of factors limit the profitability of such a strategy. However, the GPFG is in a good position to benefit from some controlled market timing. Their constant cash flow allows them to over-weight private equity in bad times without facing large transaction costs.

It has also been argued that there is performance persistence (i.e. the best firms repeat their

successes over time, and the worse firms repeat their poor returns). Selecting the funds with the best past performance is thus often advised. A closer examination of the evidence shows that this persistence is not readily exploitable as a trading strategy because, by the time one knows that a firm is really successful, the effect is gone. As a consequence, it seems fair to argue that an investor without special selection skills, i.e. an investor who simply buys the private equity market portfolio or buys past winner funds, is unlikely to obtain an alpha from its private equity investment in the long-run.

In an opaque and complex asset class, it makes intuitive sense that being a large investor could help to select the right funds. There are large fixed costs to understanding, monitoring and learning about the asset class. In addition, an investor in a private equity fund is a client and large clients are naturally favored. The fifth section shows that larger investors seem to have access to more information about the funds and obtain better terms and conditions in the contracts they sign with fund managers. Most importantly, fund favors some investors via the offering of co-investments. Such co-investments are not subject to any fees (besides portfolio company fees) and thus reduce the fee bill. Large investors have between one quarter and one third of their total investments as co-investments. Consequently, their fee bill is reduced roughly in the same proportions.

One inconvenience of being a large investor, however, is that there may not be enough good quality funds to absorb all the investible capital. In the past, the maximum amount that could be invested profitably in buyout funds varied between €1.2 billion and €4 billion per year. In venture capital, it fluctuated less and stayed around €200 million per year. The investors who picked the funds with the highest returns have a total amount under management of €5 to 10 billion in private equity. An investor with a €10 billion allocation would rank as 10th largest investor in private equity in Europe.

Another source of alpha could stem from the non-tradability (called illiquidity) of private equity funds. It is often argued that because only long-horizon investors do not mind the non-tradability, only they can invest and they will be compensated for it. In the sixth section, I point out that in the past, a liquidity premium did not seem to be present given the apparently low performance of the overall private equity market. One explanation could be that too much money was invested and eliminated the premium. Until recently many investors thought they had a long horizon, but during the crisis they tried to sell some private equity stakes at large discounts on the secondary market. Their horizon was not as long as they anticipated. If investors become more realistic about their investment horizon, fewer investors may participate and a liquidity premium may emerge in the future for long horizon investors such as the GPFG. But, it needs to be understood that, if a serious crisis were to hit the GPFG (or Norway), the money invested in private equity could not readily be cashed.

Note also that when investing in private equity via funds or fund-of-funds, the investment horizon of the investor automatically becomes that of the fund, which is generally in the range of 5-6 years. So, having an horizon longer than 6 years, like that of the GPFG, does not provide a significant advantage for private equity investments. The particularly long horizon and deep pockets of the GPFG could, however, confer a competitive advantage on the secondary market for private equity funds. Although the supply and demand in the long term is difficult to forecast, the GPFG could generally benefit by buying fund stakes on that market. An estimate of the maximum investible in this market is €1 billion per year.

The objective of the GPFG is to maximize risk-adjusted returns. However, the GPFG is subject to guidelines for responsible management and, as an investor in a private equity fund, it has little power to prevent a violation of its charter. In the seventh section, I note that the risk of losing a large investor, however, may change the behavior of a fund. Also, the GPFG could include in its due diligence an assessment of the degree of social responsibility of a private equity firm. This means that the set of eligible investments would be restricted. In particular, new funds would often be excluded. Generally, it seems advisable to obtain the best possible consensus upfront on the decision to invest in private equity in order to withstand any potentially hostile public opinion later on and to avoid being forced to liquidate the holdings on the secondary market.

Finally, if a private equity program were run, the Ministry of Finance would wish to regularly evaluate the returns. An important element of this task is to decide on the type of benchmark to opt for, an issue that is discussed in the eight section. A common approach is to compare the return of each batch of private equity fund investments to industry-wide benchmarks computed by specialized consulting firms. The spread between the investor's return and that of the industry is calculated for each batch of funds. An average of these spreads is then computed. If this is positive, the investor is said to have overperformed. This approach, however, can generate serious mistakes and is most likely to lead to an over-statement of the investor's performance. Benchmarking using a net present value approach is more appealing from both a theoretical and a practical point of view. It is simple to implement and robust (e.g. it cannot be gamed by strategically choosing the benchmark provider, it is not sensitive to data errors of benchmark providers). The benchmark used in this approach is a portfolio of publicly traded stocks chosen so that its risk is the same as that of the asset under evaluation. Based on recent empirical studies, a reasonable benchmark for buyout funds is equal to 1.3 times the market risk premium, plus the risk-free rate, plus about three percent. For venture capital, it would be twice the market risk premium plus the risk-free rate plus about one percent.

Section I: An introduction to private equity and performance evaluation

In order to understand the arguments in this document, I begin by describing the workings of private equity investing. Although I will try to keep jargon to a minimum, certain terms cannot readily be avoided. They are defined here.

Private equity usually encompasses different types of investments. The most common are called *leveraged buyout (called buyout from here on)*, *growth*, *venture capital*, *mezzanine,* and *infrastructure*. Buyout investments represent most of the money invested in private equity; they consist of buying a whole company using high levels of debt. Growth equity consists of giving cash to a company to finance its growth in exchange for shares in the company. A venture capital investment consists of giving cash to a company when it is in an early stage of development. This means that the company has only recently been established, or is still in the process of being established and it needs capital to develop and to become profitable. Companies such as Microsoft, Apple, Amazon, Google, YouTube and Yahoo were all financed by venture capital funds. Mezzanine is junior debt, meaning that, in the case of bankruptcy, this debt is repaid last. A mezzanine fund acts like a bank in the sense that it makes loans. These loans are riskier than usual loans (since they are repaid last) and so have higher interest rates attached to them. Mezzanine also often contains a warrant contract, which means that there is some equity upside and higher risk than traditional junior debt. Finally, infrastructure refers to investments in bridges, roads and the like. Private equity funds typically focus on one of these four categories of investments. This report will focus on buyout funds because they represent the vast majority of the private equity market. What is more, there is hardly any research undertaken on mezzanine and infrastructure funds.

The most common route to investing in private equity is via *private equity funds*. These funds are run by *private equity firms*. For example, the GPFG (the investor) may invest in a *buyout fund* called "ABC IV", which will be run by a firm called ABC. The GPFG grants a credit line to the fund, say $100 million. This credit line is called the *committed capital* of the investor. The sum of these credit lines across all investors is the fund size, say $1 billion. GPFG will, in this case, have a 10% stake in each of the investments made by the fund. Each time the fund buys a *company* it calls for money from its investors. For example, the fund may buy 10 *portfolio companies* for $500 million each. The way it will finance these acquisitions is by asking its investors for $100 million for each *portfolio company* (thus $10 million per company from the GPFG) and borrowing $400 million from banks and/or other sources (e.g. *Mezzanine funds*). This is called *leverage*. With $1 billion in capital, the fund can buy $5 billion worth of companies. The effect of leverage is that it increases both expected

returns as well as the risk. I illustrate this mechanism in table 1.

A company is bought for $500 million and sold for the same amount one year later. For simplicity there are no transaction costs and no taxes. The interest rate on debt is 5%. In a good scenario, the profits for the year add up to $100 million and in a bad scenario the profits for the year add up to $10 million. Table 1 shows the average return and volatility across the two scenarios; it does so for different levels of debt financing. It starts with an all equity financing. In the good scenario, the fund has $500 million from the sale of the company plus the $100 million from the earnings, hence a total of $600 million, leading to a rate of return of (500+100)/500-1=20%. In the bad scenario, the rate of return is (500+10)/500-1=2%. The average return across the two scenarios is thus 11%.

As the amount of debt used for the financing increases, the average return increases but so does the range of outcomes. For example, when the financing consists of $100 million of equity and $400 million of debt, the return in the good scenario is 80% while in the bad scenario it is -10%. To obtain these numbers, one takes the value of the company at year end (e.g. $600 million in the good scenario) and subtracts the debt due ($400 million * 1.05 = $420 million) to obtain the year end pay off ($180 million). Dividing this by the amount invested ($100 million) leads to the 80% rate of return under the good scenario. Note that in the bottom row, with 96% leverage, the returns are really extreme.[2]

Table 1: The effect of leverage on risk and return

Company bought for $500 million and sold for $500 million one year later. There are no transaction costs and no taxes. Cost of debt is 5%. In the good scenario, the profits for the year total $100 million and in the bad scenario profits for the year total $10 million.

Equity ($ million)	Debt ($ million)	Leverage ratio	Good scenario	Bad scenario	Mean return	Volatility Return
500	0	0%	20%	2%	11%	13%
400	100	20%	24%	1%	13%	16%
300	200	40%	30%	0%	15%	21%
200	300	60%	43%	-3%	20%	32%
100	400	80%	80%	-10%	35%	64%
050	450	90%	155%	-25%	65%	127%
020	480	96%	380%	-70%	155%	318%

[2] The purchase of NRJ Nabisco in 1987 by KKR is the largest buyout investment ever and had a 96% leverage ratio.

At this stage it may also be useful to describe corporate governance in private equity. As described above, the investor gives money to a fund called ABC IV and this fund uses the money to buy a company XY. Whereas ABC IV fund managers receive a stake of the equity if the investment goes well (called carried interest; see section III), by and large company XY is held by the investors in the fund. They own most of the equity. As such, the fund managers are minority shareholders, but nonetheless have full control of company XY. The investor, on the other hand, has little say about how company XY should operate (e.g. regarding potentially unpopular decisions or environmental policy).[3]

The corporate governance literature abounds with examples of the problems that can arise when a minority shareholder is in control of a public corporation. In private equity, similar issues can arise. The main issue is that most buyout funds pay themselves for providing services to company XY (e.g. refinancing debt, acquire companies that it merges with XY) and basically decide on how much to pay themselves.[4] More generally, having a minority shareholder in control fertilizes conflicts of interest. A private equity investor can reduce these conflicts of interest via covenants in the contracts that it signs with the fund. Otherwise, the only way to voice its concern is by threatening not to re-invest. For a large investor like the GPFG, this threat is more severe and therefore, it is more likely to obtain satisfaction.

The GPFG (and the Norwegian Ministry of Finance) considers transparency an important element in the decision to invest. Private equity is typically seen as a non-transparent asset class. However, it is important to stress that there is a difference between the information private equity funds provide to their investors and the information they give to the public. Investors are typically well informed about the fund's investments. They usually know how much leverage is used, the actions taken, etc. They are sometimes even better informed than shareholders of public companies. The information available to the public, however, is kept to a minimum unless practices change in the near future (which is possible given current policy makers' pressure in that direction). This means that investors cannot, without the consent of the fund, provide detailed information to the public if there would be a dramatic event involving a private equity held company (e.g. an oil spill, a massive layoff, etc.).

Importantly, we should note that besides the pay-to-play scandal, there has not really been any significant fraud or scandal in private equity, unlike in hedge funds (e.g. Madoff).[5] There has been

[3] It is actually illegal for the investor to intervene or it would lose its status of limited partner.
[4] At the moment, investors are trying to propose contracts that eliminate this type of situation.
[5] Pay-to-play refers to the situations where some pension fund employees and intermediaries were paid by private equity

some controversy about certain investments turning sour, but relative to the size of the asset class, it seems small. Moreover, the conflicts of interest described above are not greater than those in public equity. Plus, note that venture capital, unlike buyout, usually receives nothing but praise. The US venture capital model has nurtured a number of the most well known companies (e.g. Google, Starbucks, Microsoft, Apple) and many countries have tried hard to imitate it (Lerner, 2009).

Let's return to the functioning of the ABC IV fund. The 10 investments will typically be made between 2012 (the beginning of the fund's life, called the *vintage year*) and 2017. Investors will, therefore, be asked to provide cash at different times up to an agreed maximum (called *capital committed*). Around 2015, the fund will start selling, in part or in full, the portfolio companies and will distribute dividends to the investors accordingly. By 2022, the fund will have divested itself of all its portfolio companies. Importantly, unlike for other types of investments, investors cannot readily leave a fund before liquidation. Once they have committed to a fund, they are expected to stay with this fund for its full ten years duration.

Absent market prices for portfolio companies, private equity funds use some internal models and "rule of thumbs" to calculate the value of each portfolio company every quarter. The sum of these valuations is the *Net Asset Value* (NAV) of the fund. Recently, there have been some attempts to standardize these valuations and bring them closer to market values (FAS 157 rule). While such efforts are helpful, valuations of portfolio companies remain to a certain extent at the discretion of the private equity fund manager.

Because NAVs are not market values, the return of private equity funds are not computed like that of other asset classes. This presents some serious challenges in measuring performance and creates opportunities for misleading performance indicators.

In practice, two performance measures are used. Neither is a rate of return (which is used in other asset classes) and both have serious limitations. These measures are called *multiple* and *IRR* respectively. Multiple is the total amount distributed divided by the total amount invested. IRR is the Internal Rate of Return, i.e. the rate of return of an investor that would have re-invested all dividends at a rate of return equal to *IRR* (examples will be shown below). These performance measures can be computed separately for each fund. They can also be computed at the vintage level; this means that all the cash flows of all the funds from the same vintage year are added up and the performance is measured on this aggregated cash flow stream. Finally, note that when performance is measured before

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funds in order to invest in the said fund. For latest media coverage, see:
http://www nypost.com/p/news/local/manhattan/pension_big_cops_to_scam_55ebQcQQE6x4jYsQbF48TM

the fund is finished (i.e. *liquidated*), the last NAV of the fund is treated as if a final dividend equal to that value was paid. Thus NAVs are treated as correct market values.

To illustrate, table 2 shows the performance report of Calpers, the largest US pension fund and one of the world's largest investors in private equity. For its 2003 vintage, it reports an IRR of 24% (net of fees) and a multiple of 1.9. If 24% was the rate of return, the multiple over these seven years (mid 2003 to mid 2010) would have been (1+24%)^7 = 4.5. Instead the multiple is 1.9. This is quite a difference and shows the problem with the performance metrics that are used. The reason for the discrepancy is that there were large dividends paid in 2005-2006. The IRR calculation assumes that all these dividends were re-invested at a 24% rate of return per year from the payment date all the way through to 2010. Obviously, no-one knows of a single re-investment option that would have yielded such an extraordinary rate of return, especially not in the years 2007 to 2010. Yet, this is what is assumed here. This heroic and somewhat hidden assumption yields an arguably misleading result.[6]

If we had the detailed cash flows of Calpers, we could use a different re-investment assumption than the one used when computing the internal rate of return. The so-obtained performance measure is called a *modified IRR*. Unfortunately, the cash flows of Calpers are not publicly available. Yet, there is one re-investment rate for which it is possible to calculate the rate of return: zero percent. Obviously, such an assumption will lead to a lower bound for the true performance because the true re-investment rate is positive. But it may not be too far from reality for a number of vintage years. For example, for the 2003 vintage, dividends were paid mostly in 2005-2006 and had to be re-invested from that time on and interest rates (as well as stock-market returns) were close to zero from 2005 on.

Another piece of information necessary for the computation of the modified IRR is the duration of the fund. The longer the duration, the lower the performance is in absolute value. Phalippou and Gottschalg (2009) used the actual cash flows of a large number of funds to compute duration in the same fashion as for fixed income securities. They computed the average time at which dividends are paid, using the present value of the dividends as weights, and the average time when investments are made, using present value of investments as weights. They found that the spread between average payment time and average investment time is 6 years on average across funds.[7] Consequently, I estimate the modified IRR using a duration per fund of 6 years, but bear in mind that this is just an educated assumption. The true duration can be found only if we have all the cash flows of Calpers.

The performance measure we obtain using the assumption of zero percent re-investment rate

[6] See Phalippou (2009a) for an extensive discussion of this issue.
[7] It less for buyout funds than it is for venture capital funds.

and 6 years duration is called a modified IRR @ 0% and table 2 shows its value for each vintage year. Again, note that this is a lower bound. Nonetheless, in a period of low interest rates, this lower bound will not be too far from reality. The best vintage has a return of 19% and the worst a return of 3%. So, remarkably, not a single vintage has negative returns. Weighting each vintage by capital invested leads to an average return of 6.7% per year.

To illustrate, for the 2003 vintage, the modified IRR @ 0% is denoted x and solves the following equation: $(1+x)^6 = 1.9$; which yields x = 11.3%. This is a different figure from the 24% displayed in the original Calpers' table. However, the relevant question is whether such a return is better than that of the appropriate benchmark over the same time period. To answer that question, the metric used in academia and sometimes in practice is called a Public Market Equivalent (PME). PME is the ratio of the present value of dividends divided by the present value of investments. If PME is above one then the investment under review outperformed the discount rate (i.e. the benchmark). Without the exact cash flows, PME cannot be computed and that is why we cannot judge the relative performance of Calpers. Yet, we can make some assumptions to get closer to the true picture. One benefit of this exercise is to illustrate how PME works and how it can be used.

For each vintage year, I compute the average US stock-market return starting from the following year and continuing for 6 years. [8] For example, the 1990 vintage is benchmarked against the average stock-market returns observed between 1991 and 1996, i.e. 18% per year. For the 2005 vintage, I compute the average from January 2006 to September 2010 (the last month for which I have a return), i.e. 3% per year. The resulting PMEs for each vintage year are shown in the last column of table 2. As expected, the 2003 vintage outperforms the benchmark according to this calculation. A PME of 1.41 is much higher than 1. The 2002 and 2004 vintage also appear good. With the exception of 1999, the other years do not seem as good and when computing the average PME across vintage years, we obtain 0.98. This would indicate a slight underperformance on average. But, again, these results cannot be interpreted as a definitive judgment on Calpers performance. I do not have the underlying cash flows and so have made assumptions. The purpose of this exercise is simply to illustrate how to measure past performance and the challenges of judging past performance. It also shows that the most frequently used performance measure (IRR) is uninformative and can be highly misleading; it typically exaggerates true performance.

[8] To measure the return of all common shares traded in the US, it is customary in academia to use the CRSP (Chicago Research in Security Prices) value-weighted index. This is what I use here.

Table 2: Calpers performance report – March 2010

Amounts are in millions of US dollars. The modified IRR @0% assumes all dividends are re-invested at zero percent for 6 years. PME is a public market equivalent; it is the present value of dividends divided by the cash invested. All the dividends are assumed to all have occurred after 6 years. All figures except those in the last two columns and last row are from Calpers.[9]

	Capital committed	Cash in	Cash out	Cash out & NAV	IRR	Multiple	Modified IRR @0%	PME
1990 Vintage Year	125	122	296	296	15.8	2.4	15.7	0.90
1991 Vintage Year	184	180	509	510	27.6	2.8	18.7	1.05
1992 Vintage Year	160	157	342	342	20.6	2.2	14.0	0.73
1993 Vintage Year	563	560	1080	1086	20	1.9	11.3	0.56
1994 Vintage Year	1508	1410	2391	2404	14.6	1.7	9.2	0.54
1995 Vintage Year	1198	1137	1897	1916	15.7	1.7	9.2	0.81
1996 Vintage Year	1156	1122	1498	1522	8.8	1.4	5.8	0.96
1997 Vintage Year	1103	1076	1491	1553	8.6	1.4	5.8	1.02
1998 Vintage Year	2208	2184	2702	2921	6.7	1.3	4.5	1.06
1999 Vintage Year	1208	1150	1303	1472	5.8	1.3	4.5	1.21
2000 Vintage Year	3886	3616	3810	4927	7.9	1.4	5.8	0.96
2001 Vintage Year	4882	4378	4757	6811	13.4	1.6	8.1	0.93
2002 Vintage Year	1092	1033	917	1504	14.6	1.5	7.0	1.09
2003 Vintage Year	*1564*	*1395*	*1478*	*2633*	*23.8*	*1.9*	*11.3*	*1.41*
2004 Vintage Year	*2072*	*1799*	*1330*	*2561*	*15.8*	*1.4*	*5.8*	*1.13*
2005 Vintage Year	*3952*	*3498*	*1012*	*4044*	*5.8*	*1.2*	*3.1*	*0.97*
Overall	26,860	24,816	26,812	36,500	11.5%	1.5	6.7%	0.98

[9] http://www.calpers.ca.gov/index.jsp?bc=/investments/assets/equities/aim/private-equity-review/overview.xml

In addition, what renders drawing conclusions difficult is the fact that recent vintages have a large weight due to the large amounts invested then but their returns are not final. Table 2 shows that the portfolio value of the 2005 vintage year is composed of one quarter of 'cash out' and three quarters of NAV. This means only one quarter of this value is realized, the rest is uncertain. The 2003 and 2004 vintages have about half of their value that is realized. This is why I have put these data in italics in the table. Only vintage years 1999 and before have a negligible NAV.

Finally, it may be useful to have an initial overview of the capital cycles in private equity. Investing in private equity started in the late 1970s. Money allocated to buyout funds increased exponentially to reach a peak in 1989 before falling back to early 1980s levels. It increased slowly thereafter and picked up exponentially again in 2004-2007. Again, it then reverted to the levels of 10 years previously. For venture capital investments, it grew slowly over the 1980s and early 1990s and then exponentially in the late 1990s, reaching a peak in 1999-2000. Thereafter relatively little was allocated to venture capital, but amounts grew slowly over the following years. Mezzanine and especially infrastructure are relatively new forms of private equity. Infrastructure raised a lot of money in 2004-2007 and little at any other time. Mezzanine is in a similar situation.

Summary of section I

I begin by describing how investing in private equity funds works and discuss the corporate governance of funds. Private equity funds are in full control of companies while they are minority shareholders. The fund investors are the majority shareholders. This type of situation is similar in public equity and can lead to conflicts of interest. Private equity investors can prevent such conflicts of interest via contractual covenants and by threatening not to invest in the subsequent funds raised by a given private equity manager. Being a large investor, such as the GPFG, obviously helps to make this type of threat more potent.

An important question is the historical level of returns in private equity. It is worth noting that measuring returns in private equity is difficult without detailed information. In order to introduce the challenges and the vocabulary, I analyze the performance of Calpers, the largest US pension fund and one of the largest investors in private equity. Although the lack of details precludes any definite conclusions, the return of Calpers in private equity appears modest. These numbers are interesting for the GPFG because Calpers has a similar size as the GPFG, and as we shall see below investor size is probably one of the main determinants of returns in private equity.

Section II: The overall performance of private equity funds

In this section, I discuss the (past) overall return of investing in private equity. These results thus relate to the *average* investor and are looking at the past. Because gathering comprehensive datasets of private equity return data is difficult, I compare results from different sources.

A. Evidence on performance with Thomson data

The *Thomson* dataset was used until 2009 to generate the industry's performance reports such as that of the US National Venture Capital Association. *Thomson* obtains data mostly from investors. Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009), among others, had access to this database; their results are summarized in table 3. Kaplan and Schoar (2005) report that buyout funds had returns below those of the S&P 500 since the PME is below one (0.93) while venture capital funds had returns above those of the S&P 500 since the PME is above one (1.21). Phalippou and Gottschalg (2009) report that both buyout funds and venture capital funds have returns below those of the S&P 500 net-of fees but above it gross-of-fees. Note first that the buyout PME is virtually identical in the two studies but the venture capital PME is very different.[10] Second, the comparison is made with the S&P 500 index. The relative performance of private equity is higher if one chooses a benchmark index that has underperformed the S&P 500 over that time period (e.g. most Wilshire indices).

Table 3: Performance using Thomson data

Performance as of	Kaplan and Schoar (2005) December 2001		Phalippou and Gottschalg (2009) December 2003	
	VC	BO	VC	BO
IRR (average)	17%	18%	n.a.	n.a.
PME (average)	1.21	0.93	0.88	0.96
Multiple (median)	n.a.	n.a.	1.54	1.69
N_observations	577	169	616	236
Vintage years	1980-1995	1980-1995	1980-1993	1980-1993

[10] Phalippou and Gottschalg (2009) argue that the net asset value (NAV) reported by mature and inactive funds were suspiciously high: Despite having reached their 10th year anniversary, these funds had no cash flow activities for two years or more (most of them for 6 years or more) and reported the exact same NAV every quarter over the last two years or more (most of them over the last 6 years or more). These funds are those performing worse. In light of this pattern, they argue that it is more reasonable to write-off those NAVs. Phalippou and Gottschalg (2009) also show that different aggregation choices and sampling choices lead to findings of lower returns. In addition, investors providing data to *Thomson* may have fund selection capabilities, as a result of which the performance resulting from this dataset may be exaggerated. Phalippou and Gottschalg (2009) assessed a lower bound to such a sample selection bias. Using a wider sample of funds, they find that the funds in the *Thomson* dataset were indeed slightly above average. With all these considerations in mind, they find that returns for both buyout and venture capital funds are below those of the S&P 500 index (net-of-fees).

These two academic studies have samples which stop in 2001 and 2003, respectively. Given the strong growth in the amounts managed by private equity funds and the fact that one needs to wait at least 10 years before a final performance number becomes available, there is an obvious need for an updated report. Phalippou (2011) shows performance statistics for buyout funds from Thomson as of December 2007. He shows that the 453 funds in the sample invested a total of $149 billion and distributed a total of $217 billion. In addition, he finds that there is still $42 billion worth of on-going investments (NAV). This valuation seems rather high (about 30% of the amount invested) given that these funds are 10 years or more old and are thus supposed to be liquidated. If this valuation were to be believed, the multiple would be 1.74. Table 3 shows a multiple of 1.69 for buyouts between 1980 and 2003; it appears that the multiple has not changed much over time despite a large increase in number of funds. Hence, there is no apparent contradiction between the results of 2003 and those of 2007, at least in terms of multiple.[11]

From these results, it seems that more recent performance data are not very different than the older ones. Yet, two important criticisms can be made of these studies. First, although they have a large sample, the population is much wider so the true performance could be quite different. Second, Thomson data could have a systematic bias, which could have biased the performance downward.

In order to address the first concern, table 4 shows the coverage of the sample used by Phalippou and Gottschalg (2009). Thomson keeps track of all the funds raising capital in venture capital and in buyout. This is what is called the "universe" in table 4.

There are a total of 1916 venture capital funds and 739 buyout funds raised between 1980 and 1993 (and so liquidated by 2003). Thomson has performance data for a sub-set of funds. Table 4 shows that, among all funds raised between 1980 and 1993, Thomson had the performance data for 37% of the venture capital funds and 39% of the buyout funds. However, in terms of capital covered, the ratio is 67% for venture capital and to 70% for buyout, since large funds are more likely to be covered by Thomson. Therefore, more than two thirds of the universe was covered. We do not know how the other third has performed but Phalippou and Gottschalg (2009) had information concerning the investments made by some of the omitted funds. They find that omitted funds had less successful investments (measured by the fraction of investments that exit via an IPO or a trade sale), showing that excluded funds are more likely to have performed less well than included funds.

A related issue is that the studies cover funds raised up until the mid-1990s and many more

[11] Similar results are obtained for venture capital funds (Phalippou, 2011).

funds have been raised since. Phalippou and Gottschalg (2009) look at early performance indicators of more recently raised funds and these do not appear to be better than the 1980-1993 batch. In the next section, I go over more indicators of more recent performance from different data sources. But, because no-one (to my knowledge) has access to a comprehensive sample of cash flow data in recent years, it is fair to say that we do not know the net present value of funds raised after the mid-1990s.

The second concern is that *Thomson* data may be flawed. The worst scenario would be that *Thomson* stopped receiving cash flow information at, say, date T_i and thereafter they reported for every quarter t that NAV(t) equals NAV(T_i). If that is the case, then performance derived from this database is likely to be underestimated. This is because investments tend to occur in the early years of a fund (and are therefore more likely to be recorded) while dividends tend to occur in the later years of a fund (and are therefore more likely to be distributed after date T_i, being thus omitted). As *Thomson* provides no description of how they maintain their dataset, it is difficult to determine whether or not performance is, indeed, underestimated. It is important, therefore, to bear in mind that we are uncertain about data quality. Yet, the above results show that there is *no* evidence that average past performance is satisfactory. The possible flaw just mentioned indicates that actual performance may be higher but it is by no means certain. Also, remember that many funds do not make it to the database and they are *un*likely to be the better ones.

Table 4: Coverage of the cash flow dataset of Thomson

This table reports the overall number of private equity funds and the sum of committed capital in millions of U.S. dollars (size). All the data are Thomson (see Phalippou and Gottschalg, 2009, for details). The Thomson cash flow dataset is the data used by Phalippou and Gottschalg (2009).

	Venture capital				Buyout			
	Universe		Coverage of the cash flow dataset (%)		Universe		Coverage of the cash flow dataset (%)	
	N	*Size*	*% N*	*% Size*	*N*	*Size*	*% N*	*% Size*
1980–1984	662	16	0.32	0.68	84	9	0.30	0.65
1985–1989	737	42	0.46	0.72	306	79	0.46	0.79
1990–1993	517	21	0.32	0.57	349	48	0.35	0.57
1980–1993	**1916**	**79**	**0.37**	**0.67**	**739**	**136**	**0.39**	**0.70**

B. Evidence from other datasets

Due to the concerns regarding the quality of Thomson data and the general difficulty of gathering a representative dataset in private equity, it is important to compare different datasets. In this sub-section I cover, in turn, two datasets that are accessible to everyone (Preqin, Cambridge Associates) so anyone can replicate the results shown below and two proprietary datasets.[12]

1. Preqin data

A source of data that is becoming increasingly popular is that of Preqin (previously known as 'Private Equity Intelligence'). Preqin offers a list of private equity funds and their most recent performance, measured by IRR and multiple. Their performance data mainly come from pension funds in the US, since such funds are under a legal obligation to provide the list of the most up-to-date performance of their private equity investments.

If one selects all the funds raised between 1980 and 2000 and separate venture capital from buyout funds, then as of December 2009, one counts 492 buyout funds with a (size-weighted) mean and median IRR of 12%. The (size-weighted) mean and median multiple is 1.7. Interestingly, note that the multiple is similar to that in Thomson. For venture capital funds, one counts 892 funds with a median IRR of 7.5% and a value-weighted IRR of 10% (despite some IRRs above 500%). Similarly, median multiple is 1.5 and value-weighted multiple is 1.8. Again, these statistics are consistent with those shown in table 2 and with those of Calpers (table 1), implying that the conclusion I have drawn (no outperformance on average) is robust across datasets.[13]

2. Cambridge Associates

Cambridge Associates has replaced Thomson as the official data provider for the National Venture Capital Association. Their statistics, therefore, receive wide coverage and usually report that private equity outperforms public equity.[14] Here I discuss a set of statistics published by Cambridge Associates, which are more meaningful; these are shown in table 5. Performance is as of June 2010.[15]

Because we do not have the cash flows of the funds, we cannot compute an accurate PME.

[12] I cover datasets with fund level data. CEPRES and SandHill econometrics are prominent datasets at the investment level. See Phalippou (2011) for coverage of these data.
[13] Statistics are from Phalippou (2011).
[14] Phalippou (2011) discusses why the methodology used for these quarterly announcements may lead to a systematic exaggeration of returns.
[15] https://www.cambridgeassociates.com/foundations_endowments/working_together/specialized_expertise/alternative_assets/indicies_benchmarking html

Hence we cannot benchmark these statistics. We can nonetheless compare these statistics to those in other datasets. As with Calpers in table 1, table 5 shows the IRR, multiple and modified IRR for each vintage year. At the bottom of the table 5, I attempt to give an overall view by taking a weighted average of each vintage year statistic. Ideally, we should weight by capital committed each vintage year but Cambridge Associates only gives the number of funds per vintage year. Consequently, I first weighted all the performance measures in each vintage year by the number of funds; the corresponding statistics are on the row labeled "weight is N_funds". Second, I collected the amount of capital committed each vintage year in venture capital and buyout from Thomson Venture Economics, which I plot in figure 1. I then weighted all the performance measures by the capital committed in the corresponding vintage year. The resulting average is given in the row labeled "weight is V_funds".

We first observe that, again, multiples are around 1.7, for both buyout and venture capital (when weighting by capital committed, which is most sensible). Second, the average IRR across vintages depends a lot on the choice of weights in venture capital (21% versus 15%), but not in buyout (13% versus 12%). Also the difference between the average modified IRR and average IRR is about 10% per year in venture capital, but only 5% per year in buyout.

Above, we noted that for buyout funds the results from different databases and methods are similar while it is not always so for venture capital. A contributing factor is that venture capital returns are more skewed, making a naïve averaging of performance more biased upward.[16] Also, since the IRRs tend to be more extreme, they are more misleading. To illustrate once again, the 1996 vintage has an IRR of 103%. This means that each dividend distributed is assumed to have doubled in value every year until the fund is closed. If $100 million were distributed as dividends in 1997, it is assumed that the investor re-invested these dividends and that by 2002 these dividends would be worth more than $3 billion (and over $50 billion by the end of these funds' lives, in 2006). This is obviously absurd and dramatically exaggerates true returns. In addition, weighting by capital committed reduces performance significantly in venture capital. The reason for this is that years with poor returns are years when not only more funds are raised but also larger funds are raised.

Even though we cannot, without detailed cash flows, draw a strong conclusion, once we try to avoid the traps of the internal rate of returns and use a sensible weight for each vintage year, Cambridge Associate statistics do not seem to contradict the results found with Thomson data.

In terms of coverage, table 6 compares that of Thomson, Preqin and Cambridge Associates.

[16] See Phalippou, (2008) for details.

Thomson has better coverage in early years and has fallen behind in recent years. Preqin and Cambridge Associates have a remarkably similar coverage.[17] The universe seems three times larger than that of these three datasets but, as noted above, in value terms the difference is likely to be much smaller. Also, the funds not included in these datasets could reasonably be expected to have lower returns, especially in the early years because these datasets often backfill the data.

Table 5: US private equity performance according to Cambridge Associates (June 2010)

	Venture capital funds				Buyout funds			
Vintage	IRR	Multiple	MIRR @ 0%	Number of funds	IRR	Multiple	MIRR @ 0%	Number of funds
1981	8.47	1.76	9.88	9				
1982	7.38	1.79	10.19	11				
1983	10.23	2.01	12.34	28				
1984	8.62	1.76	9.88	32				
1985	12.90	2.68	17.86	25				
1986	14.52	2.90	19.42	30	19.00	3.41	22.69	11
1987	18.27	2.72	18.15	34	10.63	1.86	10.90	12
1988	18.90	2.47	16.27	26	15.98	2.00	12.25	17
1989	19.16	2.59	17.19	37	22.89	2.58	17.11	18
1990	33.96	3.21	21.46	16	14.55	1.84	10.70	8
1991	26.77	3.01	20.16	17	32.02	3.27	21.83	11
1992	32.79	3.13	20.95	23	30.66	2.90	19.42	14
1993	46.65	4.12	26.61	37	26.12	2.33	15.14	25
1994	55.63	5.33	32.17	42	8.79	1.52	7.23	21
1995	87.97	6.19	35.50	34	20.63	1.94	11.68	33
1996	103.28	5.02	30.85	40	10.30	1.55	7.58	38
1997	91.15	3.05	20.42	73	6.22	1.35	5.13	50
1998	12.21	1.46	6.51	81	6.66	1.37	5.39	51
1999	-1.79	0.91	-1.56	112	14.69	1.79	10.19	55
2000	-1.83	0.91	-1.56	156	14.44	1.64	8.59	72
2001	0.38	1.02	0.33	52	28.15	1.84	10.70	22
2002	-0.83	0.97	-0.51	33	20.68	1.69	9.14	30
2003	3.20	1.11	1.75	33	15.84	1.52	7.23	32
2004	3.19	1.10	1.60	64	8.02	1.27	4.06	62
2005	-0.46	0.99	-0.17	58	2.70	1.07	1.13	76
Total				**1103**				**658**
Average values, with weight being								
N funds	**21.46**	**2.13**	**10.21**		**13.34**	**1.67**	**8.34**	
V funds	**15.09**	**1.70**	**5.96**		**12.35**	**1.55**	**7.09**	

[17] The only exception is in the calculation reported by Cornelius (2010) for venture capital. When I do the same count, I find that the numbers for Preqin and for Cambridge Associates are similar.

Table 6: Comparing coverage of private equity fund datasets

Panel A: Buyout fund

Year start	1980	1980	1980	1990	1990	1990	2000
Year end	1993	1997	2002	1999	1999	1999	2008
Region		US& EU			EU	US	US
Thomson universe	739	1551	2793	_	_	_	_
Thomson cash-flow dataset	236	453	800	449	186	263	187
Cambridge A. (US only)	116	258	488	295	n/a	295	446
Preqin	135	292	625	349	100	249	433
State street	_	_	_	210	34	176	399
Lopez-de-Silanes et al. (2010)	164	319	548				
Ljungqvist et al. (2007)	53	115					

Panel B: Venture capital fund

Year start	1980	1980	1980	1990	1990	1990	2000
Year end	1993	1997	2002	1999	1999	1999	2008
Region		US& EU			EU	US	US
Thomson universe	1916	3251	7255	_	_	_	_
Thomson cash-flow dataset	616	998	1562	716	237	479	335
Cambridge A. (US only)	325	514	948	483	n/a	483	563
Preqin	327	520	1035	248	60	188	265
State street	_	_	_	176	11	165	383

Source: The first three columns are calculated by the author; the last four columns are from Cornelius (2011).

3. Academic proprietary datasets

Ljungqvist, Richardson and Wolfenson (2007) analyze the detailed track record of one investor and find high returns. This shows that there exist investors in private equity with high past returns. On the one hand, their data is ideal as they leave no room for cherry-picking, all fees paid would be expected to be reported and all fund track records should be complete. On the other hand, it would be surprising if investors who lost significant amounts in an asset class would provide information on how poorly they have performed. In addition, even if all investors were equally happy to share their track record, there would still be the survival issue to reckon with. If an investor continues to invest in private equity, then it is likely to be the case that its performance was good.

The prospectuses that private equity firms send to investors when raising funds contain multiples and IRRs of all their previous investments. Lopez-de-Silanes, Phalippou and Gottschalg (2010) have collected these prospectuses and created a database of 12,000 buyout investments. Table 6 shows that the coverage of their dataset is similar to those of Preqin and Cambridge Associates. These data, however, do not give underlying cash flows and are gross of fees. Once again, without cash flows we cannot benchmark returns. We can only determine whether a statistic like the value-weighted

multiple is similar to that found in other datasets. In their dataset, the value weighted multiple is 2.3. In the next section, I show that a 2.3 multiple gross of fees correspond to a 1.7 multiple net-of-fees. So, again, we find a 1.7 multiple net-of-fees for buyout.

Finally, it is worth noting that Yale endowment CIO (Swensen), who is a pioneer in private equity investing, perceived as one of the most knowledgeable on this asset class and possesses a large internal dataset also states that his data show an underperformance of the average fund.[18]

Summary and discussion – Section II

Measuring performance in private equity is an extraordinary challenge. Not only there is a lack of comprehensive and widely available datasets, but also the right methodology is seldom used. Common approaches to measuring performance are usually misleading. Academic studies that had access to datasets that are large and detailed enough find that, when employing a sensible methodology, buyout funds have, after fees, returned less than public equity while the result for venture capital is ambiguous (Kaplan and Schoar, 2005, and Phalippou and Gottschalg, 2009). Given that data quality is an issue, I also analyze other comprehensive and more recent datasets. Invariably, they show indicators of performance that are consistent with the assertion that neither buyout funds nor venture capital funds have significantly outperformed public equity on average. These observations are also consistent with the experience of investors like Calpers mentioned above and the assertion of Yale endowment CIO, who is seen as the pioneer in private equity investing. As a result, the widely held belief that overall returns in private equity have been spectacular has little foundation.

This conclusion, however, holds for the average investor and some investors have naturally obtained higher returns. In addition, the future may be different from the past. For example, at the moment, European venture capital funds and, to a lesser extent, US venture capital funds receive little capital by historical standards. This situation is usually attributed to the poor returns experienced by investors in venture capital, especially in Europe. Historically, when little capital is in a private equity segment (e.g. venture capital) returns have been high, probably because there is always a steady flow of future Googles and Starbucks out there awaiting capital. Thus while knowing past returns is apposite, these past returns should not be too naively extrapolated into the future.

[18] Swensen (2005, pp 133-135): *"While the value added by operationally oriented buyout partnerships may, in certain instances, overcome the burden imposed by the typical buyout fund's generous fee structure, in aggregate, buyout investments fail to match public alternatives (…) In the absence of truly superior fund selection skills (or extraordinary luck), investors should stay far, far away from private equity investments.(…) Some part of the failure of buyout managers to produce risk-adjusted returns stems from the inappropriate fee structure.(…) The large majority of buyout funds fail to add sufficient value to overcome a grossly unreasonable fee structure."*

Section III: The cost of investing in private equity

This section begins with the description of a composite buyout fund fee contract. Section B offers a concrete, if simplified, example of what fee a representative buyout fund would charge. Section C shows the impact of fees on IRR. Section D points out that subtleties in the contracts render fees quite different from one fund to another. Section E discusses the optimality of the compensation contracts. Finally, section F gives an estimate of the operational cost of investing in private equity funds for a large investor.[19]

A. A composite fee contract

There are four sets of fees in a typical fee agreement for a buyout fund. The technical vocabulary used here is the same as in the original contracts and the numbers/arrangements are from a typical buyout contract.

First, the annual *management fee* is 2% of capital commitments until the end of the five-year investment period (see section I for definitions). Thereafter, the management fee is 2% of funded capital commitments outstanding. The management fee is payable semi-annually in advance. In addition, the investor bears all *organizational expenses* incurred in the formation of the fund (for example, legal, travel, accounting, and filing expenses).

Second, *carried interest* is an incentive fee based on the returns earned by the buyout fund. Of the capital paid out as dividend by the fund, 100% goes to the investors until the cumulative distribution to investors equals an "internal rate of return" of 8% per year. This 8% rate is calculated annually based on the sum of two components: i) the capital contribution used to acquire all realized investments, plus the (proportional) write-downs of unrealized investments and ii) all expenses including management fees allocated to the realized portfolio investments. Once investors have received 8% annual return, all additional returns go to the private equity firm until it has received 20% of the difference between total amount distributed and the sum of the two components just mentioned (this is called the "catch up provision"). At that point, 80% of the money paid out has gone to investors and 20% to the private equity firm. Any additional returns above that level are also divided 80:20. Finally, most contracts have a "claw-back provision," which determines that on termination, if the final carried interest due is lower than that received, the excess amount is returned to investors but without interest payments and with the taxes paid on the unduly received carried interest subtracted.

[19] Most of the discussion is adapted from Phalippou (2009a).

Third, *portfolio company fees* are taken directly out of the portfolio companies and so are not directly visible for investors. These include a number of expenses: i) transaction fees when purchasing and sometimes selling a portfolio company, ii) expenses related to proposed but unconsummated investments, iii) taxes, expenses of accountants, litigation, counsel, annual meetings, iv) advisory and monitoring fees, and v) director fees. These fees are quite opaque. Contracts do not specify the amount that will be charged. I limit myself here to the two components that Metrick and Yasuda (2010) document from practitioner interviews. They report that usually *transaction fees* are 2% of transaction value below $100 million and 1% of transaction value for the next $900 million and that 50% of these expenses are used to offset management fees. These are charged at entry but can also be charged when exiting an investment. Further, Metrick and Yasuda (2010) report that typical *monitoring fees* are 0.40% per annum on the value of the firm for five years, irrespective of the actual length of the investment, and that 80% of these expenses are used to offset management fees. In the example that follows, I ignore other portfolio company fees (e.g. director fees, exit fees). Also, to be conservative, I assume that firm value stays at cost. In practice, firm value may increase over time and so would monitoring fees.

Fourth, a number of extra fees or costs can be imposed. For instance, cash proceeds can be kept for up to three months before being distributed to investors. Also, distributions to investors can be in kind and with restrictions rather than cash, which can create a significant extra cost for the investors. Investors may also pay penalties for selling their stakes or missing a capital call. In the calculation below, I also ignore all these extra fees.

B. What fee is paid in a representative buyout fund?

Consider applying this standard contract to a representative buyout fund. The fund has $250 million of capital committed and makes two investments of $110 million each. One is made at the end of the second year and one at the end of the fourth year. This schedule reflects the fact that private equity funds invest the committed capital gradually over time (Ljungqvist, Richardson and Wolfenson, 2007). Each investment is leveraged three times; that is, for $1 of equity invested, $3 is borrowed (this is the average debt-to-asset ratio according to the Standard & Poor's Leveraged Lending Review). Both investments return 10 percent per year for five years. The cost of (risky) debt is 7 percent per year. These numbers are chosen to match the representative fund performance described above. For simplicity, the tax rate is set to zero and the fund does not change the net asset value of its portfolio companies over time. Table 7 shows the resulting stream of cash flows and fees.

The first column shows the management fees paid every six months. With $250 million of capital committed, the 2% management fee is $5 million per year, hence $2.5 million every six months. In June 1986 this fee becomes 2% of equity invested – or $2.5 million per semester until December 1987 and $1.1 million per semester until December 1989. At inception (in December 1980) the organizational fee of $1 million is added to the management fee. Note that after the first investment is made (in December 1982), management fees are smaller because the portfolio company fees partly offset the management fees due.

The second column shows the carried interest. Out of the $110 million of capital called from investors, $104.6 million is invested (after transaction fees) and $330 million is borrowed. The value of the company thus starts at $104.6 million plus $330 million and grows at 10% per year while paying the monitoring fees every semester. After 5 years, the company is worth $688.92 million and the debt is worth $462.84 million, hence the equity is worth $226.08 million. The management fees related to this investment total $20.35 million. The rate of return is above 8% (the hurdle rate), hence a carried interest is received. It amounts to 0.20 x (226.08-110-20.35) = $19.16 million.

The third and fourth columns are the portfolio company fees received by the fund managers. The monitoring fees are 0.4% per year: thus, 0.002 x $440 million = $0.88 million every six months. 80% of this fee ($0.7 million per semester) offsets management fees. Transaction fees are 2% of the value under $100 million and 1% of the value above that amount. So, transaction fees at entry are (0.02 x 100) + (0.01 x 340) = $5.4 million. Half of this amount ($2.7 million) offsets management fees. This is why there are no management fees due in December 1982 and only $1.6 million due in June 1983 ($2.5 million due minus $0.2 million of transaction fees still to be refunded minus $0.7 million of monitoring fees refunded).

In a row near the bottom of the table, I report the *present value* of each fee, which is the sum of the cash flow discounted to take into account time value of money. I use 5 percent as a discount rate for all fees except carried interest for which I use 10 percent discount rate. The different discount rates are an ad-hoc correction for risk.

The portfolio company fees are the largest ($22 million in present value terms versus $18 million and $17 million for management fees and carried interest). Note that investors do not pay these fees directly. They are taken from the portfolio company's cash account. They are thus the least salient and, as we saw, the most opaque of all as their amount is not even specified ex-ante.[20]

[20] In their quantification exercise, Metrick and Yasuda (2010) also find that each fee type represents one-third of the total.

Table 7 also shows the cash flow stream both net and gross. Investors receive a multiple of 1.72 and an IRR of 11%. Gross of all fees, the multiple is 2.25, and the IRR is 17%. Note that these multiples and IRRs are close to those observed in large datasets (section II), confirming that our fund is representative.

The total fees collected can be measured by the spread in IRR (although this is not exact because IRR is not a rate of return). Table 7 shows that fees would be 17% minus 11%, i.e. 6% per year. So in this example, the fund delivers a return in the range of many stock-market indices and charges 6% per year.

Table 7: Fees collected by a representative buyout fund

This table shows the fees paid by investors for a representative fund with $250 million of capital committed. It makes two five-year investments of $110 million each. Each investment is leveraged three times ($1 of equity, $3 borrowed). The cost of debt is 7 percent per year. Investments return 10 percent per year (on assets). The first column shows management fees, the second column shows carried interest and the third and fourth columns are the portfolio company fees. The last two columns show the cash flows received by investors (net-of-fees) and the cash flows gross of all fees (net-of-fees cash flows plus the four fees). The bottom of the table shows the net present value of all cash flow streams, and practitioner performance measures (multiple and internal rate of return).

	Fees Paid by Investors to Fund Managers					
	Management	Carried	Portfolio Company fees		Cash flows	
Date	Fee	Interest	Transaction	Monitoring	Net-of-fees	Gross-of-fees
Dec-80	3.50				-3.50	
Jun-81	2.50				-2.50	
Dec-81	2.50				-2.50	
Jun-82	2.50				-2.50	
Dec-82			5.40		-110.00	-104.60
Jun-83	1.60			0.88	-1.60	0.88
Dec-83	1.80			0.88	-1.80	0.88
Jun-84	1.80			0.88	-1.80	0.88
Dec-84			5.40	0.88	-110.00	-103.72
Jun-85	0.20			1.76	-0.20	1.76
Dec-85	1.09			1.76	-1.09	1.76
Jun-86	0.79			1.76	-0.79	1.76
Dec-86	0.79			1.76	-0.79	1.76
Jun-87	0.79			1.76	-0.79	1.76
Dec-87	0.79	19.16		1.76	206.13	227.84
Jun-88	0.40			0.88	-0.40	0.88
Dec-88	0.40			0.88	-0.40	0.88
Jun-89	0.40			0.88	-0.40	0.88
Dec-89	-0.70	19.16		0.88	207.63	226.96
Present value	18.35	16.80	9.10	12.97	8.17	58.54
Multiple					1.72	2.25
Internal rate of return					10.95%	17.25%

C. The impact of fees on the internal rate of return.

The fees for the representative buyout fund shown in table 7 is in line with what both Metrick and Yasuda (2010) and Phalippou and Gottschalg (2009) report for the average fund in their sample, so the simplified example above captures the essence of actual cash flow data. To get a sense of the impact of fees on the internal rate across funds, Phalippou (2009a) uses the sub-set of fund-raising prospectuses for which both IRR net-of-fees and gross-of-fees are reported. He has 98 observations of pairs of gross and net IRR.

Results are shown in figure 2 (shown at the end of the document). Fees are defined as the spread between the IRR net-of-fees and the IRR gross-of-fees. To preserve anonymity of the data, funds are grouped as a function of their gross IRR. Each group contains between 10 and 20 observations. The first group corresponds to gross IRR below 20%, the second group corresponds to gross IRR between 20% and 30%, the third group corresponds to gross IRR between 30% and 40%, etc. The equally weighted average of fees is 13%. The minimum fee is 4% yearly. At the other end of the spectrum, funds with a gross IRR of 60% would have a net IRR of 40%. The relation between fees and gross IRR is close to perfectly linear with a slope of 25%, implying that an extra 1% return provides an extra 0.25% of fee.[21] Again, because we look at a spread in IRR, we should be cautious about interpreting these results as proxies of yearly fees paid. Yet, this shows that fees have a significant impact on the most frequently used performance metric (IRR) and increase linearly with performance, with a non-negligible minimum of 4%.

D. Fee variation across funds

Fees for buyout funds are typically described as being 2% management fees and 20% incentive fees, with a hurdle rate of 8%. As such, the fees appear the same across buyout funds and roughly resemble the fees of other so-called alternative asset classes. However, compensation contracts for private equity are long and complex, and include details that often lead to fees higher than the basic structure of the contract might suggest. These contractual details also vary across buyout funds, which creates significant dispersion in fees across funds.

As a first example, consider the basic management fees of 2%. Such fees are typically charged on the committed capital, not on capital invested by the fund. Ljungqvist, Richardson and Wolfenson (2007) report that on average, half of the capital committed to a private equity fund is actually invested.

[21] This slope is higher than the performance fee of 20%. This difference could be due to the fact that transaction fees rise with the performance of the buyout fund. It could also be due to the use of IRR, which exaggerates both gross and net performance and, to a lesser extend, fees.

Hence a 2% fee on capital committed is the same as a 4% fee of capital invested, which means that the actual management fee bill is significantly higher than might be expected at first sight. Contracts do vary on this provision. For example, some firms charge the management fee on a combination of capital committed and invested. As a result, although most funds charge a 2% management fee, the effective amount charged varies dramatically across funds.

As another example of the importance of details, consider incentive fees. The broad outline of the incentive fees almost never varies from 20% of profits and an 8% hurdle rate, but much variation arises in the details of their calculation. Some funds start receiving carried interest when they have returned 8% per annum on capital committed; for others, it is when they have returned 8% per annum on exited capital. In the past, some funds would receive carried interest separately for each investment made. Some funds have a "claw-back provision" as described above for returning what turns out to be excess carried interest payments to investors, some do not. European funds usually have a carried interest that requires that the capital committed is repaid before carried interest is charged. US funds have a carried interest like the one described in section B (called deal-by-deal carry). This contributes to making US fund fees much higher than European fund fees.

Some buyout funds pay accrued interests when refunding the carry, some do not. The hurdle rate is almost always 8%, but it can be soft or hard. The soft version is the one described in the example above and leads to a payment of $19 million. The hard version means that the carried interest only applies to what is returned above 8% annual performance, which leads to less than half of that $19 million payment.[22] All these details make a large difference in fees paid.

Details, such as the refunding rule, are important for portfolio company fees. Given the magnitude of these fees, different refunding rules generate different fee bills. For transaction fees, Metrick and Yasuda (2010) report that 80% of the contracts require fund managers to share a portion of transactions fees with investors. One-third of the funds refund all transaction fees to investors, one-third refunds 50%, and the remaining refund an amount in between these two numbers. For monitoring fees, Metrick and Yasuda (2010) report that most funds refund 80% to investors.

Fees in private equity are always sizeable but they vary from one fund to another, from one segment of private equity to another, and from one region to another. Venture capital funds charge more management fees than buyout funds but no portfolio company fees. US buyout funds usually charge more then European buyout funds who usually charge more than Scandinavian buyout funds.

[22] $0.2*(229-110-20.35)= \$19$ million (hard version) and $0.2*(229-(110+20.35)*(1.08)^5)= \$7.5$ million (soft version).

E. Are compensation contracts optimal?

The finding of a one-third/two-thirds split between performance-sensitive fees and fixed fees shown above have raised some concerns. In a recent study, Chung, Sensoy and Weisbach (2010) point out that high returns are not only rewarded by higher carried-interest but also by having larger subsequent funds, which means higher subsequent fees. They measure the sensitivity of future fund size to current returns to quantify this implicit incentive to maximize returns. They find that the implicit incentive is as large as the explicit incentive (the carried-interest). This means that buyout funds have more incentives to maximize returns than at first sight, but the fixed fees (i.e. fees unrelated to performance) remain large. It is also the case that if a buyout firm decides to stop raising funds, then there is little incentives to deliver high returns since the implicit motivation is gone.

Having large fixed fees means that large fees can be paid despite poor absolute performance (e.g. negative returns). But, due to the structure of the compensation contracts, very large fees can be paid when there is under-performance relative to public equity, which is at least as troublesome.

For simplicity, let us now ignore the time value of money and do some back of the envelop calculation using the example from section B. A fund makes two 5-years investments of $110 million. The total management fees are around $20 million, the total portfolio company fees are around $25 million and the carried interest is around $35 million. The investor gets $420 million from a $220 million investment and pays $80 million in fees. Paying $80 million of fees (or about 80/5 = 16 million per investment year) out of $220 million investment is certainly a significant amount.[23] However, the important question is whether the $200 million delivered by the fund is worth the fees.

If other financial assets have negative returns over the same time period, then it could be argued that $80 million is a fair compensation. The issue with the contract we described above is that it does not take into account the return on other markets and that makes them non-optimal intuitively.

Assume, for instance, that the stock market has returned a mere 15% per year over the life of these investments. Although above the historical average, such a return is not exceptional for public equity. In this case, a $220 million investment in public equity made passively and cheaply would have become $442 million, which is more than the money returned by the private equity fund. In that case, the $80 million compensation is difficult to defend.

In addition, if the fund had lost money and, hopefully (remember that the investor has little say on it) not charged any portfolio company fees, the fee bill would have been close to $30 million (or $6

[23] Note that these fee amounts are similar to those estimated by Gompers and Lerner (2000) and Metrick and Yasuda (2010).

million per investment year). Although fixed fees are inevitable, for a $220 million investment making a loss, the $30 million check is arguably even more difficult to defend.

On average, fees are high in private equity by any standards. Obviously, if returns are superior then high fees should not be an issue. What matters is the net-of-fees return. The above evidence, however, indicates that the average fund does not provide returns superior to public equity net of fees, so the average level of fees is too high relative to the returns they offer. It is possible that certain fund selection strategies lead to sufficient returns to justify the fees charged by the selected funds. Unfortunately, we have no robust empirical evidence on this issue.

It is also worth mentioning that portfolio company fees are a large portion of the fees in buyout funds (section B). These fees are not directly visible for investors, are not contracted ex-ante and are thus mainly at the discretion of the fund. Funds that would charge too much would risk upsetting and loosing their investors. This sort of equilibrium does not seem optimal. It seems especially vulnerable in cases where a firm would close down and thus maybe not care anymore about upsetting investors.[24]

F. Operational cost

Importantly, in addition to the fees charged by private equity funds, the GPFG needs to take into account the operational costs of running a private equity program. There are substantial costs incurred in private equity because expertise is rare and expensive; qualified professionals usually require relatively high wages. The lawyers, investment bankers and consultants working in private equity are among the best paid. This is because the asset class is complex. Yet, it is important to note large potential economies of scope if investments are made in real estate, infrastructure etc. via private partnerships. The complex issues mainly relate to performance measurement and contracts; they are common to these other alternative asset classes.

To obtain an estimate of these costs, I use data from the annual report of an investor of similar size and profile: AlpInvest.[25] From 2005 to 2009, AlpInvest has invested on average about €10 billion per year in private equity. They have a team of about 100 employees, which seems to be standard among investors of that size, which cost a total of €40 million. They have offices around the world, which rent sums up to €3 million. Traveling expenses are €2 million and they purchase advisory services for a total of €3 million. Total operational expenses are thus €50 million.

[24] Some point out that contracts are changing and investors are getting less tolerance of such fees. Yet, it seems unreasonable to expect a dramatic change.
[25] http://www.alpinvest.com/annual_reports/index.asp?Section=7,3,0

Summary and discussion of section III

I show the fees charged by a representative buyout fund. This fund returns about as much as the US stock market over the last 30 years after fees, i.e. 11% per annum. Before fees, I show that the return was 17%. This means that fees were 6% per year for a net-of-fees return in the range of public equity. The higher the return, the higher the impact of fees. I show that an IRR of 50% gross of fees corresponds to an IRR of 38% net of fees on average. Obviously, low fees should not be an objective per se. It is preferable to invest with a 12%-fee fund delivering 38% than with a 5%-fee fund delivering 15%, all else being equal.

Yet, three points are worth bearing in mind. First, fees are independent of public equity returns. This means that high fees can be charged for high returns even though these returns are inferior to those of public equity. Second, the fixed part of the fees is large. It means that an investor can be charged 3% per year even though the fund has negative returns, a situation that can also be encountered with certain mutual funds or hedge funds. Third, a large portion of the fees in buyout funds comes from portfolio company fees. These fees are not directly visible for investors, are not contracted ex-ante and are thus mainly at the discretion of the fund.

There are large differences in how much funds charge despite the apparent uniform use of the 2%-20% fee contract. A mandate restricted to funds with low fixed fees and no portfolio company fees could be given. The cost is that this limits the set of funds that are eligible for investment and this could mean that the abnormal return is lower than otherwise. However, not investing in funds that have significant portfolio company fees and/or significant fixed fees could lead to a better selection of funds. Selected funds may have fewer conflicting interests and steeper incentives to generate high returns so it could be a good strategy. Unfortunately, there is no hard evidence on this issue.

It can also happen that, if an investor such as the GPFG refuses certain contracts, it influences the industry standards. There is already strong pressure by investors, especially large ones, to modify the fee contracts. If the GPFG were to join in, it would probably help such efforts.

It is also worth pointing out that many compensation contracts in the financial industry seem non-optimal. For example, many asset managers are compensated as a function of their Sharpe ratio (or some variants of it). This pushes them to sell insurance so that, as long as markets are stable, they make a steady profit (by collecting premiums) which leads to high bonuses since they obtain positive returns with low volatility. When a bad event happens, however, the insurance is claimed and this can be sometimes enough to sink the institution (e.g. Goetzmann et al., 2007, Talleb, 2004).

Section IV: The efficiency of the private equity market

Section A discusses market efficiency and evaluates the case for consistent overperformance. Section B discusses market timing. Sections C, D and E investigate issues related to fund selection.

A. Conditions for an inefficient private equity market

A market is efficient if all information is included in the prices (the price is right) and, as a result, investors only earn risk premiums. As a consequence, there is no free lunch. The concepts of market efficiency and no-free-lunch (also called arbitrage) are sometimes used interchangeably. This is unfortunate because market efficiency certainly implies that there are no free lunches but the opposite is not true. It can be that, at certain points in time, a price is incorrect but it is too costly for arbitrageurs to eliminate the mispricing (Pontiff, 1996, Shleifer and Vishny, 1997, and Barberis and Thaler, 2003, for a survey). A third notion, called 'statistical arbitrage', is also sometimes used interchangeably with market efficiency and no-free-lunch/arbitrage. There is statistical arbitrage when the investor earns *on average* a return that is higher than would be achieved using other strategies with the same amount of risk. This excess return is called "alpha". If the market is efficient, then there are no statistical arbitrage opportunities, but the opposite does not always hold. The reason is, again, that it can be too costly for arbitrageurs to eliminate it.

When talking about market efficiency, practitioners usually refer to statistical arbitrage (i.e. alpha). Generally, for alpha to be present it needs to be the case that some investors make systematic mistakes and that there are frictions that prevent many arbitrageurs from intervening, making the supply of 'smart' money insufficient. Once alpha is identified, the next step is to evaluate whether a given investor can exploit it profitably.

In private equity, testing for the existence of market efficiency is complex because there are two layers. First, a statistical arbitrage opportunity must exist in the market for corporate control. This means that private equity funds must be able to earn an alpha on their investments in the portfolio companies. Second, a statistical arbitrage opportunity need to exist in the market for capital to private equity funds, so that some alpha is passed on to private equity fund investors. I will now go over the details of these two layers.

Let us start with the market for corporate control. Research has focused on one necessary condition for statistical arbitrage to be present: that private equity funds add value. This means that private equity funds should be able to increase the profits of the company they have invested in. There have been a number of studies on this issue. They usually conclude that this is the case (see Kaplan,

1989, subsequent studies by Guo, Hotchkiss, and Song, 2011, and Acharya et al., 2010, and a survey by Cumming, Wright and Siegel, 2007). However, increasing the profitability does not automatically lead to an alpha. There are sizeable transaction costs, estimated around 3% of asset value, meaning 12% of equity (when an investment is levered four times). In addition, the parties selling the company to private equity funds might anticipate that the new owners will increase profits and increase the price up to the point that there is no alpha left.[26]

In section II.A, we noted that private equity funds overperform the S&P 500 index gross of fees, but the cost of capital of private equity may be higher than that of public equity. Franzoni et al. (2010) find that, once they use a four-factor risk model, there is no alpha left (gross of fees) for buyout investments. Thus the added value of private equity funds may not be enough to cover transaction costs and the opportunity cost of capital.

What about the second condition (inefficiency in the market for capital to private equity)? If private equity funds were to generate an alpha gross of fees, they would need to pass some of it on to the investors. A priori, there is a limited pool of smart private equity fund managers and quite a large amount of capital that can be invested in private equity funds. The dominant theory in delegated asset management would predict that, in such situations, private equity funds retain their alpha by increasing fees (Berk and Green, 2004).[27] But some researchers have argued that this theory does not apply in private equity. Hochberg, Ljungqvist and Vissing-Jorgensen (2010), for instance, propose a model in which existing investors obtain some of the alpha by threatening to not re-invest with the firm. If they leave the firm, new investors will infer that there is probably something wrong with this firm and will stay away. The firm thus needs to give in to the demands of the incumbent investor. Hochberg et al. (2010) present empirical evidence consistent with the predictions of this model.[28]

If both the market for corporate control and the supply of private equity capital would be inefficient, then an alpha could be available for the average investor. I have just reviewed the conditions and the type of mechanisms that need to be present for these inefficiencies to occur. In the following sections, I cover empirical evidence which yield mixed results about the efficiency of private equity markets. Thus, it seems that an alpha is unlikely to be offered to the *average* investor in the long-run, besides a potential compensation for liquidity which is discussed in section VI.

[26] E.g., when private equity funds take over a publicly traded company they pay a 20% to 40% price premium (Renneboog and Simons, 2005).

[27] Note that this can be done indirectly by increasing the fraction of the fund that is passively managed thereby de facto increasing fees on the active part of the portfolio (see Berk and Green, 2004).

[28] Another theory is that of Glode and Green (2009) who argue that existing investors threaten the fund to replicate its strategy. The fund then has to give some of the cake to avoid that happening.

B. Market timing

One implication of market efficiency is that one cannot time the market. However, it has been argued that private equity performance is cyclical, and that these cycles are predictable. At some point in time, private equity funds return large dividends. As a result, investors allocate large amounts of capital to private equity. At that point, one typically witnesses higher acquisition valuations because private equity firms compete more forcefully for a limited pool of companies. Since these higher valuations are the result of price pressure rather than better prospects, the ensuing returns are low.

This money-chasing-deals effect, i.e. the fact that higher prices are paid when more capital is invested in private equity, has been documented in both venture capital (Gompers and Lerner, 2000) and in buyout (Axelson, Jenkinson, Stromberg and Weisbach, 2010). The negative relation between capital invested in a given year (as a fraction of public equity capitalization) and the return of that vintage year is shown by Kaplan and Lerner (2010) for venture capital and by Kaplan and Stromberg (2009) for buyout. The numbers in table 5 also reflect this phenomenon. The correlation between the three performance measures (IRR, multiple, modified IRR) and the number of funds raised each vintage year is -60%, -67% and -72% for buyout and -26%, -44% and -53% for venture capital (using the vintage years 1986 to 2005). These are indeed large and negative correlations.

This type of evidence usually rejects market efficiency. Nevertheless, it is not clear that there is a statistical arbitrage opportunity. First, investing counter-cyclically in public equity is also profitable. When I calculate the same correlations as above, using the average return of US stocks over the six years following the vintage year[29] instead of private equity returns, I also obtain high negative correlations. These correlations are actually higher. Although these are simple statistics, they highlight the fact that cycles in other asset classes resemble those of private equity, so it is not certain that one should overweight private equity in bad times.

When there is a bust in private equity, there is usually also a bust in other financial markets. If an investor would have sold public equity or bonds between July 2007 and December 2008 to buy private equity funds, it is not clear this would have been profitable. Not only is the cost of rebalancing high, but the expected future 6-year return from public equity was probably also high in 2008.

More research is obviously needed on this question. Nonetheless, it is worth pointing out that the GPFG would be in an ideal situation to time the market because, unlike most investors, it has an almost constant cash inflow. The GPFG does not need to sell an asset to buy another one. Because the

[29] These stock-market returns are those I used to compute PME in table 2.

GPFG has about $10 billion coming in every year, it is relatively simple to have $3 billion going to private equity in some years and $0.5 billion in others.

Second, the amount of capital that can be invested counter-cyclically is limited by the demand, because there are, by definition, fewer funds raising money in bad times. This is a particularly relevant constraint for the GPFG given its large size. Similarly, in good times, investors can only abstain from investing; they cannot sell short. In addition, as mentioned below, it is difficult for investors not to invest in boom times because if they refuse to invest with a firm, the firm may not accept the investor's money in the future. Furthermore, Phalippou (2011) shows that the worst five years in terms of returns of buyout funds are the years from 1995 to 1999.[30] The following four years were top years in buyout (2001-2004). For venture capital 1998, 1999 and 2000 were among the worst five years. Thus, cycles can last for a long time. Can a team of 100 employees stop investing for five years? The solution seems to lie in investing relatively little in boom times and in avoiding the newly formed funds raised in boom times (Kaplan and Schoar, 2005).

Cornelius (2011) also shows that years with an abnormally high level of capital committed are vintage years with lower returns. Further, he suggests an interesting partial solution for a large investor would consist of combining the primary and secondary market. An investor could buy private equity fund stakes from other investors (this is called the secondary market) in bad times to compensate for the small supply of private equity funds on the primary market. An investor could even consider selling some of its private equity stakes on the secondary market in boom times. This type of strategy can also take place within private equity segments. If infrastructure is 'hot' at one point in time but venture capital is 'cold', then the investor could buy venture capital funds on the secondary market and sell some of its infrastructure funds.

To conclude, all these considerations mean that excess returns from market timing are more limited than at first sight, especially for a large investor. Yet, it seems sensible to pursue a slightly counter cyclical strategy in private equity given the current evidence and bearing in mind capacity constraints.

[30] Note that a similar result can be seen with Calpers' record in table 1. From the 1996 vintage all the way to the 2000 vintage, the IRR is less than 10%.

C. Performance persistence

Another frequently used argument for market inefficiencies in private equity relates to performance persistence, implying that the best firms repeat their successes over time, and the worse firms repeat their poor returns. Researchers have found that two successive funds have positively correlated returns (Kaplan and Schoar, 2005, Phalippou and Gottschalg, 2009, Hochberg, Ljungqvist and Vissing-Jorgensen, 2010). For example, assume that firm ABC raised the following funds: ABC IV in 2005, ABC III in 2003, ABC II in 2002 and ABC I in 2000. The documented evidence would imply that, if ABC III had high returns, then ABC IV also had high returns. Kaplan and Schoar (2005) also find that for venture capital funds, the result holds true even if one were to skip one fund. This means that if ABC IV had high returns then ABC VI also had high returns (but this does not hold for buyout funds).

Consultants and the private equity community have usually embraced this result and sold it as evidence of performance persistence, of the existence of superior skills and as a trading strategy. The promoted strategy can be summarized as: although average performance is not good, you can earn high returns if you select top quartile funds because their performance is persistently good. Fund managers also like this argument because no less than 77% of them claim to be in the top quartile (appendix 1).

One issue with this strategy is that an investor cannot just look at the track record of a firm and simply give money to the firm with a high past performance (and even less so to anyone claiming to be top-quartile). The key point is the following. At the time ABC IV was raised, ABC III had only made a few investments. At the time of investing in ABC IV, investors are therefore largely uninformed about whether ABC III was a top fund (they will know for sure only around 2013). Consequently, it is not obvious whether ABC IV is a good choice. To test for the profitability of a strategy based on performance persistence, it is better to impose a minimum time interval between two funds of the same firm. In the above example, imposing 4 years would mean that one could look at whether ABC IV (raised in 2005) and ABC I (raised in 2000) had returns that are positively correlated.

Phalippou (2010) investigates this issue of time between two funds and finds that the more time one requires between two funds of the same firm, the lower the performance persistence. The results in table 8 show that the persistence result disappears once 6 years are required in between two funds. This means that, although some firms repeat successes and that some aspects of past performance may be informative, it is not trivial to design an effective selection strategy based on past performance.[31]

[31] Hochberg et al. (2010) also find that the performance of the firm at the moment a new fund is raised cannot predict the

D. Overperformance of certain types of investors

A third factor apparently affecting the returns that are earned by investors is the characteristics of the investor itself. Lerner, Schoar and Wong (2007) find that different types of investors have different returns when it comes to investing in private equity funds. Endowments have high returns and can select the good funds. Whenever they decide not to re-invest with a firm, the funds subsequently raised by that firm perform poorly and vice versa. In contrast, investors such as pension funds and banks have low returns and their decisions to re-invest do not predict future performance.

They interpret this as evidence that the private equity market is not efficient and that some investors can select funds that are better than average. Furthermore, Lerner et al. (2007) conjecture a number of reasons to explain their results. First, they argue that some investors are not paid competitive wages and do not have much freedom to choose investments. This leads to reduced effort, attracts less qualified employees and results in high employee turnover.[32] Second, they argue that private university endowments enjoy greater flexibility to evaluate nonstandard investment opportunities while other institutions often rely on rigid decision criteria and generally lack a sufficient understanding of private equity. Third, they argue that the salary and rank of the employees within the organization depend on how much cash they manage rather than how much return they generate and this creates perverse incentives. Fourth, a number of investors have some externalities when investing in private equity, as a result of which they may not optimize returns. For example, banks may invest to build relationships and to generate business for other divisions (e.g. equity issuance, debt underwriting). Similarly, some public pension funds may invest in certain venture capital funds in order to stimulate the local economy.

DaRin and Phalippou (2010) use a different and more up-to-date dataset and find that the results of Lerner et al. (2007) hold true for early years (pre-1998) but not for recent years (see table 9 – panel A).[33] In addition, DaRin and Phalippou (2010) find that the overperformance of Endowments for early years is present only in venture capital (table 9 – panel B). Thus it may be the investments in star venture capital funds of the 1990s that drive the overperformance of Endowments. Yet, there are a number of other potential explanations for the disappearance of the difference between returns achieved by different type of investors. The bottom line is that, again, the private equity market may not be as inefficient as it looks at first sight and/or as it used to be.

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return of the new fund.

[32] In some institutions, personal rotation is actually deliberate because they want their personnel to often change divisions.

[33] Similar results are obtained if one uses multiple instead of IRR, stops in years other than 2005, or drops smaller funds.

Table 8: Persistence and Time Overlap

This table shows results from regressions with the return of the focal fund as the dependent variable. Return is measured as the log of one plus PME. The sample is separated into preceding funds raised less than three years before the focal fund, between 3 and 6 years before and more than 6 years before. Independent variables include the log of the sequence number of a fund and the log of the size of the preceding fund. Vintage year fixed effects and region of focus fixed effects may be included. *t*-statistics based on firm-level clustered standard errors are reported below each coefficient in italics.

	High overlap (overlap < 3 years)			Intermediate overlap			Low overlap (overlap > 5 years)		
Return of the preceding fund	0.48[a]	0.47[a]	0.44[a]	0.41[a]	0.41[a]	0.28[a]	0.20	0.20	0.09
	0.09	*0.10*	*0.09*	*0,10*	*0.10*	*0.10*	*0.15*	*0.14*	*0,13*
Fund sequence number		0.01	0.02		0.01	0.03[b]		0.03	0.05[a]
		0.01	*0.03*		*0.03*	*0.01*		*0.02*	*0.02*
Size of the preceding fund			0.04			0.10[a]			0.10[a]
			0,03			*0,02*			*0.03*
Region fixed effects	no	no	yes	no	no	yes	no	no	Yes
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	Yes
R-square	0.35	0.35	0.36	0.25	0.25	0.30	0.12	0.12	0.16
Number of observations	157	157	157	347	347	347	299	299	299

Table 9: Return and investor characteristics

This table shows results from regression analysis following the same methodology as in Lerner et al. (2007). The dependent variable is the IRR of a fund in which an investor invested. Vintage year fixed effects are included in all the specifications.

Panel A: By fund type, 1981-1998

	Venture capital				Buyout			
Endowment	0.146[a]		0.109[b]	0.041	-0.020		-0.012	0.008
	0.052		*0.048*	*0.050*	*0.018*		*0.021*	*0.019*
Banks	-0.202[b]		-0.112	0.010	0.021		0.013	0.007
	0.085		*0.076*	*0.098*	*0.017*		*0.023*	*0.023*
Pension fund	0.011		-0.018	-0.082[b]	-0.025		-0.013	0.006
	0.030		*0.035*	*0.039*	*0.016*		*0.018*	*0.018*
Insurance	0.050		0.047	-0.016	0.025[c]		0.030	0.042[c]
	0.051		*0.056*	*0.064*	*0.015*		*0.021*	*0.022*
Fund-of-funds	-0.035		-0.033	-0.062	0.007		0.016	0.015
	0.034		*0.043*	*0.043*	*0.015*		*0.017*	*0.017*
LP experience		0.038[a]	0.038[a]	0.024[b]		-0.014[b]	-0.009[c]	-0.008[c]
		0.011	*0.011*	*0.011*		*0.006*	*0.005*	*0.004*
LP size		-0.024[b]	-0.012	-0.016		0.007	0.005	0.005
		0.010	*0.009*	*0.010*		*0.005*	*0.005*	*0.005*
Fund size				0.104[a]				0.014
				0.020				*0.010*
US-based investor				0.071[b]				-0.039[b]
				0.033				*0.017*
R-square	0.184	0.175	0.190	0.263	0.164	0.159	0.162	0.186
Number of observations	1856	1681	1681	1517	2550	2226	2226	2143

Panel B: By time sub-period

	1981-1998				1999-2005			
Endowment	0.062[b]		0.053[b]	0.042	-0.017		-0.018	-0.020[c]
	0.029		*0.027*	*0.026*	*0.011*		*0.014*	*0.012*
Banks	-0.028		-0.020	0.013	-0.001		-0.007	-0.028[b]
	0.022		*0.023*	*0.023*	*0.013*		*0.016*	*0.014*
Pension fund	-0.005		-0.017	-0.016	-0.030[a]		-0.030[b]	-0.035[a]
	0.017		*0.019*	*0.020*	*0.010*		*0.012*	*0.011*
Insurance	0.025		0.027	0.049[c]	-0.007		-0.011	-0.035[a]
	0.021		*0.026*	*0.028*	*0.010*		*0.013*	*0.012*
Fund-of-funds	-0.003		0.004	0.001	-0.009		-0.018[c]	-0.026[a]
	0.017		*0.021*	*0.020*	*0.009*		*0.011*	*0.010*
LP experience		0.014[b]	0.019[a]	0.008		-0.013[a]	-0.010[a]	-0.004[c]
		0.007	*0.007*	*0.006*		*0.003*	*0.003*	*0.002*
LP size		-0.013[b]	-0.010[c]	-0.007		0.007[a]	0.007[a]	0.004[c]
		0.006	*0.005*	*0.005*		*0.002*	*0.002*	*0.002*
Fund size				0.058[a]				0.015[c]
				0.015				*0.009*
US-based investor				0.001				-0.008
				0.017				*0.009*
Fund is buyout focused				-0.202[a]				0.141[a]
				0.034				*0.012*
R-square	0.11	0.10	0.11	0.19	0.09	0.09	0.09	0.29
Number of observations	4406	3907	3907	3660	9967	8417	8417	8385

[a] significant at 1%; [b] significant at 5%; [c] significant at 10%.

E. Fund selection

A common argument from advisors of investing in private equity is that the average private equity fund should be avoided as only top quartile funds deliver good returns (e.g. Fraser-Simpson, 2007). Note that this argument is consistent with the results reviewed in section II. Next, advisors typically argue that investing in top quartile funds is not difficult if one is familiar with the asset class (e.g. Fraser-Simpson, 2007). While the above may be true, one still has to explain why 75% of the money in private equity (invested in the bottom three quartiles) would be 'dumb-money'.[34]

In addition, there is an important caveat to bear in mind: most top quartiles funds are from a few vintage years. Thus, investing in top quartile funds is as much about finding the top funds in any given batch as it is about market timing. Phalippou (2011) shows that if an investor simply picks the top half of the funds each year but avoids the five worse years in venture capital (1986, 1996, 1998, 1999, 2000), the achieved returns are high. In particular, the value at risk (return achieved by the worse funds

[34] The expression Dumb money was coined by Frazzini and Lamont (2008) and refers to investors who systematically allocate their money to the wrong stocks. This expression is also used on Wall street by technical analysts and in the press.

among those selected) is highly improved. The same holds true in buyout, with the worse five years being all the years from 1995 to 1999. As noted above, this result shows how long a bad cycle can be. A full five years straight should have been avoided in buyout. Note that a similar result can be seen with Calpers record in Table 1. From the 1996 vintage all the way to the 2000 vintage, the IRR is less than 10%. The following four years were good (2001-2004).

The literature has recently documented some determinants of buyout returns which may be used to select funds. Lopez-de-Silanes, et al. (2010) find that the main driver of returns is the number of investments simultaneously held by a firm. They also find that large investments underperform but the effect is less than for the number of simultaneous investments. This illustrates that fund size is an enemy of performance and that if an investor wants to limit itself to large funds, then it is better to focus on those spending large amounts on a few deals than on those spending less but spreading over many deals. Lopez-de-Silanes et al. (2010) show evidence that this result is not due to diversification benefits but is instead related to organizational diseconomies of scale.[35] These findings are consistent with the negative relation between fund size and return documented by Kaplan and Schoar (2005) and with arguments in Gottschalg and Kreuter (2006) that firms which grow faster underperform.

Although there is no equivalent study in venture capital, there is a widely held belief that issues are similar in this asset class and some studies hint in that direction. Cumming and Dai (2010) find that, in venture capital, fund size *increases* valuations whilst geographic proximity *decreases* valuations. All else being equal this means that, in venture capital, better returns are obtained when the venture capitalist is physically close to their portfolio companies and runs smaller funds. Gompers, Kovner and Lerner (2009) have also found that specialized venture capital firms perform better.

Finally, it is important to use common sense. Experience is likely to be of great benefit in a complex and relatively young asset class like private equity. Also, funds should probably be discarded whenever a business proposal seems unlikely to bring value (e.g. crowded strategy, no expertise in the strategy etc.), when past performance is poor and there is no reason to believe the future will be any different. It is also possible that funds with contracts that do not align interests and have a high level of performance insensitive fees generate lower returns. Similarly, funds that engage in secondary buyout transactions, invest in public equity, or take over publicly listed companies may be scrutinized more closely because these transactions may signal an insufficient deal flow.[36]

[35] Several theories argue that if an organization is handling too many projects it underperforms because of the cost of transmitting information in a large organization (e.g. Stein, 2002).

[36] For some of these selection criteria, Gottschalg and Kreuter (2006) report the additional return that can be generated.

Summary and discussion of section IV

The possibility for a given investor to earn abnormal return with a given asset is intimately related to the notion of market efficiency. A market is efficient if all information is included in the prices. As a consequence, when markets are efficiency, investors do not earn abnormal returns (i.e. no alpha). They are only compensated for the risk they take.

For the private equity market to offer an alpha, there need to be a number of conditions satisfied. First, the private equity fund managers need to generate an alpha. It is generally accepted that private equity funds increase the profitability of the companies they buy. However, funds face high transaction costs when buying a company. In addition, those who sell them the companies may sell at high prices because they know that private equity funds can increase profitability. Available evidence seems to indicate that private equity funds may not generate an alpha on average. Some funds, however, may provide such an alpha. If so, it needs to be the case that these funds do not capture this entire alpha in higher fees. Some researchers argue that incumbent investors could threaten not to re-invest with a private equity firm if they do not obtain part of the alpha. To avoid damaging their reputation, funds give in. Thus, an investor with selection skills could earn an alpha.

Empirical evidence related to market efficiency focuses on market timing and performance persistence. It has been argued that market timing in private equity is relatively easy because, in times when there is less capital invested in private equity funds, the returns of the funds that are raised in this period are higher. In practice, there are a number of factors that limit the profitability of such a strategy. However, the GPFG seems in a good position to benefit from some controlled market timing. Their constant cash flow allows them to over-weight private equity in bad times without facing large transaction costs.

It has also been argued that there is performance persistence (i.e. the best firms repeat their successes over time, and the worse firms repeat their poor returns). A closer examination of the evidence shows that this persistence is not readily exploitable as a trading strategy because by the time one knows that a firm is really successful, the effect is gone.

As a consequence, it seems fair to argue that an investor without special selections skills, i.e. an investor who simply buys the private equity market portfolio or buys past winner funds, is unlikely to obtain an alpha from its private equity investment in the long-run.

However, these are in-sample estimates. While informative, these additional returns may not be available out of sample.

Section V: Is the size of the GPFG a benefit in private equity?

This section discusses whether the size of an investor can be an advantage when investing in private equity. Section A provides evidence regarding the advantages of being a large investor in private equity. Section B focuses on the co-investment opportunities that being a large investor confers. Section C gives an estimate of the maximum that can be profitably invested in private equity and derives an estimate of the optimal investor size.

A. Advantages of being a large investor: Survey evidence

DaRin and Phalippou (2010) conduct a large survey of private equity investors. Their sample contains close to 300 investors from more than 30 countries. They ask a number of questions related to investors' due diligence practices, monitoring, and favors that investors obtain from private equity firms. They execute a series of regressions, whose output is summarized in table 10. The dependent variables (i.e. the variables that are to be explained) are listed in the first column. The explanatory variables are investor size and the category of the investor (pension fund, endowment, fund-of-funds, insurance, bank, or government owned). Columns 2 to 4 show the t-statistics. The higher it is, the stronger the link between the explanatory variable and the dependent variable.

The first regression shows that the number of fund advisory boards on which an investor sits is strongly related to investor size. The result is similar, although less strong, if one uses the number of seats relative to the number of funds held. This shows that large investors have superior access to the details of fund's activities and indicates higher monitoring. Out of all investor categories, government held investors are those most present on advisory boards. Another indication of monitoring activity is captured by asking investors whether they keep track of the cash flows. Again, large investors do that significantly more often. All else equal, endowments also tend to do it more often.[37]

Turning to due diligence, DaRin and Phalippou (2010) ask how many days are spent on reviewing a fund before deciding to invest (i.e. due diligence). Results in table 10 show that investor size is highly positively related to the time spent on due diligence. All else equal, fund-of-funds also spend more time on due diligence but investor size is what is most strongly related to time spent. DaRin and Phalippou (2010) also ask whether investors benchmark the contract terms. This variable is

[37] As an anecdote consistent with the idea that larger investor can monitor more closely, a large investor reported that they always try to get an idea of how much portfolio company fee a firm is charging. As explained in section III, these fees are not specified in the contracts so an investor can only get a sense of it by asking private equity firms for the list of previous investments and the list of related portfolio company fees charged. Many firms are reluctant to provide such information. Being a large investor, according to this anecdote, helps considerably in getting this type of information.

not related to size, but government held investors are found to be more likely to benchmark. These investors may be more sensitive to compensation features and conflicts of interest.

The next two questions relate to whether investors receive favors regarding the terms and conditions in the contract with the fund. All investors receive the same contract but some investors also receive so-called side letters. These side letters are basically favors. In addition, an investor can obtain the 'most preferred nation' clause, which guarantees that no other investor has obtained better terms in the side letter. Again, investor size is very strongly positively related to such favors. We may also note that all else being equal, banks are less likely to obtain the 'most preferred nation' clause.

DaRin and Phalippou (2010) also ask whether investors invest in the first funds raised by a newly formed firm. Table 10 shows that large investors are more likely to invest in these. Table 10 also shows that large investors are more selective because we observe a negative relation between investor size and the fraction of funds that go through a thorough due diligence process.

In an opaque and complex asset class it makes intuitive sense that being large is a competitive advantage. There are large fixed costs to understanding, monitoring and learning about the asset class. In addition, large investors might have a better bargaining position, because the investor in private equity funds is a client and large clients are usually favored by financial intermediaries. The evidence reviewed above is consistent with all of these ideas.

Table 10: Advantages of being a large investor

This table reports the results from 9 regressions. Each regression uses a different dependent variable. Explanatory variables are the (natural logarithm of) the value of the investor's private equity portfolio in 2008 (size) plus a dummy variable for each category of investors (pension fund, endowment, fund-of-funds, insurance, bank, or government owned). The t-statistic for both size and endowment are always displayed. The third t-statistic to be shown is that of the most significant investor category, identified alongside. The last column shows the number of observations in the regression.

	t-statistic				N_answers
Dependent variables:	Log (size)	Endowment	Most significant type		
Advisory board seats	*8.54*	*1.01*	*2.44*	Government	232
Track cash flows	*3.22*	*2.08*	*2.08*	Endowment	126
Time for due diligence	*6.11*	*0.23*	*2.35*	Fund-of-funds	170
Benchmark terms	*0.94*	*-0.82*	*2.00*	Government	184
Receive side letters	*7.01*	*1.69*	*1.90*	Government	145
Obtain Most Preferred Nation	*7.11*	*1.46*	*-2.43*	Bank	147
Invest in First time funds	*2.88*	*-0.34*	*-2.06*	Insurance	180
Fraction going through due-diligence	*-2.01*	*0.72*	*1.80*	Bank	121
Co-investment invitations	*6.46*	*1.61*	*1.61*	Endowment	186

B. Investor size and co-investment opportunities

Certain investors are more valuable to private equity funds than others. Some investors indicate investment opportunities to the fund, give advice, provide access to a network of alumni for recruitment purposes (endowments), and give access to some politicians (some pension funds). In addition, high reputation investors can be useful when raising funds. Funds raise money in stages and occasionally reveal the list of the investors in the previous fund-raising rounds. Having well-known existing investors may facilitate ongoing fund-raising. Finally, funds usually prefer to have a relatively small number of investors. It is less costly to have a few large investors than many small ones. Thus investors that can commit a large amount are valuable.

However, funds cannot propose very different contracts to different investors, although they can favor large investors somewhat by the use of side letters. It seems that the main way funds favor some investors is by offering co-investments. Such co-investments are not subject to any fees (besides portfolio company fees). Here is how it works. Assume a fund makes two investments: A and B, for $100 each. Investment A returns 30% and investment B returns 0%. An investor has a 10% stake in the fund; it thus invests $20 and pays (say) $8 in fees. If the fund invites the investor to co-invest an extra $10 in each deal, then the investor puts $40 to work and pays $8 of fees. So it has halved its fee bill. It addition, it is possible that the fund anticipated that investment A would be better and invited the investor to co-invest only in that one. In this case the selected investor also obtains higher returns before fees. In their survey, DaRin and Phalippou (2010) find that investors see co-investment opportunities mainly as a fee reduction device.

There is no empirical evidence on whether co-investments are better investments than average. At first sight, it seems that co-investments are simply larger investments, so they may not be better than the rest. It could also be that they are worse or riskier investments. One may not naively assume that they are bargains. In fact, DaRin and Phalippou (2010) find that investors reject the majority of co-investment invitations they receive. The effect on fees, however, is unambiguous and the question is how many co-investments an investor can make. Table 10 shows that investor size is strongly positively related to being invited to co-invest. DaRin and Phalippou (2010) find that large investors have between one quarter and one third of their investments in private equity as co-investments. Figure 3 shows that the share of co-investments for AlpInvest fluctuates between these two bounds. Thus the reduction in fees is between one quarter and one third for large investors.

C. Investor size and returns

As seen in section A, the advantage of being a large investor is that it allows economies of scale in due diligence and monitoring. It may also give access to more information. The obvious inconvenience, however, is that there may not be enough good quality funds to absorb all the capital a large investor wishes to invest. To evaluate this capacity constraint, DaRin and Phalippou (2010) use Preqin data and select, for each vintage year, the funds that have an IRR above a benchmark.[38] For each of the selected funds, the investor is assumed to invest 5% of fund size. Table 11 shows how much money this perfect-foresight investor is able to invest profitably. The exercise is conducted separately for buyout funds (Panel A) and venture capital funds (Panel B). In buyout, from 1997 onwards, the maximum is between €1.2 billion and almost €4 billion per year. Interestingly, these allocations are almost exactly the minimum and maximum invested by AlpInvest from 2001 to 2010 (see figure 3). In venture capital, the capacity is much lower. It hovers around €200 million.

Note that there are no limits on the number of funds held. Typically, investors find it difficult to monitor one hundred or more funds. Imposing such a limit reduces allocation significantly. It is also interesting to see how, in certain years, almost all the funds pass the threshold (e.g. 2000 to 2003) and usually these are years when there are fewer funds being raised.

A related question is the optimal size of an investor. DaRin and Phalippou (2010) compute for each investor the average abnormal IRR obtained in all the funds it invested in. This is only a measure of fund selection abilities because the actual allocation across funds and the fees are not known. Table 12 shows the results broken down by the amount of private equity under management as of 2010 (i.e. investor size). The lowest size bracket contains investors with less than €500 million while the highest size bracket has investors with more than €10 billion. Most investors are small. Half of them have less than €500 million in private equity. Return initially increases across size brackets and then slightly declines for investors with more than €10 billion under management. The highest abnormal return is reached for the €5-10 billion bracket at 5.86%. The difference between that return and that of the preceding size bracket is statistically significant (standard error for the statistical test is 0.01). From these statistics, €10 billion appears to be a reasonable target allocation. It is above the €5 billion median allocation to private equity by the GPFG peer group according to a proprietary CEM study and would rank the GPFG in the top ten of the largest investors in Europe (table 13).[39]

[38] The benchmark is the same as the one used in table 2: the average stock-market return over the following six years. As shown in section VIII, the appropriate benchmark is probably higher, thus the number of funds selected could be lower.

[39] Note however an endogeneity issue in this approach. We expect investors to have increased their allocation following

Table 11: Capacity constraints

This table shows the maximum amount of money and number of funds that can be profitably invested in each vintage year in buyout (panel A) and venture capital (panel B).

Panel A: Buyout

Vintage year	Maximum amount that can be invested for a profit	Maximum number of funds that can be held for a profit	Total amount raised (universe)	Total number of funds (universe)
1990	71	7	3108	14
1991	55	5	2021	6
1992	144	8	3964	14
1993	98	6	7444	20
1994	334	16	10896	31
1995	276	12	12944	28
1996	354	19	14832	34
1997	1263	27	36140	48
1998	1620	47	54964	69
1999	1709	44	46393	61
2000	3963	65	94598	79
2001	1778	36	37162	41
2002	1928	41	41515	48
2003	1369	31	30869	41
2004	1578	37	40960	56
2005	2939	53	109535	100

Panel B: Venture capital

Vintage year	Maximum amount that can be invested for a profit	Maximum number of funds that can be held for a profit	Total amount raised (universe)	Total number of funds (universe)
1990	28	8	1284	18
1991	40	6	1123	11
1992	46	10	1679	21
1993	71	17	2048	31
1994	68	11	2174	27
1995	116	16	3222	29
1996	169	23	4721	37
1997	213	36	6058	59
1998	235	26	9662	61
1999	278	24	22707	79
2000	290	18	50593	130
2001	274	16	29752	84
2002	201	24	11369	71
2003	140	14	6711	45
2004	166	14	8516	50
2005	219	19	16369	83

good performance. This means that the advantage of size is exaggerated by this effect.

Table 12: Investor size and abnormal returns

The table shows the average and median abnormal IRR achieved by investors who belong to a given size bracket. The investor return is the fund-size-weighted average of the abnormal IRR taken over all the funds it invested in. A fund abnormal IRR is the difference between its IRR and the (equally-weighted) average IRR in that vintage year. Investor size is the allocation to private equity in million of Euros, as of 2010, according to Preqin. To be included in the sample, an investor needs to have invested in at least three funds. All the venture capital and buyout funds raised between 1981 and 2005 are included.

	Minimum size	Maximum size	Mean return	Median return	N_observations
Smallest	0	250	1.97%	2.61%	193
…	250	500	2.64%	3.20%	84
	500	1,000	3.77%	4.01%	75
	1,000	2,500	3.85%	3.87%	95
	2,500	5,000	3.08%	4.42%	41
…	5,000	10,000	5.86%	5.77%	28
Largest	10,000	45,000	5.78%	5.56%	27
All	0	45,000	3.11%	3.86%	539

Table 13: Largest European investors in private equity in 2010

Source: http://www.efinancialnews.com/story/2010-11-15/top-25-investors-in-private-equity, using Preqin data.

Name	Country	Allocation to private equity (billion of euros)
AlpInvest Partners	The Netherlands	45
Credit Suisse Asset Management	Switzerland	23
Partners Group	Switzerland	17
Axa Private Equity	France	17
Pantheon	UK	16
Capital Dynamics	Switzerland	15
Altius Associates	UK	14
LGT Capital Partners	Lichtenstein	11
Pictet	Switzerland	10
Schroders	UK	9
Allianz Capital Partners	Germany	8
UBS	Switzerland	7
ATP Private Equity Partners	Denmark	6
SL Capital Partners	UK	6
Hermes	UK	5

Summary and discussion of section V

In an opaque and complex asset class, such as private equity, it makes intuitive sense that being large can yield a competitive advantage. There are large fixed costs to understanding and learning about the asset class. In addition, an investor in private equity funds is a client. Large clients are usually favored by financial intermediaries. Survey evidence shows that larger investors monitor their funds more intensively. It also seems that larger investors gain access to more information about the funds.

In addition, larger investors obtain more favors regarding the terms and conditions in the relevant contracts. Yet, funds cannot propose very different contracts to different investors. The main way funds favor some investors appears to be via the offering of co-investments. Such co-investments are not subject to any fees (besides portfolio company fees) and thus reduce the fee bill. Large investors have between one quarter and one third of their investments as co-investments, which means that their fee bill is reduced in the same proportions.

The obvious inconvenience of being a large investor, however, is that there may not be enough good quality funds to absorb all the capital a large investor wishes to invest. In the past, the maximum that could be invested profitably in buyout varied between €1.2 billion and €4 billion per year. In venture capital, it fluctuated less and stayed around €200 million per year. In terms of size, the investors with the highest returns would have a total amount under management of about €5-10 billion in private equity. Investors around that size are found to outperform by about 2.7% per year. A €5-10 billion allocation would rank the GPFG between the 15th and 10th largest investor in private equity in Europe.

To conclude, having a large amount of the capital invested in private equity seems to bring considerable benefits in terms of access to information, monitoring, fund selection, and fees. These benefits are probably less important past a certain size. It is also the case that there is a maximum that can be invested profitably in any given year. Overall, it seems that the optimal amount to have invested in private equity is about €5 billion.

Section VI: Can the GPFG profit from its long horizon in private equity investing?

Section A investigates whether there is evidence of a liquidity premium available to investors in private equity. Section B describes the liquidity characteristics necessary to invest in private equity and argues that the main benefit of having good liquidity characteristics is to be able to buy on the secondary market. Section C documents how the secondary private equity market works.

A. Is there a liquidity premium available to private equity investors?

As mentioned in section I, private equity funds usually have a five-year investment phase, followed by a five-year divestment phase. During the investment phase, the fund calls for capital from investors to invest in private companies. During the divestment phase (and sometimes starting a bit earlier) the fund returns capital to investors. Investors cannot readily sell their holding (see below for details). As a result, investors are basically locked in for 10 years.

Being locked in for 10 years is quite a dramatic feature and should make private equity a priori unsuitable for many investors. As a result, it is reasonable to expect a 'clientele effect' whereby only investors with high tolerance for illiquidity invest in private equity. To the extent that such capital is not in perfect supply (i.e. is rare), such investors may earn a premium over public equity. However, if there are enough investors who do not mind having a portion of their portfolio locked in for such a long period of time, the liquidity premium may be negligible.

While such a liquidity premium has been documented for hedge funds (Aragon, 2007), we have no such evidence available in private equity. The main reason is that there is little variation across funds in terms of illiquidity, making an analysis a la Aragon (2007) impossible. Yet, the evidence reviewed in section II shows that the average private equity fund seems not to outperform public equity. Although not direct proof, it casts some doubt on this liquidity channel as a source of out-performance. If the provision of capital in private equity was not in perfect supply, we would observe that the average fund offers higher returns than public equity. The fact that we do not is a first indication that a general liquidity premium may not be available. [40]

Observing the industry supports this idea. When looking at the range of investors present in private equity, there is no indication that the supply of capital is rare or limited. Basically, all types of investors argued they had the required long horizon and therefore invested in private equity:

[40] Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009) both argue that private equity performance is above that of listed equity gross of fees. However, Franzoni et al. (2010) find that once returns are adjusted for risk, the alpha is zero for returns gross of fees. This contributes to questioning whether a general liquidity premium has been present.

endowments, foundations, pension funds, sovereign wealth funds, family offices, and insurance companies. Put differently, I do not know of any type of institutional investor that stayed out of private equity because it could not cope with the liquidity properties of private equity. Consequently, if there is no large set of institutional investors staying out of private equity, it is unlikely that there is a premium paid for those that have long horizons.[41]

One explanation for the presence of all the types of institutional investors in private equity is due to the Swensen-model, which is the investment model that has been most popular among institutional investors over the last decade. It is also called Endowment-model.[42] The typical reasoning of institutional investors could be summarized as follows: "Swensen is the world's most successful investor. He has achieved this by investing in illiquid asset classes, thereby gaining a liquidity premium. I have a long horizon too, so I should get this liquidity premium too and, therefore, I should invest in private equity and other alternative asset classes too." In fact, Swensen never said that investing in private equity would give high returns due to a liquidity premium. He said that the average investment in private equity is a bad deal and he only earned high returns because he could select the right managers (see footnote 18).[43] It means that an investor should be in that asset class only if it has selection expertise not just a long horizon. Having a long horizon, or more generally the right liquidity characteristics (detailed below), is a necessary but not a sufficient condition to obtaining high returns.

To provide some evidence, here is an extract from a recent newspaper article: "The success of Harvard and Yale attracted imitators. After suffering endowment losses in 2001 and 2002, smaller schools looked to their Ivy League idols for guidance on bulletproofing their portfolios. "Alumni called me up and said, 'We're going to be just like Yale, right?'" recalls the CIO of one midsize endowment fund. As a result, many small schools crowded into hedge funds and private equity, but they underestimated the risks. Limited access to the finite universe of top-tier investment managers began to create additional problems for a large swath of schools. The best hedge funds closed, and smaller endowments invested in second-tier players. At the same time, the top private equity funds became bloated and their managers invested in less lucrative deals."[44]

In addition, many investors seem to have over-estimated their illiquidity tolerance. Endowments such as those of Harvard University and Princeton University tried to sell large parts of their private

[41] One can argue that although all types of institutional investors committed capital to private equity, it was still insufficient to absorb all the demand.
[42] See for example: http://en.wikipedia.org/wiki/David_F._Swensen
[43] Recently, Swensen said explicitly that it was a bad idea for "most endowments" to try to imitate the Yale model: http://www.propublica.org/article/yales-financial-wizard-david-swensen-says-most-endowments-shouldnt-try-to-b
[44] http://www.institutionalinvestor.com/Popups/PrintArticle.aspx?ArticleID=2331334

equity portfolio during the financial crisis. If they were as tolerant to illiquidity as they pretended before the crisis, they would not have done that. Many institutional investors reported troubles during the financial crisis because they could not cope with the illiquidity of private equity.[45]

In the future, many investors may not supply capital to private equity so readily and may think of themselves as less liquidity tolerant. It is therefore reasonable to think that a liquidity premium could be earned by private equity investors in the long-run, but it is equally reasonable to argue that no such premium seems to have been earned in the past.[46]

B. Appropriate liquidity characteristics

As mentioned above, it is necessary (but not sufficient) for an investor to have appropriate liquidity characteristics for private equity. Three appropriate liquidity characteristics can be identified: long horizon, deep-pockets and a flexible allocation model. They are closely connected and discussed below.

Liquidity characteristic I: Long horizon.

As said above, investors are basically locked in for 10 years. It is therefore necessary to have a long horizon in the sense that the investor should not need the money allocated to a private equity fund within the next 10 years. Otherwise, it may end up as a seller on the secondary market. As I detail below, that is usually the wrong side of the trade.

Liquidity characteristic II: Deep pockets.

At a basic level, having deep-pocket means that an investor can pay the money they committed to the fund. During the crisis, many investors could not pay what they had promised. Although we do not have empirical evidence here either, it is reasonable to assume that an investor who cannot pay capital calls may not be allowed to invest in funds in the future. So, again, an investor without deep pocket runs the risk of facing a smaller investment set.

Deep pockets could also mean that the investor can provide capital anytime, including in bad times. As mentioned in the previous section, private equity firms raise a new fund every two to four years. For most firms it is vital that, every two to four years, fresh capital is committed because they

[45] http://www nakedcapitalism.com/2008/12/harvard-yale-other-big-endowments.html
[46] Note also that a liquidity *risk* premium seems to be present in private equity but it is a different concept, discussed in section VIII below.

cannot afford to wait 10 years (until a fund is liquidated) to raise a new one. For private equity firms, an ideal investor is one that commits money to each fund they raise, both in good times and in bad. Although there is no empirical evidence on this point, it seems that if an investor does not invest in one fund, they will be banned from the next fund of the capital-raising firm. This reduction in future opportunities should impact returns negatively. In their survey of investors, however, DaRin and Phalippou (2010) find that less than ten percent of the investors report that they have ever had part of their money rejected and, when asked about the fraction of capital that was rejected, they say it is negligible. It seems that the problem of accessing funds is limited to a handful of buyout funds and only a few more of venture capital funds.[47] Hence having deep pockets can provide some benefits but they may not be sizeable.

Liquidity characteristic III: Flexible allocation model.

Having a flexible allocation policy means that the allocation to private equity can fluctuate significantly over time. There can be a target allocation, but the bandwidth around it should be wide enough. This characteristic is important in order to be able to time the market as discussed in section IV. It is also important in order to avoid being a victim of the "denominator effect", which I describe below.

Usually, institutional investors commit more capital to private equity funds than their target allocation, based on a model of private equity fund cash flows. The objective is to obtain an amount invested at any point in time that is approximately equal to the target allocation. In the recent downturn, two concomitant events happened: the Net Asset Values posted by funds hardly changed and dividends were not paid at the expected rate. Both had the same effect; they made the allocation to private equity look higher than the target allocation. As a result, some investors offered parts of their private equity fund holdings on the secondary market at only half of the NAVs and some private equity fund commitments that had not been drawn (so it was just a credit line) at a discount of over 10%.[48]

[47] It is also the case that investors may not know they do not have access to certain funds because these funds do not send them a fund raising prospectus. There are a number of successful buyout funds in Scandinavia who would not send a prospectus to investors in the US and Canada, except maybe for the ten big names. Similarly, many investors in Europe do not receive prospectuses from successful small US buyout funds. The GPFG would benefit from receiving prospectuses from more funds given its visibility. However, these funds are usually small.

[48] For example, Nick Ryder (2010) from Nabprivatewealth, reports that "back in 2006, secondary sales of private equity commanded a premium of almost 10% over the underlying fund's net asset value, as investors competed to get into funds managed by firms such as KKR, Carlyle, TPG and Blackstone. However, by September 2009, sellers offered discounts of as much as 54% of the net asset value to exit these investments. Prices have since recovered to discounts of around 17% of net asset value [*as of Fall 2010*]." Available at:

Making matters worse is the fact that this apparent increase in allocation was not real; it was due to a temporary depression in public equity prices and to the reluctance of most private equity funds to mark-to-market their NAVs. Being forced by the allocation model to engage in such trades could lead to large losses. As such, a flexible allocation model, which allows for a temporary deviation would be better.

C. The secondary market for private equity holdings

If an investor sells on the secondary market, it is usually at a loss. The main benefit of having the three liquidity characteristics mentioned above is the ability to avoid such a loss. However, a loss for an investor can be a profit for someone else. If the GPFG takes the other side of the trade, it could obtain superior returns. As argued above, there does not seem to be a liquidity premium available on the primary market for private equity funds but it can be argued that there could be a liquidity premium available on the secondary market. To evaluate this source of return, I describe the working of the secondary market. I start with the demand for capital on the secondary market and then review the supply of capital.

The demand side

There are a number of liquidity sellers, i.e. people who sell only because they need money, not because they have any negative information about the funds. For example, entrepreneurs who committed to venture capital funds before the recent crisis, when their net worth was in the hundreds of millions of dollars, had difficulties meeting the capital calls of the funds to which they had committed because of the stock-market downturn and the resulting loss in wealth. Liquidity sellers are expected to be more present during downturns but we can expect some liquidity sellers in good times as well.

Regulatory changes can also have large effects on the secondary market. It seems that, in the short- and mid-term, banks and insurance companies will face tighter regulations vis-à-vis their private equity holding. This may create a flow of liquidity sellers. Recently Bank of America, anticipating such regulatory changes, sold its US$1.9 billion to AXA private equity in what is the largest secondary deal ever.

Appendix 2 gives four examples of sizeable secondary transactions in recent years executed by AlpInvest, the largest investor in Europe and an active investor on the secondary market. Appendix 2

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http://privatewealth.nab.com.au/nabprivate/insights/people/nick_ryder/new_opportunities_in_private_equity html

shows other reasons for selling on the secondary market and the change in these reasons over the recent years. It appears that there is a stable pool of liquidity sellers present in the market. This market could therefore continue to be profitable beyond the recent financial crisis.

Figure 3 shows how much capital was invested in secondaries by AlpInvest over the years. Between 2005 and 2009, it fluctuated between €600 million and €1.1 billion per year. This gives an idea of what the GPFG could invest on that market.

The supply side

To evaluate whether the secondary market could be profitable for the GPFG, it is important to assess the necessary conditions for being a successful investor in this market. The first condition is size. If Harvard wants to sell US$1 billion of private equity funds, as they did in 2008, they will not break it up into 10 pieces. The buyer is expected to take it all. On that dimension, GPFG obviously has a big advantage. Not many investors can buy $1 billion of private equity in one transaction.

The second necessary condition is that the investor should have a large number of fund commitments. An investor who wants to sell on the secondary market needs the approval of each fund, and funds do not welcome new investors in the middle of fund's life. As a result, it is easier to transfer a private equity fund holding from one existing fund investor to another. Taking this into account, GPFG is at a disadvantage compared to AlpInvest. In the longer run, however, as the GPFG would have several fund investments, it would no longer have a disadvantage.

The third necessary condition is that the investor needs to have strong expertise. Buying interests in private equity funds is not straightforward because their value is difficult to calculate. Ideally, buyers need to perform bottom-up valuations by looking through the fund's portfolio and separately valuing the equity in all the underlying private companies. If this is not possible, the buyer is forced to rely upon the fund's most recent valuation of its investments, which can be several months out of date and can differ significantly from the true value. Given its size and image, the GPFG could easily attract a team of experts capable of executing such a task.

The fourth and last condition is confidentiality, which is highly valued by private equity funds. In a secondary transaction, the potential buyer receives a lot of confidential information in order to determine the price. Only trusted investors are invited to carry out due diligence and, therefore, to bid. Being a new investor and potentially having the etiquette of government-run may put the GPFG at a disadvantage in this regard, but this may only be true in the short run.

An overview of the current situation on the secondary market is offered in appendix 2. The

secondary market has developed rapidly and seems to be here to stay. From the above discussion, there seem to be potential benefits here for the GPFG in the long-run. However, as shown in the appendix, the supply side in this market is also rather competitive and it is not obvious that a material liquidity premium is available.

Finally, large secondary transactions present an opportunity for a large investor like the GPFG because it could quickly build a meaningful allocation to private equity at relatively low cost.

Summary and discussion of section VI:

Investors in private equity should receive a premium to compensate them for holding an illiquid asset. In the past, a liquidity premium did not seem to be present given the apparently low performance of the overall private equity market portfolio. One explanation could be that too much money was invested and that this eliminated the premium. Until recently, many investors claimed they had a long horizon, but during the crisis they tried to sell some private equity stakes at large discounts on the secondary market. Their horizon was not as long as anticipated. If investors become more realistic about their liquidity tolerance, it is possible that a liquidity premium will be present in the future for long-horizon investors such as the GPFG. But it needs to be understood that, if a serious crisis were to hit the GPFG (or Norway), the money invested in private equity could not readily be cashed. Note also that, when investing in private equity via funds or fund-of-funds, the investment horizon of the investor becomes that of the fund, in the range of 5-6 years. So, in a sense, having a horizon much longer than 6 years, like that of the GPFG, does not provide a significant advantage for private equity investments.

Having a long horizon and deep pockets are necessary to invest in private equity and the GPFG certainly satisfies this condition. But more so, the particularly long horizon of the GPFG and its deep pocket could confer a competitive advantage on the secondary market for private equity funds. Although the supply and demand in the long term are difficult to forecast, it seems that there should be a steady amount of funds to be purchased on this market in the long run. The GPFG could generally benefit by buying fund stakes on that market. An estimate of the maximum amount investible in this market is €1 billion per year.

Section VII: Public image and impact on private equity returns

The objective of the GPFG is to maximize risk-adjusted return. At first sight, this could mean that the way private equity is perceived by the public or the way private equity funds operate the companies they own is irrelevant. However, the GPFG is keen on corporate social responsibility and, as an investor in a private equity fund, it has no direct say on how the companies are run by the fund. Hence, it has little power to prevent a violation of its charter. There are some indirect ways to do this, which I will discuss below. In addition, as mentioned above, it is very costly to interrupt a private equity investment program. It is, therefore, preferable to obtain the best possible consensus upfront on the decision to invest in private equity; this is in order to withstand any potentially hostile public opinion later on.

It is fair to say that there is little reputational risk with venture capital, but this is not the case with buyout. In order to assess the reputational risk of buyout, I present recent evidence on what buyout funds do to the companies they purchase. I then discuss how the GPFG can handle this risk and how this risk impacts its expected returns.

One of the buyout community's most important claims is that it runs companies better than public (i.e. quoted) companies and there is ample evidence supporting this claim; see for example Cumming et al. (2007) and Kaplan and Stromberg (2009) for useful surveys.

In terms of impact on employees, recent studies find that employment appears to fall at first under private equity ownership but generally significantly increases later , making the overall effect on employment close to neutral (Wright et al., 2007, Davis et al., 2008).

A popular charge against private equity managers is that they have short horizons and buy companies in order to break them up. However, the opposite seems to be true. In fact, "buy and build" or growth strategies are much more common. These involve making add-on acquisitions and injecting new equity into companies. Also, the average private equity holding period is around four years (Lopez-de-Silanes et al., 2010, Stromberg, 2009, Wright et al., 2007) so, on average, the horizon does not appear short.[49]

Another popular charge is that private equity might starve companies of investment for short term profits. One way of measuring this is through patenting activity, as a proxy for innovation by companies. A recent study (Lerner, Sorensen and Stromberg, 2010) finds no decrease in innovation (patenting activity) after a company is bought by a private equity firm. Moreover, it seems that the

[49] However, Lopez-de-Silanes et al. (2010) show that briefly held investments ("quick flips") generate the highest returns. Companies held more than 4 years generate low returns. Private equity firms seem to be holding on to their losers.

quality of the innovations increase, as reflected in the number of times these patents are cited.

Buyout funds usually finance the companies they buy with 75% debt - 25% equity, i.e. close to the reverse of quoted companies (Axelson, Jenkinson, Stromberg and Weisbach., 2010). All else equal, high debt levels create risk. But private equity has not yet caused a financial crisis. No private equity firm has needed a public bailout – unlike hedge funds (LTCM), insurance companies (AIG) and banks (many). Nor does any private equity firm seem likely to need one. The same could not be said for hedge funds or structured debt products.

Because buyout firms raise most of their debt at the level of their portfolio companies, it may be more meaningful to analyze the financial risk of portfolio companies. Studies have found that about one in ten portfolio companies goes bankrupt (Stromberg, 2009, Lopez-de-Silanes et al, 2010). Figure 4 plots the percentage of companies going bankrupt by year of investment initiation. There is variation over time with some peaks at one in five companies going bankrupt. So the number of companies going bankrupt is certainly not negligible and these cases often create public hostility. The public, quite naturally, makes a link between the buyout funds' decision to significantly increase the debt of the companies and the subsequent bankruptcies.

Research on supermarkets acquired by private equity firms in the US has also found that buyout ownership leads to higher prices and less choice for consumers (Chevalier, 1995, and Matsa, 2009). This is a common criticism of buyout funds and it seems to be supported by data.[50]

The picture that emerges is that, although there are some concerns (e.g. higher prices, less choice) and that research is this area is still ongoing due to the lack of reliable data (e.g. there may not be a loss of jobs on average but wages may be reduced or more volatile), there is no evidence to date that buyout has been a threat to society. Also, as said in section I, with the exception of the pay-to-play scandal, there has not really been any fraud or significant scandal in private equity, unlike in hedge funds (e.g. Madoff).[51]

Despite this evidence, buyout funds generally suffer from a poor public image. Many countries have had parliamentary hearings and requested reports on the impact of buyout funds on society. [52]

[50] For example, there has been recent press coverage in the UK about unhappy Manchester United supporters facing higher ticket prices (since the club is run by a private equity fund) and in the Netherlands about unhappy parents alleging increasing prices and decreasing quality of children day care centers (since they are privately run and the main center is run by a private equity firm).

[51] Pay-to-play refers to the situations where some pension fund employees and intermediaries were paid by private equity funds in order to invest in the said fund. For latest media coverage, see:
http://www nypost.com/p/news/local/manhattan/pension_big_cops_to_scam_55ebQcQQE6x4jYsQbF48TM

[52] Formal investigations into private equity have been held by the US, the European Union, the UK, Australia etc.

Over the years, we have seen politicians, unions and journalists calling buyout fund managers locusts, tax avoiders and asset strippers. Such vocabulary and vehemence might be puzzling given the evidence reviewed above, but it is a fact. This means that, at some point in time, the GPFG may face public pressure to interrupt their private equity program. This situation therefore needs to be anticipated. Obtaining an ex-ante broad consensus to investing in buyout funds seems like a good step towards minimizing the risk and the cost of interrupting a private equity program.

As mentioned at the beginning of this section, an investor keen on corporate social responsibility cannot impose their views/opinions on a fund. Yet, the risk of losing a large investor may induce the fund to avoid potential scandals. An investor such as the GPFG needs to look at the past behavior of a group of managers to assess their degree of social responsibility. This should be part of the due diligence. As a consequence, this will probably restrict the investment field, in particular for first-time funds. However, there is no evidence that funds engaging in the types of strategies that lead to public scrutiny (aggressive cost-cutting and high leverage strategies) perform better. Axelson et al. (2010) actually find that funds that use less leverage do better.

Summary and discussion of section VII

The objective of the GPFG is to maximize risk-adjusted return. At first sight, this could mean that the way private equity is perceived by the public or the way private equity funds operate the companies they own is irrelevant. However, the GPFG is keen on corporate social responsibility and, as an investor in a private equity fund, it has no direct say on how the companies are run by the fund. Hence, it has little power to prevent a violation of its charter. As mentioned above, however, the risk of losing a large investor may induce a fund to avoid potential scandals. An investor such as the GPFG may integrate in its due diligence an assessment of the degree of social responsibility of a private equity firm. As a consequence, this will probably restrict the set of eligible investments, in particular for new funds. It also seems advisable to obtain the best possible consensus upfront on the decision to invest in private equity; this is in order to withstand any potentially hostile public opinion later on and to avoid having to liquidate the holdings on the secondary market.

Section VIII. Benchmarking private equity investments

The Ministry of Finance wishes to regularly evaluate the returns from the private equity program relative to a benchmark. A first step is to decide on the type of benchmark. Sub-section A discusses the use of industry benchmarks and its drawbacks. Section B proposes a better approach which uses a benchmark based on stock-market returns. Section C discusses some practical issues when implementing this method.

A. Using industry benchmarks

A frequently used method of benchmarking private equity returns is to relate them to some industry benchmarks. The most commonly used industry benchmarks are those provided by Cambridge Associates and Thomson Venture Economics. There are two main industry-benchmarking approaches. The first approach is to simply compare the return for the past year (or the past 5, or 10 years) to that of the industry. These yearly returns are basically calculated by i) adding up all the end-of-the-year NAV of all the funds plus all the dividends paid during the year (gains), ii) adding up all the beginning-of-the-year NAV of all the funds plus all the capital paid during the year (investments) and iii) computing the rate of return as gains divided by investments minus one (or an internal rate of return with the so obtained cash flows). The returns of the industry benchmarks are computed in the same way by using all the funds in its dataset.

This first approach is problematic because the returns computed in this way depend crucially on the age of the portfolio. In the first years, the GPFG will earn a return close to zero because NAVs at the beginning of a fund's life tend to be equal to the sum of investments. Moreover, few dividends are paid in the initial stage. The industry benchmark, however, contains old funds and their returns are more likely to be positive. As a result, investor's relative performance can be understated.

The second approach consists of computing the IRR for each vintage year (as in table 1). The industry benchmark provider then gives the IRR for the industry for each vintage year (as in table 5). Then each vintage year is weighted by capital committed and we obtain one return for the investor and one for the benchmark, which can then be compared to one another. The exercise is typically done separately for buyout funds, venture capital funds, buyout co-investments etc.

The main issue with this approach is that it often leads to an exaggeration of the relative performance. Table 14 shows an example with two vintage years (2006 and 2007) and four years of cash flows (2006 to 2009). Panel A shows what the industry benchmarks would be. The 2006 vintage invested 1000 and returned 500 each year thereafter. The 2007 vintage invested 500 and returned 250

thereafter. Both vintages are, for simplicity, assumed to be liquidated in 2009. Calculating the IRR of each vintage, I obtain the industry benchmarks of 23% for 2006 and 0% for 2007. The last line shows the aggregated cash flows across the two vintage years. They are equal to -1000, 0, 750 and 750 respectively, corresponding to an IRR of 18%.

Panel B shows some hypothetical cash flows from an investor. My objective is, for simplicity, to have the same overall return for the investor and for the industry. The 2006 vintage had an investment of 100 which led to returns of 150, 0 and 25 over the following three years, leading to an IRR of 60%. The 2007 vintage had an investment of 150 which generated dividends of 75 and 50 over the following two years, leading to an IRR of -12%. So, on aggregate, the return of the investor is equal to the industry return because the industry cash flows are exactly ten times those of the investor. And, indeed the investor's overall IRR is 18%, the same as the industry's overall IRR.

However, applying the benchmarking approach described above, the conclusion would be that the private equity program overperformed by 37% in 2006 and underperformed by 12% in 2007. In 2007, 50% more was invested than in 2006, so the average overperformance would be (37%-1.5*12%)/2.5 = 8%. An overperformance of 8% per year over four years is an impressive record. But, in this example it obviously does not reflect actual overperformance. The overall performance of the investor is exactly the same as that of the benchmark, and not superior by 8% per year.

Table 14: Using industry benchmarks – An example

This table shows hypothetical cash flows generated over four years by two generation of funds (2006 vintage year and 2007 vintage year). The last column shows the IRR of each generation of funds, computed from these cash flows.

Panel A: The industry cash flows

	2006	2007	2008	2009	IRR
2006 vintage year	-1000	500	500	500	23%
2007 vintage year	0	-500	250	250	0%
Overall	-1000	0	750	750	18%

Panel B: The investor cash flows

	2006	2007	2008	2009	IRR
2006 vintage year	-100	150	0	25	60%
2007 vintage year	0	-150	75	50	-12%
Overall	-100	0	75	75	18%

Two remarks are worth making here. First, this approach to benchmarking does not necessarily lead to an exaggerated performance. However, the structure of cash flows in private equity is such that this approach will, in the vast majority of cases, lead to an exaggeration of performance, just as in the example given. In a nutshell, IRRs are more (artificially) skewed when there are fewer funds and the average of skewed numbers has an upward bias. Because the industry benchmark consists of more funds, it is less skewed and so less biased upwards. Thus this approach not only leads to odd numbers, but these numbers are usually biased in favor of the private equity program being benchmarked.

Second, in the above example, the solution would seem obvious. If one pools all the cash flows across vintage years, the correct benchmark IRR is obtained. However, for simplicity I only had two successive vintage years in this example. If a program has 10 vintage years, the pooling of all these vintages will typically give a large weight to early vintage years.[53] This can also lead to misleading numbers. In addition, if all vintage years are pooled, then one cannot see if there has been a deterioration of performance in recent years. This is important because private equity programs typically grow rapidly over time and it is good to evaluate whether some capacity constraints are reached. Consider again at the returns in table 1. Calpers invested nearly four times as much in 2005 than in 1995. So conditions change rather quickly over time and recent vintages may give more relevant information on expected performance.

Another issue with using an industry benchmark to evaluate the relative performance is related to the benchmark itself. Benchmark providers want to show that they have a high number of funds in their benchmarks, and as a result they sometimes include funds which should have been kept out. For example, Fraser-Simpson (2007) voices a recurrent concern among practitioners that the Europe-VC benchmark of Thomson contains many funds that are not really venture capital funds. Related to this issue is the fact that the "vintage year" is not clearly defined. It can be defined as the year when the fund started to raise money, the year when it made its first investment, or the year when it raised its last penny. One benchmark provider may thus include a fund in the 2003 benchmark while another benchmark provider will include the same fund in the 2004 benchmark.

Cornelius (2011) summarizes this issue as follows: "For a benchmark to serve its intended role, it needs to provide unbiased information. Unlike in public markets, however, private equity benchmarks are based on voluntary reporting as well as on legal obligations arising, for example, from the United States Freedom of Information Act. Other data providers, such as gatekeepers or custodians,

[53] This is because of the re-investment assumption I mentioned above. Early dividends are assumed to be re-invested at the IRR rate and so dividends paid in the early years can have a disproportionate weight (see Phalippou, 2008).

generally require the consent of their clients to use their data in calculating published benchmarks. Not surprisingly, therefore, the limited number of private equity benchmarks that have emerged over time show considerable variation in terms of their sample sizes, geographic coverage, and the periods for which they are available. More importantly, benchmarks for the same market segment and geography tend to show significantly different returns. As a matter of fact, as we discuss in this chapter, these differences are large enough to have meaningful implications for capital allocations, manager selection and compensation."

This confirms that existing benchmarks are not trusted very much even when they cover "mature" segments of private equity such as US buyout, US venture capital, and European buyout. In addition, for market segments such as buyout in emerging markets, mezzanine, and infrastructure, the number of funds is so small that any benchmark for these segments is even less reliable than those for "mature segment".

Recently, another approach has been used by Peracs, a consulting company. It consists of benchmarking investment by investment and using a net present value approach so that overperformance and underperformance can be aggregated in a meaningful way. This approach is useful to see which investment of a fund overperforms and which underperforms, thereby evaluating the skills of a fund manager. It also enables the decomposition of returns into the part of returns due to multiple expansion (i.e. increase in general corporation valuations), due to leverage and the remainder, which is usually thought of as the value added by the fund manager (see Acharya et al., 2010, for such an exercise). However, this decomposition is based on a number of assumptions.[54] In addition, the Ministry of Finance wants to evaluate how much the private equity program would contribute to the returns of the GPFG, not decompose returns nor have portfolio company level benchmarks. The method presented in the next section avoids the limitations I just reviewed and is more appropriate for the problem at hand.

[54] A key assumption is that the beta on asset is the same for the private equity portfolio company and for the matched public companies. The match is usually done by industry, size, book-to-market ratio or a combination of these. From the beta on asset, the beta on equity can be inferred by making a mechanical adjustment for leverage. Usually the equity beta is leverage times the asset beta. In theory, the beta on risky debt should also be incorporated but we do not really know what that would be. It could also be argued that higher leverage reduces the asset beta because of its disciplining role on managers (see Jensen 1989), but this is assumed away. This approach is, however, a 'textbook approach' and as been used by many studies such as Ljungqvist, Richardson and Wolfenson (2007), Phalippou and Gottschalg (2009) and Groh and Gottschalg (2009). Given the assumptions, this method is much more problematic for buyout than it is for venture capital.

B. The expected required rate of return

An alternative to using industry benchmarks for evaluating the performance of the private equity investment program is the use of a Net Present Value (NPV) approach. An NPV can be interpreted as how much money the private equity program delivered in excess of what the best alternative investment (with similar risk) would have delivered. The most important input for an NPV calculation is the discount rate, also called 'cost of capital', which is the return of this best alternative investment. Once we have the appropriate cost of capital, we can construct a table similar to table 1, with the NPV of each vintage year.[55]

Although the number of investors using NPV to assess their private equity program is unknown, it does seem that many investors use a stock-market based benchmark. For example, Calpers use a 'Custom Wilshire 2500 Index plus 3% per year'.[56] According to a document given to the GPFG by the CEM – a market leader for pension fund returns benchmarking – many investors use a stock-market return (often Russell 3000) and add between 3% and 5% per year.[57]

Using as a benchmark a stock-market index plus a fixed percentage imposes some restrictive and somewhat unrealistic assumptions. For one, the stock market benchmark assumes that private equity has a beta of one (i.e. has the same risk as stock markets). The additional fixed percentage assumes that it poses some additional risks which do not vary over time.[58] The academic literature has suggested additional types of risks which might arise in private equity, but they are all time varying (e.g. value risk, liquidity risk and volatility risk).

Before discussing estimates of risk exposures in private equity, we should note upfront that different segments of private equity have very different risk profiles and thus receive a different cost of capital. Also, I will focus here on articles that estimate the risk of private equity funds by looking at their cash flows (or proxies of these cash flows). There are two sets of indirect approaches to inferring risk exposures in private equity. One is matching publicly traded companies, the drawbacks of which are discussed in footnote 54. The other approach is to use publicly traded fund-of-funds. Potential

[55] We can also compute the Public Market Equivalent; and a modified rate of return using the cost of capital as a re-investment rate to obtain a figure that resembles a rate of return which people find more intuitive because it can be compared to rate of returns of other assets (see Phalippou, 2008, for a discussion and calculations).

[56] http://www.calpers.ca.gov/index.jsp?bc=/investments/assets/equities/aim/private-equity-review/overview.xml

[57] There are also investors using absolute returns of 9.5% or inflation rate plus 5% according to CEM. This does not seem appropriate for any private equity segments. Unlike hedge funds, private equity does not pretend to deliver 'absolute returns.' Deciding on a 9.5% benchmark would mean that one terminates a program delivering 5% return per year from 2007 to 2010, while such a record should be rewarded given that other asset classes did poorly over that period.

[58] Beta measures *market risk*, which is the sensitivity of the return on an investment to that of a diversified portfolio. This diversified portfolio should be one that resembles that of the GPFG (40% bond – 60% global equity). For academic studies, the diversified portfolio is typically set to the S&P 500 index for simplicity's sake and to keep the analysis general.

drawbacks of this approach are discussed in appendix 3.

Starting with buyout funds, there are two studies that used a large sample of cash flows generated by private equity funds to estimate risk exposures. Driessen et al. (2011) use Thomson data. They find a market beta equals to 1.3 when using the CAPM and 1.7 when using the three-factor model of Fama-French. Franzoni et al. (2010) use data from CEPRES and find a market beta equal to 1 when using the CAPM and 1.5 when using the three-factor model of Fama-French. The difference in beta's between the two different models (CAPM vs. Fama-French) is due to a large exposure to the value factor and a large negative correlation between the value premium and stock-market returns over long holding periods.

Based on this evidence, it seems reasonable to opt for a beta of 1.3. This estimate should become more refined as more research is done and better data becomes available.[59] Note also that this is lower than what one would expect given the leverage used for this type of investment (i.e. using the method described in footnote 54), but it is plausible that private equity firms manage leverage better than public companies and so with an equal leverage their companies would have less risk.

Franzoni et al. (2010) also find a significant exposure to liquidity risk with a beta of 0.7.[60] In addition, both Driessen et al. (2011) and Franzoni et al. (2010) find that buyout-held companies have a large exposure to the value premium (beta is 0.9 according to Franzoni et al. (2010) and 1.4 according to Driessen et al. (2011)). Some academics argue that the value premium captures some sort of macroeconomic risk. Over the last twenty years, the value premium has been 3.8%, which means an additional cost of capital of 3.5% for buyout investments (using the beta of 0.9). Although this interpretation of the value premium is polemical, a compelling argument for including this in the cost of capital is that buyout funds should not be rewarded for earning higher returns simply because they buy value companies. Value stocks can also be bought directly at negligible cost. There is no need to pay high fees for it. As a result, even those believing that the value premium is not due to risk would argue for a hurdle rate increased by 3.5%.

The compensation for the value premium, however, may vary greatly from one fund to another. Funds that have more growth capital will naturally be less loaded on the value premium. Funds that buy the cliché buyout target (cash-rich companies with low growth options or companies in financial distress) will probably load more on value stocks. As such, some adjustments may be necessary as a

[59] Note that this is the same beta that Cao and Lerner (2007) find for post-IPO reverse buyout transactions.

[60] Franzoni et al. (2010) argue that liquidity risk arises in buyout from solvency constraints. When going through bad times, refinancing buyout investments become difficult and may precipitate bankruptcy. They also find that liquidity risk is time varying. When credit spreads are small, liquidity risk is higher.

function of the industries in which the selected funds invest or, if one wants to be yet more precise, as a function of the financials of the companies bought by the selected funds. Most importantly, at present, the GPFG does not take into account the value premium for the benchmark of other asset classes, so I choose to ignore it here.

The cost of capital will obviously vary greatly over time. Going forward, if we have a risk free rate of 3%, a market premium at 4%, and a liquidity risk premium of 3%, that would give a cost of capital for buyout of 3% + 1.3*4% + 0.7*3% = 10.3% per year. In this scenario, it would be stock-market plus 3.3% per year.[61]

For venture capital funds, the market beta may be high because the few venture capital investments that actually make money (about three quarter of venture capital investments return nothing) have high returns but require a booming IPO market. Google and the other success stories would not have been possible without a buoyant IPO market and high valuations for tech investments on the stock market. These two features are present when the stock market has experienced high returns. This makes the return of venture capital intimately related to those of the stock market, hence a high beta. For example, in the late 1990s venture capital funds returned the largest dividends ever but it was also a period of record high returns of public equity. In the early 2000s, dividends from venture capital were rare and stock markets were posting relatively low returns.

This observation is confirmed by two studies which use two different datasets and methods (Korteweg and Sorensen, 2010, and Driessen, et al, 2011). They both find a beta around 2.7.[62] This basically means that if the stock market goes up 1%, venture capital returns tend to go up 2.7% and if the stock market goes down 1%, venture capital goes down 2.7%. One criticism to this estimate is that this is based on one dramatic cycle (the boom of the late 1990s and the ensuing bust). Unfortunately, we do not have more recent estimates. At first sight, venture capital investments have not particularly suffered during the recent financial crisis. As a result, it could be argued that the beta estimate would probably be lower using more recent data. We could set the beta to 2, which is the beta estimated for the small-growth stock portfolio of Fama and French (1992) using a long time-series.[63]

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[61] Some studies also indicate that idiosyncratic risk can be incorporated but the only evidence on the role of market volatility in buyout is provided by Franzoni et al. (2010) and they find that this factor does not relate to buyout returns.

[62] Like Cochrane (2005), Korteweg and Sorensen (2010) measure the risk of companies in which venture capital funds invest. They do not have the cash flows to and from investors. Their data could be seen as a proxy for the true cash flows. Note also that their sample is an updated and improved version of that used by Cochrane (2005) so it can be argued that their estimates are more reliable. We may also note that they report a large alpha. In both papers the large alpha seems to be driven by the combination of a high volatility and the parametric assumption regarding the distribution of returns. The alpha reported in these studies is not the outperformance experienced by investors.

[63] I estimated beta at monthly frequency using US stock-market data from 1968 to today. The exact coefficient is 1.96. The

A liquidity risk premium could be added to the required rate of return. Metrick (2007) finds a beta for liquidity risk in venture capital of 0.23. This means that the cost of capital for venture capital should be set at the risk-free rate plus twice the market risk premium plus 0.23 times the (public equity) liquidity risk premium. Using the same data as for buyout funds would give a cost of capital for venture capital of 3% + 2*4% + 0.23*3% = 11.7% per year. In this scenario, it would be stock-market plus about 4.7% per year.

An important risk that should be accounted for, but for which we have no estimate, is that of the credit line risk. In bad times, the drawing of the credit line granted to funds is particularly costly.[64]

Regarding smaller private equity segments such as mezzanine, infrastructure, or emerging market buyout we have little evidence on risk if any. For mezzanine, one may choose a high yield bond index. For infrastructure, there could be a case for assuming a market risk close to zero. For emerging markets, one could use an emerging market stock index plus a liquidity risk premium.[65]

C. Practical implementation

The benchmarking method described in the previous sub-section is relatively simple. It consists of taking all the funds, categorizing them by date of first investment and pooling all the funds with a similar starting date together (e.g. all 2000-2001). Pooling the funds simply means that their cash flows are added up. This can be done by geography and type (e.g. US buyout 2000-2001). The result is a stream of cash flows and the next step is to compute a Net Present Value by discounting this cash flow stream with the benchmark returns. A positive NPV indicates outperformance of the benchmark. The benchmark is the ex-post realization of the cost of capital I proposed in the previous sub-section. There are, however, several practical issues. An important issue relates to the fund Net Asset Values (NAVs). As mentioned in section I, NAVs are subjective to a certain extent and we should not reward the private equity division based on potentially inflated valuations, nor should they be penalized if the valuations are conservative. One can thus have a stress test with respect to NAV by looking at the impact on performance of a change in total NAV of say +/- 33%. A more precise solution is to evaluate the companies in the portfolio every year. It is not necessary to do this for all companies, but only for a sub-sample for which the valuations seem more suspicious. For example, investments held for more than four years and without a market value could be reviewed with higher priority.

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small growth stock portfolio is from the 100 size/book-to-market portfolio posted on Ken French website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library html

[64] See Phalippou (2009b) for a brief discussion.

[65] Note that leverage is seldom used in emerging markets; investments are more like so-called "growth equity".

Conclusion and discussion of section VIII:

The Ministry of Finance wishes to regularly evaluate the returns from the private equity program. An important first element of this task is to decide on the type of benchmark to use. A common approach is to compare the return of each batch of private equity fund investments (e.g. the 1990 batch of buyout funds one invested in, the 1991 batch of funds etc.) to industry-wide benchmarks computed by some specialized consulting firms. The spread between the investor's return and that of the industry is calculated for each batch of funds. An average of these spreads is then computed; if positive, the investor is said to have overperformed.

This approach can generate serious mistakes and is most likely to lead to an over-statement of the investor's performance. Benchmarking using a net present value (NPV) approach is not only more appealing from a theoretical point of view, but it is also more appealing from a practical point of view. It is robust because it cannot be gamed by strategically choosing a benchmark provider and it is not sensitive to data errors of benchmark providers etc. In addition, it is simple to implement.

The NPV approach uses as a benchmark a portfolio of publicly traded stocks. This portfolio needs to be chosen so that its risk is the same as that of the asset under evaluation. The estimates of risk found in recent empirical studies imply a benchmark for buyout funds that equals to the risk free rate plus 1.3 times the excess return of the stock-market over the risk free rate plus about 2.1%. This will usually be the stock-market return plus about 3%. For venture capital, a reasonable benchmark is the risk free rate plus twice the excess return of the stock-market over the risk free rate plus about 0.7%. This will usually be the stock-market return plus about 5%. Note that benchmarks of this magnitude are in the upper end of those that are used in practice.

Appendix 1: Is there any fund that is not top quartile?

Deanna Buckman - 28 Jul 2009 – PrivateEquityonline

The oft-repeated private equity quip that "75 percent of funds claim to be in the top quartile" may indeed be true. Of 500 firms surveyed by consulting firm Peracs, as many as 77 percent could place themselves within the coveted top-quartile performance category by manipulating key data inputs, co-founder Oliver Gottschalg said during a seminar in New York. Gottschalg noted that by carefully selecting the right performance benchmark provider, some 66 percent of funds surveyed could claim top-quartile status. In private equity, benchmark comparisons are typically derived from commercially available performance data provided by companies including Thomson Venture Economics and Cambridge Associates. Vintage year selection can also make a material difference. Although the majority of funds in the sample considered the year of the first close to be the vintage year, this was not an iron-clad rule. Gottschalg said a private equity firm could, hypothetically, define its fund's vintage year as the year it began fundraising, which would possibly place it in an earlier and less competitive peer group. Alternatively, the GP could define its vintage year as the year of the final close one or several years later, to the same relative-performance-enhancing effect.

Adding vintage year manipulation to benchmark-provider selection allowed 77 percent of funds in the Peracs study to claim top-quartile status. In a February note produced for the Buyout Research Program, Gottschalg wrote: "[T]he good news is that in general fund managers are not exaggerating their performance when they claim to be in the top quartile. The bad news is that the state of performance benchmarking in the private equity industry is still imperfect and insufficient for investors to make accurate investment decisions that maximize the returns to their private equity portfolio." […] "Being in the 'top quartile' somewhere, somehow is not a meaningful criterion to assess the quality of a GP," said Gottschalg.

Appendix 2: The secondary market for private equity funds

A.2.1. Examples of secondary private equity fund stakes purchased by AlpInvest

Sale of limited partnership interests

February 2005: AlpInvest was lead investor in the purchase of a $1.2 billion private equity portfolio from Dayton Power & Light Company. The highly diversified portfolio consisted of forty-six funds. At the time, it represented one of the largest secondary transactions completed. AlpInvest offered the seller a substantial premium to book value.

May 2008: AlpInvest purchased a $330 million private equity portfolio from a US corporate pension plan. AlpInvest worked with the seller to construct a select portfolio of high-quality funds that would optimize pricing. AlpInvest's existing relationships with the managers of the respective funds allowed for an expedited due diligence and execution process.

Spin-out

February 2003: AlpInvest was a lead investor in the €1.5 billion divestiture by Deutsche Bank of its direct and co-investment private equity portfolio, consisting of over 100 underlying companies. It remains a watershed transaction in the development of the secondary market. The spun-out firm was subsequently renamed MidOcean Partners. The transaction provided MidOcean with the capital to acquire the portfolio, as well as capital for new investments.

December 2007: AlpInvest was a lead investor in a £1.1 billion spinout transaction involving the divestiture by a european financial institution of a portfolio of twenty direct private equity investments. It represents one of the largest European secondary transactions to date. The transaction created a new private equity fund to house the existing investments and provided the manager with incremental capital for new and follow-on investments.

A.2.2. The size of the secondary private equity fund market

The supply of capital is hard to assess but, as a yardstick, in 2009 alone secondary funds – whose objective is to buy these private equity fund holdings on the secondary market – raised $23 billion. The three largest such specialists are Goldman Sachs, Lexington Partners and Coller Capital.

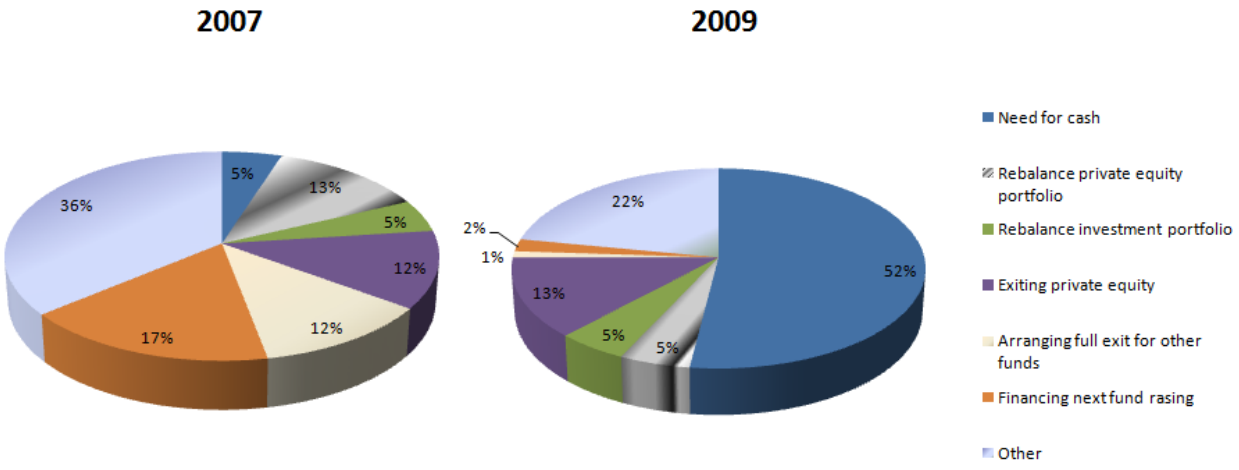
These buyers are a sort of fund-of-funds. To these, one should add direct buyers such as AlpInvest, the largest private equity investor in Europe (about $50 billion invested in private equity). Yet, it seems that overall there is a shortage of buyers, especially at the end of the market for large transactions like the Bank of America one, described in the text.

There is no data on the quantity of holdings that are on sale but some insiders provide various estimates. For example, Philip Bilden, Managing Director at HarbourVest Partners, a private equity fund of funds, estimates that the amount on sale is around $100 billion (late 2009). A back of the envelop calculation suggests that five per cent of the money invested seeks to exit private equity funds through the secondary market within four to six years of committing to the fund. Given that US$1.200 trillion was raised by private equity funds between 2005 and 2008, the secondary market could be worth as much as US$60bn over the next few years.

A.2.3. The returns on the secondary private equity fund market

There is no data on return available but there is a widely held belief among investors that, at least at the moment, returns on secondaries are good. For example, Probitas (a service provider) shows that in 2009 institutional investors expected returns for secondary funds to be among the highest of all private equity returns as shown in the graph below.

A.2.4. Reasons to sell on the secondary market



Appendix 3: Using listed fund of funds to infer risk exposures

Most of the private equity money is invested via private partnerships, not via listed vehicles. The research reviewed above focuses solely on private equity partnerships. As Jegadeesh, Kraussl and Pollet (2009) aptly point out, however, some of these listed vehicles are funds-of-funds (FoFs), which themselves invest in private partnerships. As a result, we can observe regular market prices for a pool of partnerships. At first sight this is an extremely attractive feature. In addition, although FoFs are supposed to select the best private equity partnerships, sample selection bias may be low.

These FoFs inform their investors annually of the total investment, distribution, net asset value and fees faced by the fund-of-fund. The general perception of NAVs in private equity is that the figures are not reliable. Hence, the information they provide cannot enable the computation of a reliable return. When conducting due diligence, large investors gather a good deal of information about the accounting of portfolio companies to evaluate the NAVs and therefore form an opinion on the market values and actual returns. Investors in listed FoFs do not have access to such detailed information. But even if these investors did have access to all the information possible, could they process it efficiently? Investors in listed vehicles are typically small and have little knowledge of the intricacies of such a complex asset class (e.g. Cumming, Fleming and Johan, 2010). So can investors come up with a reasonable market price? Do variations in such a market price provide reliable information about the risk profile of the asset class? Note that even if they were getting it right on average, this would not be enough for the beta to be right. The size of the up and down movements needs to be right.

Assume that the market under-reacts to news concerning private equity listed vehicles, possibly because it does not observe most of them. In that case, the stock may follow the market return more closely than it would otherwise do. Without such an under-reaction, the beta may be very different. Similarly, recent literature (e.g. Barberis and Shleifer, 2003) has pointed out that stocks tend to co-move more with those that are included in the same index than with those that are classified in the same industry. A chemical company that belongs to the S&P 500 may co-move more with Microsoft (as they both belong to the S&P 500) than with a chemical company not in the S&P 500. Hence, private equity listed vehicles may co-move more closely with the stock market than with the underlying business. Consistent with this observation, studies using listed private equity usually find a beta close to one. While some of the above are only assumptions, we believe that bearing them in mind is apposite and using estimates from listed private equity to compute a cost of capital may be premature.

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Figure 1: Capital raised per vintage year

Data are from Thomson Venture Economics. Numbers are in millions of US dollars. The dotted line represents venture capital funds while the circled line represents buyout funds.

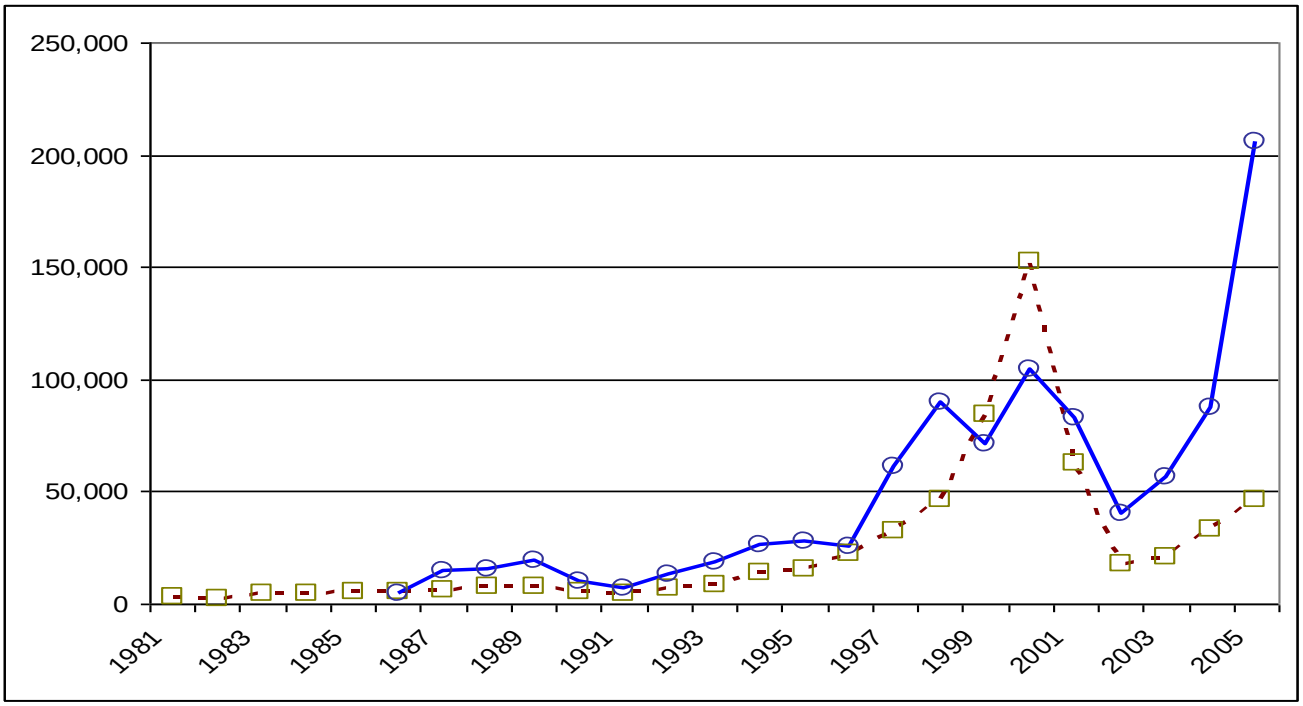

Figure 2 – Impact of fees on IRR

Fees are defined as the spread between the IRR net-of-fees and the IRR gross-of-fees. To preserve anonymity of the data, funds are grouped as a function of their gross IRR. Each group contains between 10 and 20 observations. The first group corresponds to gross IRR below 20%, the second group corresponds to gross IRR between 20% and 30%, etc.

Figure 3: Allocation of AlpInvest

Secondary funds represent all the investments made on the secondary market (direct purchase of funds and investemnts in specialized secondary funds). Primary funds are direct investments in private equity funds. Amounts (y-axis) are in million of euros. Data source: AlpInvest annual report.

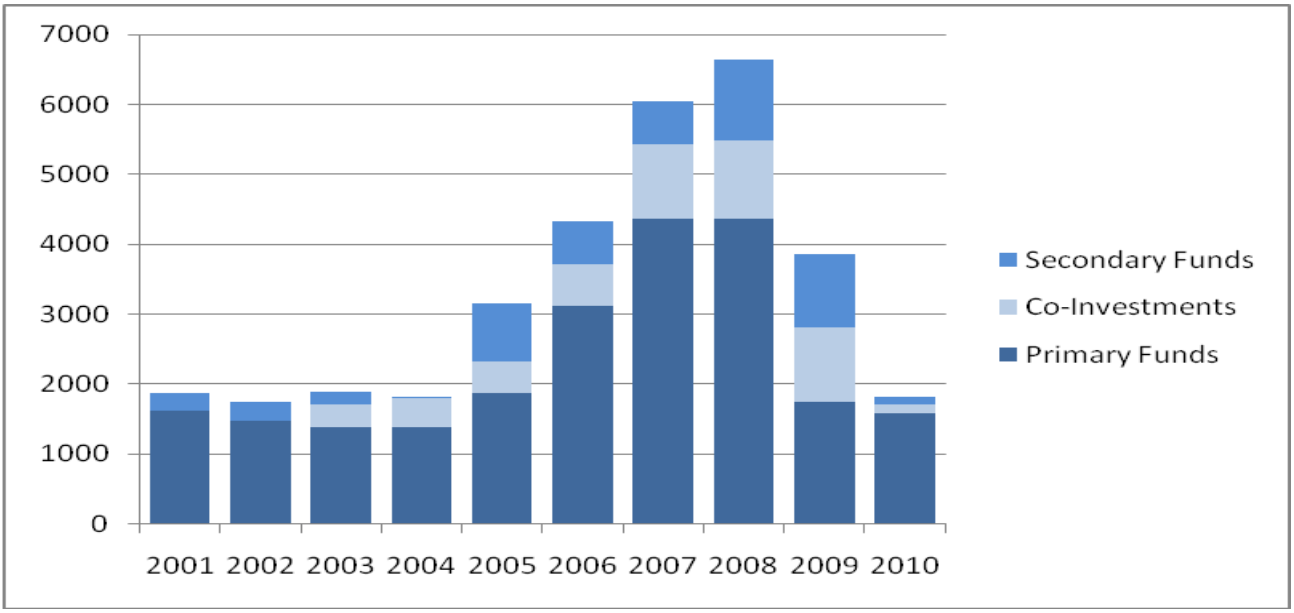

Figure 4: Fraction of companies going bankrupt by year of investment initiation

Worldwide sample of buyout investments. Source: Lopez-de-Silanes et al. (2010).