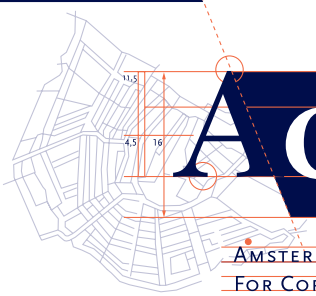

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Amsterdam Center
For Corporate finance

Topics in Corporate Finance

Regulating Private Equity

Ludovic Phalippou

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Ludovic Phalippou

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Preface

Private equity plays an important role in the financing of the corporate sector. An important issue is the attractiveness of this asset class to investors. That is, how well have private equity funds performed for their investors?

The importance of private equity is undeniable, and the returns that are available to investors will in part determine its future success. Against this backdrop the Amsterdam Center for Corporate Finance (ACCF) has decided to devote this issue of its discussion series "Topics in Corporate Finance" to this important topic.

Ludovic Phalippou, an Associate Professor of the University of Amsterdam, is one of the key researchers in this area. His research, reflected in this booklet, raises some points of concern. In particular, he concludes that the average private equity fund performs below reasonable (i.e. risk-matching) benchmarks. Fees paid by investors are high even when performance is below these benchmarks. Moreover, the contracts between private equity firms and their investors do not align interests, i.e. induce potential conflicts of interest. Professor Phalippou proposes some carefully crafted general guidelines for regulation.

We hope that you enjoy reading it, and that this publication may contribute to bridging the gap between theory and practice.

Arnoud W. A. Boot
Director ACCF

May 2010

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Introduction and Summary

Private equity has recently attracted a lot of attention from policy makers. To be sure, it is not the first time. The first wave of private equity in the US (in the 1980s) had also led to many political debates. The book and the corresponding movie called "Barbarians at the gate" describe the most famous deal of that first wave: the acquisition of the giant Nabisco by the tiny KKR.

What is new with the second wave (2004-2007) is that it was worldwide and much larger than the first wave. Probably as a result, the reactions have been more dramatic. Franz Müntefering made a name by treating private equity firms of "swarms of locusts." Politicians in most countries have conducted extensive hearings about the private equity phenomenon, including the Netherlands. What is very new is a number of legislative projects that have been adopted or are currently being discussed. Of those, the most dramatic project is probably the French-German led European directive on alternative investments.[1] The project achieved the rare outcome in politics of making unanimity; the hick is that it is unanimity against it. It seems that the project was primarily designed for hedge funds and at a later stage was said to encompass all alternative investments. Private equity is, however, a very different animal than hedge funds. There may be window dressing happening but no Madoff-type of fraud has been detected yet nor does it seem of any likelihood. There has not been a failure of a private equity firm that triggered an intervention from the Fed or the ECB, unlike in the LTCM case; nor does it appear a plausible outcome in the short or medium term. There has not been massive de-leveraging from private equity firms that triggered or deepened (or both) the recent financial crisis; the same cannot be said of hedge funds. Does it mean that private equity firms are angels that should be left alone, unregulated? Not in my opinion. But the reason is orthogonal to the current legislative efforts and as a consequence, the type of regulation that is needed is very different.

In this book, I describe a number of related lines of research. The bottom line from these research efforts can be summarized as follows. The average private equity fund performance seems to be below reasonable (i.e. risk-matching) benchmarks, fees paid by investors are high even when performance is below these benchmarks, and the contracts between private equity firms and their investors do not align interest, they have perverse incentives and could lead to investor hold-up.

In the first chapter, I will present evidence on the performance of private equity funds, their fees and their contracts. I will show the contractual features that bring conflicts of interest and potential hold-ups. The next two chapters will bring some details on two issues raised in the first chapter. The first issue is the problem of using IRR. Using IRRs not only means that the investor has a distorted view of performance, but in addition, creates perverse incentives for fund managers. The second issue is the gap between what industry associations advertise performance-wise and what academic research finds. In that chapter, I show that the method used for industry benchmark systematically bias

1 http://ec.europa.eu/internal_market/investment/alternative_investments_en.htm

upward true performance in the long-run. In both cases, simple solutions are proposed to improve the current state of affairs. In neither case, however, is the solution perfect.

Before diving into the evidence, it may be useful to have in mind a helicopter view of the private equity world which is consistent with all what follows. From this discussion, the needed type of regulation will naturally follow.

So let me begin by presenting this thesis but the reader may bear in mind throughout that this is only one view consistent with evidence but is certainly not the only one.

Private equity firms have lots of room to window dress their past performance. This is due to the nature of their business (investing in non-traded assets) and the flexibility they have (lack of unambiguous valuation rules and reporting standards). This means that they can present inflated performance to prospective investors. Some investors can undress them partially, maybe some can do it fully but many investors either do not know at all or choose to ignore this issue. The latter case is plausible due to the multiple layers in investor organizations and the relative complexity of the asset class. The idea, in a nutshell, is that the people working at an investor's private equity division have no incentive to report to their CIO that opportunities in private equity are poor, if it were the case. Since the private equity division has a similar window dressing toolkit as the private equity firms, they are themselves complacent. The CIO should be alarmed but she/he may not be acquainted enough with private equity to see through. In addition, one should not underestimate the number of investors who just invest in private equity because this is the successful "Yale model" of asset management and do not objectively assess their past performance.

Distorted performance means that too much money is allocated to private equity or that money is not invested optimally or both. The former statement may be obvious, the latter not. If the game in town is to produce the highest performance number possible, then the investment decisions, the strategy implemented and divestment decisions will be tilted to satisfy this objective. If this performance number can be window dressed, then efforts and decisions are titled towards the window dressing game rather than the investor's goal: having the highest risk-adjusted rate of return possible. (This may not be the society preferred outcome, but I leave this aside here.) The result of these actions is inferior true returns and a large number of investors wanting to invest in private equity very badly. This dear demand will mean that the power is in the private equity firms hands and that they can write the contracts they want. In particular, they can ask for high fees even if returns are lower than reasonable benchmarks. But why is it that more private equity firms cannot enter the private equity market, thereby competing away the fees? Some firms enter the market. There is evidence that new firms start when the sentiment towards private equity is highest. But to window dress one needs a relevant track record and not all firms/individuals have that. The window dressing tools mentioned in chapter one are more readily available when a firm has a longer history. So there is a barrier to entry. Also existing established firms cannot have too large a number of investors because there is a substantial (administrative) cost per investor. Another reason is that if they raise too much money they may have to invest in about anything and that would be visible even to the unacquainted CIO I refer to above.

Many private equity firms may not be aware they are window dressing because they are just doing what everyone does or what appears natural; some may do it but despise it. Note that in practice it is difficult for any firm to deviate from the window dressing/poor-contract equilibrium. A firm that would offer a different contract than anyone else would raise suspicions. A firm that would present an undressed track record may be perceived as inferior. It may be difficult to convince investors that others are cheating and this is why you look inferior but in fact you are superior. Again, this may raise suspicions. That firm would also have to demonstrate to many uninformed investors what other firms do. Other firms may sue the virtuous firm. So, it is difficult. Yet, we observe some differences across countries. Scandinavian contracts usually align interests more, European contracts are more aggressive than Scandinavian ones but less than US ones.

Importantly, as said above, this is a story consistent with empirical results. It may not be the only one. It does not even have to be the full story. But there is also casual evidence that this story is a significant part of the picture and this story is plausible. As such, it deserves to be investigated and treated seriously. It also means that preventive legislative steps may be taken. They have nothing to do with the current directives and other laws directed at private equity.

What is needed is someone (could be the European Union) that helps investors and fund managers to coordinate and reach the good equilibrium; the equilibrium in which private equity firms maximize risk-adjusted returns, and have contracts that align interests. The inferior private equity firms and private equity investors will lose, the rest will benefit. This is in no case trivial to do in practice. There is a reason why things are the way they are. It is basically impossible to measure risk and return at each point in time with non-traded underlying investments. Hence, the good equilibrium is not obvious but there are clear steps that can be made in its direction and these steps would probably lead to a substantial improvement. First, we may design a standardized "clean" contract, which gets stamped by the EU or any independent body. Investors may select funds that have the stamp or not. If they do not invest with stamped funds, they will be confronted to the was-unacquainted CIO who would now be sufficiently informed. If the CIO wants to go ahead anyway, then this is her/his problem. But information is now available. Similarly, rules can be put in place for the track records so they cannot be window dressed easily or not at all. My goal here is to give a flavor of what a regulation would be. Its exact design is left to future endeavors.

1 Performance, Fees and Contracts

1.1 Introduction

A large literature has pointed out that publicly owned companies may suffer from a separation of their ownership by dispersed shareholders and their day-to-day control by managers. This separation of ownership and control leads to a number of so-called agency conflicts, in which management may not act in the best interests of shareholders.

Because a private equity fund buys 100 percent of the company and controls it, it has often been argued that the arrangement will reduce these agency problems (Jensen, 1989; Shleifer and Vishny, 1997).[2] But while private equity funds have full control of companies, the fund itself is acting on behalf of outside investors. In a typical scenario, a private equity buyout fund buys a company by borrowing money from banks and by using cash provided by a small group of large investors such as university endowments or pension funds. The companies targeted for buyout could be listed on a stock exchange (for example, Nabisco in 1989 or Hospital Corporation of America in 2006) or be privately held (Hertz Corp. bought from Ford in 2005 or Warner Music bought from Time Warner in 2004). This new private equity fund governance structure may ameliorate some agency conflicts, but it may also introduce new ones. As a step towards understanding whether private equity buyout funds reduce overall agency conflicts, this paper describes the contracts between funds and investors and the return earned by investors.

This chapter sets the stage with a puzzle: the average performance of private equity funds is above that of the Standard and Poor's 500 – the main public stock market index – before fees are charged, but below that benchmark after fees are charged. This fact leads naturally to a discussion of the institutional background of buyout funds, beginning with the compensation contracts between the fund and the investors. Next, it covers how buyout funds report their returns.

1.2 The Puzzle: Low Average Returns on Private Equity Funds

The two studies with the most extensive and most representative samples of cash flows going from and to investors of private equity buyout funds are Kaplan and Schoar (2005) and Phalippou and Gottschalg (2009). Kaplan and Schoar have data on 169 funds that are U.S.-based or U.S.-focused. Phalippou and Gottschalg include the same funds, plus non-U.S. funds for a total of 314 funds. Both studies find that the average performance of buyout funds is below that of the Standard and Poor's 500, after fees are taken into account.

The findings of these studies contrast with the glowing reports of high returns from private equity industry associations although the underlying data are the same (see chapter 3). Phalippou and Gottschalg (2009) show that three elements contribute to the

2 I focus on private equity funds that operate buyout funds, but in some cases, private equity funds are also involved in venture capital, or in various kinds of mezzanine (debt), infrastructure or real estate funds.

discrepancy. First, industry associations use a sample of funds that slightly over-represent good funds. Second, they treat the self-reported accounting values of funds as market values. This approach imparts an upward bias, because a number of poorly performing, old and inactive funds report surprisingly high accounting values for their on-going investments. Third, they often use the internal rate of return as a performance metric, which is particularly misleading in the buyout context for reasons explained below. A fourth and important explanation is detailed in chapter 3; it is a methodology flaw in the industry approach.

An incompletely resolved issue here is whether the lower returns from private equity might reflect a lower level of risk. Driessen, Lin and Phalippou (2008) devise an econometric approach to estimate the risk of funds such as buyout funds and find that the buyout funds in their sample have a slightly lower risk than public equity. However, they have a relatively small sample of buyout funds which makes this estimate imprecise. Franzoni, Nowak and Phalippou (2009) have a large sample. They find that the risk is higher than that of public equity. This makes the puzzle only stronger.

In any case, it seems unlikely that most investors expect an average performance of private equity buyout funds, after fees have been charged, below that of major stock indices.

1.3 Compensation Contracts

The investors in buyout funds "commit" a certain amount of capital at fund's inception and cannot add capital during the fund's life. Fund managers search out investments during the first five years of the fund, known as the "investment period." When an investment is identified, the fund "calls" the necessary capital from the investors. The companies held by the fund are called "portfolio companies." Every two to five years, the private equity buyout firm which runs the buyout funds may seek to raise a new fund. When raising a new fund, the firm will send a fund-raising prospectus that contains the track record, contract, biographies, strategy and case-studies on the past investments of the firm. The data I use below comes from a proprietary collection of fund-raising prospectuses. It contains information on 12,000 investments made by buyout funds from 1971 to 2007 in 80 countries.

This section begins with a composite of the key compensation terms for a buyout fund. It then offers a concrete, if simplified example, of how a buyout firm would compute fees and report its performance.

A Composite Fee-Contract

There are four sets of fees in a typical fee agreement for a private equity buyout fund. First, the annual *management fee* is 2 percent of capital commitments until the end of the five-year investment period. Thereafter, the management fee is 2 percent 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 divested by the fund, 100 percent goes to the investors until the cumulative distribution to investors equals an "internal rate of return" (a term explained in more detail in the next section) of 8 percent per year. This 8 percent 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 percent annual return, 100 percent of additional returns goes to the private equity firm until it has received 20 percent of the difference between total amount distributed and the sum of the two components just mentioned (the "catch up provision"). At that point, 80 percent of returns have gone to investors and 20 percent to the private equity firm, and any additional returns above that level are also divided 80:20. Finally, most contracts have a "claw-back provision," which holds that on termination, if the final carried interest due is lower than what was received, the excess amount is returned to investors.

Third, *portfolio company fees* are taken directly out of the portfolio companies and so 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 specify neither the amount nor when such fees will be charged. Here, I concentrate on the two components that Metrick and Yasuda (2008) document with practitioner interviews. They report that usually *transaction fees* are 2 percent of transaction value below $100 million, 1 percent of transaction value for the next $900 million and 50 percent of these expenses are used to offset management fees. These are charged at entry but can also be charged when exiting an investment. Next, Metrick and Yasuda report that typical *monitoring fees* are 0.40 percent per annum on the value of the firm, for five years, irrespective of the actual length of the investment, and 80 percent of these expenses are used to offset management fees. For the example that follows, I ignore other portfolio company fees and account only for transaction fees and monitoring 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 up to three months before being distributed to investors. Also, distributions to investors can be in kind and with restrictions rather than cash, which creates an 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 these extra fees.

An Example – The Representative Fund

Now 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 captures the fact that private equity funds typically invest the committed capital slowly over time (Ljungqvist and Richardson, 2003). 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, tax rate is set to zero and the fund does not change the net asset value of its portfolio companies over time. Table 1.1 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 percent management fee is $5 million per year – or $2.5 million every six months. This fee is then reduced starting June 1986 to 2 percent 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 significantly smaller. This is because the fees taken directly on the portfolio company partly offset the management fees due (as described above).

The second column shows the carried interest. This is taken directly out of the exit proceeds. 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 starts thus at $104.6 million plus $330 million and grows at 10% per year while paying $0.88 million of 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 sums to $20.35 million. The rate of return is above 8 percent (the hurdle rate), hence a carried interest is received. It amounts to 0.20 x (226.08-110-20.35) = $19.15 million.

The third and fourth columns are the portfolio company fees received by the fund managers. The monitoring fees are 0.4 percent 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 percent of value under $100 million and 1 percent of 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 net present value of each fee. 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 ad-hoc correction for risk.

The portfolio company fees are the largest fees. Again, investors do not pay these fees directly. They are taken directly from the investments. They are thus the least salient and, as we saw, the most opaque of all as their amount is not even specified ex-ante. In Table 1.1, they amount to $23 million of net present value, which is slightly more than a third of the net present value of all fees. The other two fees are also about one third of the

total. In their quantification exercise, Metrick and Yasuda (2008) also find each fee type represent one-third of the total.

This example ignores the fact that some investors will be invited by the fund to co-invest in some deals and that no fees are paid on these co-investments. If an investor gives $100 million to a fund and gets invited to co-invest in all the deals at the same proportion as the fund for another $100 million, then the fee bill is essentially divided by two. Certain investors, therefore, pay lower fees than other investors and may also get higher gross-of-fees returns if they get invited to co-invest in better deals.

An investor cannot know in advance the quality and quantity of investments it will get invited to co-invest in. Yet that often has a large impact on the fee bill and final performance.

Table 1.1: Fees Paid by Investors to Fund Managers

This table shows the fees paid by investors for a representative fund with $250 million of capital committed. It makes two five-years investments of $110 million each. Each investment is leveraged three times ($1 of equity, $3 borrowed). The cost of debt is 7 percent

	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	1.10			1.76	-1.10	1.76
Jun-86	0.80			1.76	-0.80	1.76
Dec-86	0.80			1.76	-0.80	1.76
Jun-87	0.80			1.76	-0.80	1.76
Dec-87	0.80	19.15		1.76	202.86	224.57
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	0.40	19.15		0.88	202.86	223.29
NPV	19.59	17.95	9.34	13.34	7.14	61.09
Yearly fee	2.23%	2.04%	1.06%	1.52%		
Multiple					1.68	2.26
IRR					10.83%	17.64%

per year. Investments return 10 percent per year (on asset). The first column shows management fees, the second column shows carried interest, 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, yearly fee equivalents and practitioner performance measures (multiple and internal rate of return).

Performance Measures

Table 1.1 also shows the cash flow stream both net of fees and gross of fees. Measuring the performance of an investment from its cash flows is not obvious. Textbooks often recommend using a Net Present Value (NPV), but in practice two other metrics are used: an "internal rate of return" and a "multiple". The Internal Rate of Return (IRR) is the discount rate that makes the NPV equals to zero. The "multiple" is the undiscounted sum of the cash flows received divided by the sum of cash flows paid. Table 1.1 shows that investors receive a multiple of 1.68, an IRR of 11%, and an NPV of zero. Gross of all fees, the multiple is 2.26, the IRR is 18 percent, and NPV is $75 million.

It is trivial to compute the net present value of fees but less obvious to give a more intuitive measure of fees such as a percentage per year of amount invested. One way is to compute how much a standard equity mutual fund would have to charge per year to collect the same net present value of fees as the buyout fund. I thus assume that a mutual fund does like the buyout fund. It invests the same amount at the same time, use the same amount of debt, has the same return on asset but charges a yearly 1% of equity value fee. The present value of the fees collected by this fund is $8.8 million. To compute such a present value, I use 16% discount rate, which is the internal rate of return achieved by the mutual fund.

The total fees collected are above 7% per year. They appear an excessive compensation given the underperformance of the S&P 500 index after fees.

Cross-Section of Fees

The fee for the representative private equity buyout fund shown in Table 1.1 is in line with what both Metrick and Yasuda (2008) and Phalippou and Gottschalg (2009) report for the average fund in their sample, so the simple calibration exercise above satisfactorily captures the essence of actual cash flow data. To get a sense of the actual empirical distribution of fees across funds, I now use the sub-set of fund-raising prospectuses for which both internal rate of return net-of-fees and gross-of-fees are reported. I have 98 pairs of gross and net internal rate of return. The equally weighted average of fees is 13%. Results are shown in Figure 1.1.

Figure 1.1: Cross-Section of Fees
Annual fees are proxied by the spread between gross and net internal rates of return. R-square and slope refer to the results of an ordinary least squares estimation.

The relation between fees and gross internal rate of return is close to perfectly linear. A simple linear regression produces an R-squared of 70%. The slope represents the actual pay-for-performance contract. The slope of 0.25 is higher than the typical carried interest of 20 percent. This difference is due to the way in which transaction fees rise with the performance of the buyout fund, as mentioned below.

To preserve anonymity of the data, I group observations as a function of performance. I define seven groups which all contain between ten and twenty observations. The first group corresponds to gross internal rates of return below 20 percent, the second group corresponds to gross internal rates of return between 20 and 30 percent, the third group corresponds to gross internal rates of return between 30 and 40 percent, etc. The plot shows how regular the relation is.

1.4 Why Some Investors May Misunderstand

The average payment received by buyout funds appears excessive. How then have such funds continued to attract investors? This section discusses some potential reasons behind investor misperceptions. It begins with arguing that while compensation contracts for private equity funds may appear similar, they often differ in crucial details in a way that often generates larger fees than expected. Moreover, current standards for reporting the performance of buyout funds tend to produce exaggerated performance figures, while the relevant information needed to correct the potential exaggeration is typically "shrouded."

Variations within Similar-Looking Fees

Fees for private equity buyout funds are typically described as being 2 percent management fees and 20 percent incentive fees, with a hurdle rate of 8 percent. 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 for buyout funds of 2 percent. Such fees are typically charged on the committed capital, not on capital invested by the fund. Ljungqvist and Richardson (2003) and Phalippou and Gottschalg (2009) report that on average, half of the capital committed to a private equity fund is actually invested. Hence a 2 percent fee on capital committed is the same as a 4 percent fee of capital invested, which means that the actual management fee bill is significantly higher than what may be thought at first sight. Contracts do vary on this provision; for example, some firms charge the management fee on some combination of capital committed and invested. As a result, although most buyout funds charge a 2% management fees, 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 percent 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 percent per annum on capital committed; for others, it is when they have returned 8 percent per annum on exited capital (like the example above). In the past, some funds would receive carried interest separately for each investment made, which is an expensive detail for investors. 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. Some buyout funds pay accrued interests when refunding the carry; some do not. Another related "detail" is the hurdle rate. It is almost always 8 percent but it can be soft or hard. The soft version is the one described above and lead to a payment of 0.20 x (229-110-20.35) = $19 million. The hard version would lead to less than half that payment: 0.20 x (229-(110+20.35)*(1.08)^5) = $7.5 million. All these details thus make a large difference for the incentive fees paid.

Details like the refunding rule is important for portfolio company fees. Given the magnitude of these fees, different refunding rules generate very different fee bills. For transaction fees, Metrick and Yasuda (2008) report that 80 percent 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 percent; and the remaining refund an amount in between these two numbers. For monitoring fees, Metrick and Yasuda (2008) report that most funds refund 80 percent to investors.

Nonetheless, an important detail is missing in the contract. It is never specified how much will be charged in the first place. To get a sense of how much portfolio company fees may be charged, investors ask private equity firms for the list of previous investments

and the list of related portfolio company fees charged. Investors say that some firms refuse to provide such information and when they look at those that provide it there is wide discrepancy in the rates applied for portfolio company fees.

This fact is puzzling. How can investors accept such contracts? When asked, some investors ignore (voluntarily or involuntarily) such details. The investors who do not ignore them say that if a fund charges too much portfolio company fees its return is negatively affected and it may upset its current investors. Hence, it would raise less money in the future, thus collect less fees in the future. It obviously seems like a fragile equilibrium especially if there is a permanent downturn in the buyout fund raising industry. Note also that this means that a good performing fund will probably charge more portfolio company fees than a poorly performing fund. Hence, the proportion of incentive fees in the total fee bill may be larger than at first sight.

Most fees and costs imposed by private equity buyout firms on their investors are complex and contain a multitude of dimensions. It is thus difficult for investors to compare different contracts, to anticipate accurately the magnitude of fees.

Using IRR Flaws to Improve Performance

A private equity buyout firm that has raised several funds need not report the performance of each fund separately, but instead can pool them arbitrarily. The arbitrary grouping of funds can bias performance dramatically, especially when firms have had some highly performing investments in their early days. By grouping all funds together, the reinvestment assumption of the internal rate of return will kick in – future payouts can be reinvested and earn the same return as past payouts – and will hide bad recent investments. This will be detailed in chapter 2.

Shrouded Negative Internal Rates of Return

When displaying the performance of past individual investments, private equity buyout funds always report multiples, but not always internal rates of return. Table 1.2 shows that the poorer the performance (according to the multiple) the more likely it is that the internal rate of return is missing. When the multiple for an individual investment is less than 0.1 (that is, less than 10 percent of the money is returned to investors), then the internal rate of return is missing in more than 80 percent of the cases. As the multiples get better, internal rates of return are more frequently reported. When the multiple is above 2, internal rates of return are missing only in 10 percent of the cases (and these are from funds that do not report any internal rate of return). If the multiple is exactly zero – in which case the internal rate of return should be -100 percent – then the internal rate of return is not reported in 98 percent of the cases.

Table 1.2: Missing Poor Performance Figures
This table shows the fraction of internal rates of return that are not reported as a function of the multiple of the investments (fraction missing). Statistics are based on the sub-sample containing buyout investments that are either fully realized (liquidated) or partially realized. Investments made in the United States and those liquidated are shown separately. The total number of observations that fall in each multiple range is displayed below each fraction, in italics between parentheses. The data comes from a proprietary dataset of buyout fund raising prospectuses.

Multiple range	All	US	Liquidated
(0.0 – 0.1]	0.81	0.81	0.81
	(166)	*(95)*	*(98)*
(0.1 – 0.5]	0.76	0.70	0.78
	(367)	*(195)*	*(178)*
(0.5 – 1.0]	0.60	0.59	0.65
	(402)	*(200)*	*(120)*
(1.0 – 2.0]	0.21	0.19	0.11
	(1458)	*(641)*	*(603)*
(2.0 – 5.0]	0.10	0.10	0.08
	(1539)	*(794)*	*(1029)*
(5.0 – …	0.10	0.10	0.08
	(715)	*(476)*	*(536)*
All	0.26	0.24	0.19
	(4647)	*(2401)*	*(2564)*

Shrouded Accounting Information and Keeping Losers at Cost

About half of the investments listed in the average fund-raising prospectus for a private equity buyout fund are fully realized. The performance of the other half of the investments is computed using valuation standards applied by the fund itself (see chapter 3). Obviously, aggressive revaluations of on-going investments could exaggerate past performance. However, the main issue appears to lie with the valuations that are not updated; specifically, the performance of poorly performing investments is rarely acknowledged by a write-down. The related contractual provision typically states: "Investments will be valued at cost unless a *material change* justifies a different valuation."

In my sample of private equity buyout investments, about one-third of the investments are losses and two-thirds are gains. However, at age 1, investments reported at a gain are five times more numerous than investments reported at a loss; at ages 2 and 3, investments reported at a gain are three times more numerous than investments reported at loss. Among investments that are four years old or more, the proportion between gain and loss is steady and close to that of the universe. This pattern implies that the performance of poorly performing investments in fund-raising prospectuses is likely to be substantially exaggerated.

This pattern is only indicative, but it does coincide with some casual evidence. In 2008, a regulation has been passed to enforce some common valuation standards. The *Wall Street Journal* reported on May 5, 2008, that the stock price of a private equity firm called American Capital had decreased substantially (Eavis, 2008). This decline was attributed to the claim that poorly performing investments held by this firm had previously been valued at cost, but that the new accounting rule was forcing it to place a market value on these investments – which would cause the firm to report losses. Interestingly, one may interpret the decrease in stock price as the benefits of loose accounting standards for the buyout firm. Usually, improved accounting standards increase the value of companies as it decreases asymmetric information. One interpretation is that private equity firms manage to trick investors thanks to lose accounting rules and as a consequence better accounting standards reduce their value.

Sample Bias: Good Track Records are Shown More Often

About 20 percent of the fund-raising prospectuses include the list of investments that some partners were "responsible for" in funds they have worked for. These investments performance is above-average (2.8 average multiple versus 2.1 average multiple for the rest of the sample) and prospective investors see them several times (for all funds that will be raised by the new employer and for all funds that will be raised by the old employer). This creates an obvious sample bias. In addition, no rules specify who is "responsible for" an investment, and hence fund managers have some discretion for the inclusion of past investments – which may partly explain why these investments have better performance than average.

Certain fund-raising prospectuses even specify that they are selecting track records from the past. For example, a prospectus can state that "the objective of the current fund is to invest in U.S. firms with sales between $100 million and $500 million. The following track record shows the performance realized in the past on the investments that correspond to our objective." Obviously, in retrospect, one can select future investment criteria that correspond to successful past investments. Another observed case is a track record that is the one of "the current team," which implies that by reorganizing or firing, a fund can improve its track record. These explicitly selected track records are relatively rare perhaps because it is too obvious that some past investments have not gone well. However, such selection is possible and sometimes observed. All these facts mean that prospective investors see more often the best returns, which may contribute to a biased perception of the performance in the industry.

Key Shrouded Details: Duration, Leverage, Net-of-Fees Performance and Fee Details

The prospectuses issued by private equity firms often withhold important details. For example, prospectuses report multiples of cash flows received over cash flows paid in, but a multiple without duration is of little use. A multiple of 2 generated over three years is a significantly better performance than a multiple of 2 generated over eight years. In

more than a third of prospectuses, information on date of entry and exit of investments is not provided. Even when investors are provided the dates, no information is provided on intermediate. Thus the exact (weighted) duration is not provided. Less than 2 percent of the prospectuses show a holding period weighted by cash flow. Some funds (about 5 percent) also report the date of initial realization, in which case the holding period shown is shorter than the actual one. Hence, accurate information on duration is missing, often making multiples of little use.

In addition to duration, it is important to know leverage. Obtaining a multiple of two with $1 borrowed for $1 invested is significantly better than obtaining a multiple of two with $2 borrowed for $1 invested. However, the extent of leverage seldom is mentioned on prospectuses. Finally, the details of how much fees were charged in the past are never mentioned and only 25 percent of the funds report overall past performance net of fees.

Discussion

Economists are congenitally suspicious of any argument where people are consistently fooled; after all, even if the prospectuses themselves are not transparent, even unsophisticated investors should be able to request the data necessary to compute past performance net of fees, and to learn from it.

Investors may indeed request additional information from buyout fund managers to make the calculations for duration, leverage and net-of-fees performance of previous investments as well as to get additional details of the fee contract. Not many do so and, when they do, the fund may refuse to provide this additional information, especially if the investor is small.

Nonetheless, even if investors have all the relevant data, simply measuring performance and the impact of fees is difficult. To illustrate this point on a concrete example, I take the statement on the website of CalPERS – one the largest investors in private equity.[3] The headline says that "since inception in 1990 to September 30, 2007, the Alternative Investment Management Program has generated $12.5 billion in profits for CalPERS. Given the young, weighted-average age of the portfolio (3.5 years) this amount will continue to grow as the portfolio matures." In short, CalPERS seems pleased with its private equity investments and continues to increase its allocation to private equity. However, CalPERS has invested $25 billion and so far only $19 billion has been received back. The rest of the gain represents accounting values not yet realized. If we look only at mature private equity funds (those raised between 1990 and 2000) in order to avoid relying on accounting valuations, the multiple for CalPERS is 1.5. Is this return a good one? If the investments are held for three years on average, this multiple equals that of a U.S. stock-market index fund over the same period. If the investments are held for five years – which is the average in the industry – the rate of return for CalPERS would be a disappointing 8 percent. It is thus difficult to understand why CalPERS would be so happy and the justification on their website is "short" to say the least. So, is one of the largest investor in buyout funds learning from past return? Maybe not.

3 http://www.calpers.ca.gov/index.jsp?bc=/investments/assets/equities/aim/home.xml>, dated May 19, 2008.

In more dramatic cases, learning has occurred. For example, several banks have decreased (or stopped) their allocations to private equity and banks are identified in Lerner, Schoar and Wong (2007) as consistently worst investors in private equity. Hence, when it is obvious enough, investors may learn but when it is less obvious, the complexity of performance measurement may seriously impair learning.

There may also be organizational reasons within financial markets that allow the combination of low performance and high fees in private equity buyout funds to persist. One possibility concerns agency conflicts that may exist within the investor organization. The person in charge of private equity investments in an organization may be compensated based on the reported (misleading) performance. Others in the investor organization may not be acquainted enough with all the details of the private equity industry to monitor or to detect a discrepancy between actual and reported performance, or may not have sufficient incentive to do so.

Yet another possibility is an economy described by Gabaix and Laibson (2005) where sellers choose to hide certain contractual details. As one example, banks do not compete on costs such as usage fees for automatic teller machines, or fees for minimum bank balances. Instead, banks "choose to shroud" these fees and customers do not learn about the "details of the fee structure until long after they have opened their accounts." Gabaix and Laibson also show that the printer market operates in a similar way. The main part of the actual cost is hidden from customers. They propose an explanation based on consumer myopia; that is, some customers are just not paying attention. Those who do pay attention can avoid the higher costs, and no firm has an incentive to be more transparent. Such reasoning may apply to private equity buyout funds as well.

1.5 Contracts and Conflicts of Interest

To further isolate potential conflicts between the managers of private equity buyout funds and their outside investors, I discuss a few features of buyout contracts that exacerbate conflicts of interest, rather than mitigate them. First, managers have an incentive to time cash flows in a way that will increase incentive fees. Second, certain contracts provide steep incentives for shortening investment horizons. Third, transaction fees may distort choices of buyout firms in terms of leverage, size of investment, and number of changes in capital structure.

Carried Interest And Strategic Timing of Cash Flows

Assume a $500 buyout fund makes five investments of $100 each. After five years, the market value of the first investment rises to $300 while the market value of the other investments declines to $10. All investments are expected to grow at a rate of 10 percent per year from that point onward. Still, for simplicity, assume that the fund manager can liquidate investments either now or at the end of the fund's life, in five years time. Finally, assume that investors' hurdle rate is below 10 percent, which means that investors would prefer that all investments were liquidated at the end.

If the fund manager liquidates all the investments at the end, no carried interest will be paid because the fund earned less than the 8 percent hurdle rate. If the fund manager liquidates the first investment now, it receives 0.20 x (300-100) = $40 of carried interest which can be invested for four years at say 5 percent per year. In five years, the manager needs to refund $40 to the investors ("claw-back" provision) minus the (say 50 percent) taxes paid on the $40. This strategy leads to a final profit of 40 x 1.05^4 – 40 x 0.5 = $4.3. Hence, fund managers have an incentive to liquidate the good investment immediately and to delay as much as possible the exit of the poorly performing investments. Such incentives are rarely in line with the benefits of outside investors.

Incentives to Exit Early

Private equity contracts often contain provisions that encourage early exit from investments. For example, some contracts allow re-investment of capital coming from investments that are shorter than 18 months. This provision provides a clear incentive for funds to exit investments early because it offers them a chance to reinvest funds and thus effectively increase the assets under management, hence fees. Distributing large payments early to investors also often increase more the internal rate of return than the effective rate of return. As funds are just on their internal rate of return instead of effective rate of return, they have an incentive to distribute large dividend early in the fund's life. Finally, exiting some investments early may increase the collected carried interest as seen in the previous section.

On the other side, early exit from an investment can also decreases management fees after the investment period, and may decrease total incentive fees. From the standpoint of manager compensation, the question of whether benefits of early exit outweigh the costs remains an open empirical question. However, evidence that suggests that private equity funds sell their portfolio companies at a larger discount than other sellers (Lee and Wahal, 2004, and Masulis and Nahata, 2008) may be interpreted as selling companies too early.

Out of the 2500 liquidated buyout investments in my dataset, 6 percent liquidated within 1 year, 23 percent liquidated within two years, and 44 percent liquidated within three years. Hence almost half of the investments are held for less than three years. Interestingly, the short-term investments have similar multiples as the long investments, but significantly higher internal rate of return (69 percent for short-term investments versus 10 percent for long investments), which hints that more successful investments are being exited more quickly.

Transaction Fee Incentives

Managers of private equity buyout funds receive compensation for making a purchase or changing the capital structure which are not always fully refunded to investors. These fees may distort choices of the buyout fund in terms of leverage, size and number of transactions that occur.

Buyout fund managers may prefer to invest in many small deals, rather than a few large ones, because they earn more per dollar invested when arranging small deals (usually 2 percent of asset value) than when arranging large deals (usually 0.5 percent of asset value.) Similarly, fund managers may earn higher fees by selling a company in ten different pieces rather than in one piece. In addition, fees are charged on *asset* value and not on equity value. This provision provides incentives to increase debt, because a larger deal means larger transaction fees. Finally, all the pay-for-doing type of compensation pushes managers to make more changes than would be optimal — like modifying capital structure.

In addition, contracts do not always fully regulate the relations between several funds of the firm. As carried interest is perceived only if a fund is profitable, it may be fee-maximizing to allocate anticipated high performance investments to profitable funds and not to unprofitable funds or to sell investments at a discount from an unprofitable funds to a profitable funds.

All these distortions are however speculative in the sense that they are what a contract allows or do not prevent but future research may hopefully measure empirically the actual distortions if any.

1.6 Conclusion

The average private equity buyout fund has a low rate of return for its outside investors after fees are subtracted, and charge 7% fees per year for a fund underperforming the S&P 500. This finding is consistent with a statement by who is certainly the most knowledgeable private equity investor (David Swenson, CFO of Yale endowment): "The large majority of buyout funds fail to add sufficient value to overcome a grossly unreasonable fee structure." This result in addition to the observation that compensation contract buries in details costly provisions that cannot readily be justified on the basis of proper incentive alignment means that it is premature to assert that the agency conflicts are lower in private equity than in public equity. More research is needed before we can make a clear judgment on the benefits and costs of private equity governance structure compared to the alternative of public equity governance structure.

Also puzzling is the fact that investors keep buying aggressively buyout funds with such contracts. One potential explanation is misleading information and insufficient expertise of certain investors. Nonetheless, the complexity of the private equity fund arrangements make difficult things as fundamental as measuring past performance, fees paid and risk. This complexity may prevent learning and maintain the low-performance-high-fees situation.

Lest these judgments about buyout funds seem overly harsh, it is perhaps worth pointing out that research has reached similar conclusions about actively managed mutual funds and hedge funds. An extensive literature holds that average fees for actively managed mutual funds are too high given their performance (e.g., Malkiel, 1995). However, investors keep on purchasing actively managed mutual funds and the answer may lie in a too optimist probability to choose top-performing mutual funds. In addition, a variety of

conflicts of interest between mutual funds and investors has been revealed.[4]

A similar argument can be made about hedge funds. The average performance of hedge funds appears close to that of public equity (Fung, Hsieh, Naik and Ramadorai, 2008). In addition, research by Brown, Goetzmann and Liang (2006) points out some potential conflicts of interest. Specifically, funds "either rely on portfolio managers to determine the final prices of their own portfolios, conduct day-to-day accounting internally without a third party verification, or lack a fraud-proof mechanism for authorizing money transfer." Their results indicate that "funds with deficient operating mechanisms suspiciously report higher than average risk-return trade-offs."

4 For example, researchers have documented the existence of "soft dollar" arrangements where mutual fund managers does not choose the broker with lowest commission. Investors indirectly pay the extra cost and the manager receives a kick-back from the broker (Conrad, Johnson and Wahal, 2001). In addtion, they found favoritism within fund families (Gaspar, Massa, and Matos, 2006), late trading practices (Zitzewitz, 2006), and incubation practices which artificially generate good track records (Evans, 2006).

2 The Hazards of Using IRR to Measure Private Equity Performance

2.1 Introduction

Most of the investments in asset classes such as real estate and private equity (include buyout, mezzanine and venture capital) are made via private partnerships. Measuring performance in these partnerships is important for investment allocation decision as well as for compensation. The main performance measure that is used in practice is the Internal Rate of Return (IRR).[5] However, it is known that the effective Rate of Return (RoR) experienced by investors differs from IRR.[6] This difference means that the incentives of the asset managers partly differ from the objective of the investors. It also means that investors may unknowingly select the wrong funds or reward the wrong managers if they use the conventional IRR.

This chapter makes two main contributions. First, it shows the problems that arise when IRR is used as a performance measure in the context of private partnership investments. It shows that in addition to the well-known pitfalls, IRR leads to a number of issues which are especially dramatic in private equity. The second contribution is that it describes in details a solution. While it is known that using Modified IRR (labeled MIRR), or, equivalently, Net Present Value, (labeled NPV) largely tackles the well-known pitfalls of IRR, its practical implementation in a private partnership context is not obvious. I show how MIRR can be implemented at the investment level and at the fund level in order to not only tackle the well-known pitfalls of IRR but also provide the right incentives to the fund managers.

More specifically, I first show that the implicit re-investment assumption made when using IRR as a rate of return creates room for managers to window dress performance. For example, a firm with good performance in its early funds and recent poor performance can pool the investments made by all the funds and the overall IRR will then show high performance. A firm in the opposite situation may use a so-called time-zero IRR to show better performance. Second, using IRR biases upward volatility estimates. The commonly held belief that there is wide dispersion in performance in private equity is thus due in great part to the re-investment assumption inherent to IRR rather than genuine spread in effective performance. Third, the common practice of averaging IRR is hazardous. In the private equity context, an average IRR is a meaningless and misleading number. It systematically exaggerates true overall performance. Fourth, using IRR provides severely distorted incentives for the timing of cash flows. I show situations in which a manager can improve its IRR by distributing early dividends even when this action comes

5 In practice, a multiple (sum cash distribution plus estimated value of on-going investments divided by cash invested) is also shown in performance report but play a secondary role.

6 In theory, they could be equal but the conditions under which this happens are rarely fulfilled in practice simply because IRR is used when a rate of return cannot be easily computed. They are equal if one can re-invest intermediary distributions at the IRR rate and borrow at the IRR rate to finance intermediary payments. This is virtually impossible. A special case is when there are no intermediary cash flows, then IRR and rate of return are the same but when there are no intermediary cash flows in an asset class, people do not use IRR.

at the cost of destroying substantial value. Judging a manager on IRR can thus provide strong incentives to burn cash. A related point is that in a situation where 'kick-backs' can happen, the use of IRR provides incentives to alter significantly cash flow amounts. For example, if a fund has performed well enough and brings public an investment towards the end of its life, then the exact pricing of the IPO will hardly influence its IRR. In this case, the fund may accept a deep underpricing of the IPO if it brings press attention or other benefits. Obviously, IPO underpricing comes at a cost for fund investors.

In practice, there are two main reasons why investors do not use MIRR. First is the belief that the current performance metric (IRR) is good enough but the evidence provided in the first part of this paper and summarized above should tackle this objection. Second is that the implementation is not obvious and the second part of this paper should tackle this objection.

2.2 IRR PITFALLS

IRR is the most common way of measuring performance for both private equity investments and corporate projects.[7] IRR is defined as the discount rate which makes the Net Present Value (NPV) of a series of cash flows equal to zero. Investment textbooks hardly talk about IRRs and never about its shortcomings or alternatives (e.g., see Bodie, Kane and Marcus, 2005, Francis and Ibbotson, 2002).[8] Paradoxically, investors in such assets have to turn to Corporate Finance textbooks to read about performance measurement. This is because their problem is closest to that of CFOs evaluating the profitability of corporate investments. Here, I take private equity funds as an example, but the results apply to other asset classes (e.g. real estate).

Working Example

To illustrate the different problems and solutions, Table 2.1 shows hypothetical cash flows from 4 funds. For an investment of $100 million, fund X returns $150 million after one year and then $50 million in the third year. Overall, it doubles the money and boasts an IRR of 68%. For the same amount invested, funds Y1 and Y2 return $100 million after five years and another $100 in year eight. They also double the amount invested, but the IRR is 11%. Fund Z returns $50 million in the fifth year and $10 million in year twelve, corresponding to an IRR of -8%. These figures correspond to the average IRR of private equity funds that are in the bottom quartile (-8%), inter-quartile (10%) and top quartile (65%) according to Thomson Venture Economics.

7 For example, the EVCA (European Venture Capital Association) and the BVCA (British Venture Capital Association) use IRR as their standard performance measure. For corporate projects, Graham and Harvey (2001) report that 75% of CFOs use IRR.

8 Bodie, Kane, and Marcus (2005) mention IRR but do not say anything about shortcomings. It does not say what to do to measure performance of a stream of cash flows despite a whole chapter dedicated to performance measurement (chapter 24).

A Major Pitfall: Reinvestment Assumption

IRR equals the effective rate of return if and only if intermediary dividends are reinvested at the IRR rate. This means that when IRR is high, the spread between IRR (the performance measure) and the effective rate of return (what is of interest to investors) is positive and large and when IRR is low, the spread between IRR (the performance measure) and the effective rate of return (what is of interest to investors) is negative and large.

The above fact is well-known, but its direct consequences for private partnership performance evaluation are less known if at all. The first consequence is that using IRR as a proxy for performance is misleading for an asset class that is volatile and has large intermediary cash flows. Table 2.1 shows the cash flows for our working example. Investors in fund X get a 68% rate of return only if they can invest the $150 million dividend for two years at a rate of return of 68% per year. In this case, the $150 million dividend will be worth $420 million at the end of year 3, which added to the $50 million dividend provides the ($470/$100)^(1/3)-1 = 68% per annum rate of return. The question is whether getting $420 million out of a $150 million dividend in only two years is feasible in practice or not. If the answer is no then this IRR is an exaggeration of the rate of return experienced by investors.

The second consequence is that performance appears more dispersed than it really is. There is a lot of talk about private equity fund performance being widely dispersed. This claim is mainly based on the spread between the IRR of the top quartile and that of the bottom quartile fund. In our working example, this spread is indeed very large (76%). Often, researchers/practitioners compare this spread to the spread in rate of returns between top and bottom quartile mutual funds. This is comparing IRRs with rate of returns or, to put it simply, "apples with oranges". The re-investment assumption means that funds with high IRR have a higher IRR than effective rate of return and funds with low IRR (below re-investment rate) have a lower IRR than effective rate of return. It is thus mechanical: volatility is exaggerated. The true spread depends on the re-investment rate. If we assume that it is 12% per annum for the full 12 years, then the spread in rate of return between the two extreme funds shrinks from 76% to as low as 15% (Table 2.1, using Modified IRR – see below for definition).

Table 2.1: Working Example
This table shows hypothetical cash flows from four funds. On the right hand side, their aggregated cash flows (firm XYZ) are shown both gross of fees and net of fees. Fees are assumed to be 4% per year. The stock market index is set to a constant 12% per year. NPV is computed using 12% as a hurdle rate. Modified IRR (MIRR) is computed assuming dividends are re-invested at 12% until the end of the period (date 12).

Year	Fund X	Fund Y1	Fund Y2	Fund Z		Firm XYZ (gross)	Firm XYZ (net)
0	-100	-100	-100	-100		-400	-416
1	150	0	0	0		150	134
2	0	0	0	0		0	-16
3	50	0	0	0		50	34
4	0	0	0	0		0	-12
5	0	100	100	50		250	238
6	0	0	0	0		0	-12
7	0	0	0	0		0	-12
8	0	100	100	0		200	188
9	0	0	0	0		0	-4
10	0	0	0	0		0	-4
11	0	0	0	0		0	-4
12	0	0	0	10		10	6
IRR	68%	11%	11%	-8%		12%	5%
MIRR	17%	12%	12%	2%		12%	10%
IMIRR	34%	12%	12%	2%		12%	10%
NPV	69.52	-2.87	-2.87	-69.06		-5.28	-95.41
Duration	1.42	6.25	6.25	5.58			

Window Dressing with IRR: Strategic Grouping of Funds

Managers can use IRR flaws to hide some poor performance. To illustrate, let us assume that the firm XYZ has raised first fund X, then fund Y1, then fund Z. If an investor receives the IRR of these four funds separately, she may not be very enthusiastic. The first fund had an IRR of 68%, the second had an IRR of only 11% and the last one an even worse IRR (-8%). This sharp decrease in performance over the years would probably raise some concerns. Now, assume that firm XYZ shows a track record in which all funds are pooled together. Its track record would be what is shown in the second column of Table 2.2 (called case 1). In this case the IRR is a staggering 47%. This would probably give a very different impression to the investor.

The problem still comes from the re-investment assumption. The firm XYZ distributed some large dividends 20 years ago and it is assumed that these dividends have been

invested at a rate of 47% per year for 20 years. Consequently, the recent performance is irrelevant because these re-invested dividends are extremely large. In Table 2.2, the case 2 shows that if the latest dividend was as much as $1 billion the IRR would still be 47%. So the IRR is the same whether the last dividend is $10 million or $1 billion. This is yet another illustration that IRR may be a very misleading performance indicator and that it is possible to act strategically so as to exploit IRR flaws.

Table 2.2: Grouping Successively Raised Funds
This table shows cash-flows from firm XYZ if it had raised first fund X, then (in year 4) fund Y1 and lastly (year 13) fund Z. These three funds are like those shown in Table 2.1. Three cases are shown. In case 1, fund Z has the same cash flows as in Table 2.1 while in case 2 and 3 fund Z has a different final cash flow (high in case 2 and low in case 3).

Year	Case 1		Case 2	Case 3
0	-100		-100	-100
1	150		150	150
2	0		0	0
3	50		50	50
4	-100		-100	-100
5	0		0	0
6	0		0	0
7	0		0	0
8	0		0	0
9	100		100	100
10	0		0	0
11	0		0	0
12	100		100	100
13	-100		-100	-100
14	0		0	0
15	0		0	0
16	0		0	0
17	0		0	0
18	50		50	50
19 to 24	0		0	0
25	10		1,000	0
IRR	*47%*		*47%*	*47%*

IRRs Cannot be Averaged

An important pitfall for IRR is that the average IRR is different than the IRR of the aggregated cash flows. It is possible that an average IRR is above a benchmark and yet, if an

investor would have invested in each fund, she would have underperformed the benchmark. The bias can be upward or downward and in general relatively small.

In private equity, however, aggregation is a dramatic issue because performance is negatively related to duration. This fact, pointed out by Phalippou and Gottschalg (2009) and López-de-Silanes, Phalippou and Gottschalg (2009) on different datasets, is strong in the data and has important consequences. The large negative correlation implies that average performance is always substantially biased upward. In the example shown in Table 2.1 – which uses actual data from private equity fund performance – the IRR of the aggregated cash flows is 12%. The average IRR is, however, almost twice as much (21%). Hence if an investor had invested an equal amount in the four funds, she would *not* have earned the average IRR of 21% but half that amount.

As another example, consider an equal investment in Fund X and in Fund Z. Fund X posts an IRR of 68% over 3 years and fund Z posts an IRR of -8% over 12 years. Even though the same amount was invested, it is obvious that the average IRR (30%) is meaningless. As mentioned above, the problem is severe in private equity because funds with longer duration underperform dramatically, just like in this example. Phalippou and Gottschalg (2009) suggest to correct for this by weighting each IRR by duration. This is an intuitive albeit imperfect correction. In Table 2.1, durations are respectively 1.4 years, 6.2 years and 5.6 years.[9] The duration weighted IRR is 10%. It is more reasonable than the plain average IRR but, again, it is not the same as the IRR of the aggregated cash flows. Hence, an average IRR is a meaningless and misleading number, especially in private equity.

Endogenous Cash Flows

The most important issue with IRR is the incentives it provides to managers to strategically time their cash flows. Irrespective of whether this is done in practice or not, it is important to know the incentive a performance measure provides.

An example is shown in Table 2.3. Consider first a high performance fund. This fund invests 100 at date 0. Assuming that the rate of return over the first year is 50%, the market value of the fund has increased to 150 at date 1. The fund can sell the investments now or keep them and earn 20% per year for 4 more years. Assuming the hurdle rate is 12%, it follows that the investors would prefer the fund to keep the investments until the fifth year. If fund A does what its investors want, its IRR is 25%. However, if fund A exits the investments after one year, the IRR will be 50% - twice as much. This provides strong incentives for fund managers to terminate good investments early even though this hurts investors. If this happens in practice, we should observe that good investments are shorter. As mentioned above, this is precisely what is found in the data. However, this

9 Duration has to be computed like in the fixed income literature. The answer consists in computing the weighted average payment time using the present value of the payments as weights. Compared to the fixed income setup, in some practical situations like in private equity, an extra difficulty is that capital contributions also vary over time. It is therefore necessary to compute the average time of capital contributions as well. The difference between average time of dividends and average time of capital contributions is the duration of the investment. Duration can be negative. Note also that funds Y1 and Y2 terminate before fund Z, but have a longer duration.

is not a proof that managers are strategic because other explanations exist for a negative correlation between duration and performance. It is nonetheless important to note that the data are consistent with this behavior and that judging someone on IRR induces this type of incentive.

Table 2.3: Timing Exits
This table shows hypothetical cash-flows. The stock market index is set to a constant 12% per year. NPV is computed using 12% as a hurdle rate. The rate of return is always 50% for the first year. In the second column, the rate of return is 20% from year 1 to 5. In the third column, the rate of return is 10% from year 1 to 5.

Year	Sell all	Keep all	Early dividend
0	-100	-100	-100
1	150	0	100
2	0	0	0
3	0	0	0
4	0	0	0
5	0	311.04	73.21
IRR	50%	25%	28%
NPV	33.93	76.49	30.82
MIRR	19%	25%	18%
IMIRR	50%	25%	18%

Consider now the case of intermediary dividends. Buyout funds have recently been criticized for buying a company, borrowing large amounts with company's assets as collateral and using the borrowed money to pay large dividends. This phenomenon is also consistent with an attempt to inflate IRRs (although not a proof). For instance, consider the last case in Table 2.3. The investments made by the fund have a value of 150 at date 1. Assume that distributing a large dividend at this stage (say 100) would halve future performance to 10% yearly (instead of 20%). The idea is that distributing a dividend early is not optimal economically (this is an assumption). If a dividend is distributed early anyway, IRR is 28%. If not, IRR is lower (25%) even though the investment earns a 20% return until year 5 instead of 10% return. Hence a manager's incentive in this example is clearly to destroy value to pay an early dividend because it increases its IRR.

Another such example is with fund X of firm XYZ in Table 2.1. If this fund has as much as $50 million to distribute in year 10 and does so, the IRR stays at 68%. A fund manager in this situation is thus indifferent between distributing $50 million (half of what has been invested!) to investors or nothing. A manager acting strategically could then do the following. Sell the investment in year 10 for $10 million instead of $50 million to another private equity firm called A. Then firm A could return the favor by selling an investment at a discount to another fund of the XYZ firm. Hence so-called secondary buyout transactions (transactions between two private equity firms) can help gaming the IRR. This operation is even easier if it happens between funds of the same firm.

Interestingly, other exit channels are affected by this incentive. For example, in the case of an IPO, fund X manager would not mind leaving some money on the table (via large underpricing) in exchange of subsequent favors, because the underpricing will not change its IRR. One of the reasons behind the large IPO underpricing of venture-backed internet companies that are (informally) given by some prominent venture capitalists is that the pricing of the IPO had little impact on their funds' IRR because the IRR was already very high. Some venture capitalists thus did not mind too much their IPO to be underpriced as long as they get some kind of kick-backs (which could be making it to the front page of the Wall Street journal for exceptional first day return of their IPO).

An obvious force against the behavior described above is that the manager earns a carried interest. Hence he/she loses 20 cents of each dollar wasted. This may be enough to align incentives in many cases but probably not in all cases. The question is to know how large a distortion this incentive creates in practice. While such research is beyond the scope of this article, some recent research provides results that are consistent with this (again, this is not a proof, simply consistent evidence). Lee and Wahal (2004) shows that venture capital backed IPOs are more underpriced and Nahata and Masulis (2007) show that M&As in which a venture capital firm is the seller is more underpriced.

A similar issue is seen in Table 2.2 when successively raised funds are grouped together. The difference between the 3 cases is the final cash flow of fund Z. Irrespective of what fund Z pays as a final dividend, the IRR is exactly the same. That is, whether fund Z returns at the end is $1 billion, $10 million or nothing, the IRR stays at 47%!

To correct for the problem discussed above and to measure its importance in practice, one needs the exact cash flow amounts and timing of funds. Nonetheless, even without this information, one can get a sense of the distortions by comparing IRR and multiples – two performance measures that are typically provided.

Table 2.4 shows an extract of Calpers performance report. Two funds are among the top performers with an IRR of 39% (Media com partners) and 46% (Doughty Hanson). However, the multiples are different. Media com partners have a 4.5 multiple while Doughty Hanson has a multiple of 2. To generate a multiple of 4.5 and a rate of return of 39% without intermediary cash flows, one should hold the investment for 4.5 years. This is close to the average duration of private equity investments and thus this high return is plausible, which would make this fund indeed exceptional. To generate a multiple of 2 and a rate of return of 46% without intermediary cash flows, one needs a duration of less than 2 years. Such a short duration is rare but also unlikely here because this fund is still running after 12 years (it reports a value for on-going investments of 10% the total amount invested). Hence, this IRR and multiple combination indicates that the rate of return experienced by investors is much lower than 46%. There must have been some large dividends early on that inflated IRR. Note that Blackstone II is in a similar situation with an IRR at 38% and a multiple at 2.2. This does not mean that fund managers game IRR on purpose but it means that judging funds on their IRR is misleading.

Table 2.4: Calpers Performance Report 1990-1995, as of June 2007
Investment, Distribution and Total (Distribution + Remaining Values) in Million of Dollars.

Fund Name	Year	Inv.	Dist.	Total	IRR	Mult.
Apax Ventures IV International Ptrs L.P.	1990	10	31	31	0.25	3.2
Warburg, Pincus Investors, L.P.	1990	100	236	236	0.15	2.4
Permira U.K. Venture III	1991	13	37	37	0.31	2.8
Hellman & Friedman Capital Partners II	1991	87	239	239	0.23	2.7
Media Communications Partners II, L.P.	1992	25	111	112	0.39	4.5
First Reserve Fund VI, L.P.	1992	35	99	100	0.26	2.9
Alta V Limited Partnership	1992	35	84	85	0.26	2.4
Landmark Equity Partners III, L.P.	1993	24	63	64	0.36	2.7
1818 Fund II, L.P.	1993	75	117	125	0.11	1.7
Blackstone Capital Partners II, L.P.	1994	84	174	182	0.38	2.2
Landmark Equity Partners IV, L.P.	1994	31	45	46	0.17	1.5
FS Equity Partners III, L.P.	1994	75	164	165	0.16	2.2
Green Equity Investors II, L.P.	1994	74	153	154	0.14	2.1
Levine Leichtman Capital Partners I, L.P.	1994	108	121	124	0.12	1.2
Aurora Equity Partners I, L.P.	1994	27	34	43	0.11	1.6
Bachow Investment Partners III, L.P.	1994	38	39	57	0.10	1.5
Technology Partners Fund V, L.P.	1994	18	24	26	0.07	1.4
Stonington Capital Apprec 1994 Fund LP	1994	101	32	97	0.00	1.0
Rice Partners II, L.P.	1994	60	51	52	-0.04	0.9
Fairview Capital I, L.P.	1994	50	22	27	-0.14	0.5
Information Technology Ventures I, L.P.	1995	25	139	139	0.90	5.6
Doughty Hanson Fund II, L.P.	1995	44	85	90	0.46	2.0
Kline Hawkes California, L.P.	1995	41	112	113	0.41	2.7
Hellman & Friedman Capital Partners III	1995	120	275	275	0.35	2.3
APA Excelsior IV, L.P.	1995	25	48	50	0.20	2.0
Apollo Investment Fund III, L.P.	1995	137	207	219	0.11	1.6
McCown De Leeuw & Co. III, L.P.	1995	51	67	68	0.10	1.3
Lombard/Pacific Partners, L.P.	1995	355	371	446	0.05	1.3
SpaceVest Fund Limited Partnership	1995	31	16	17	-0.07	0.6
TSG Capital Fund II, L.P.	1995	49	31	32	-0.09	0.7
INROADS Capital Partners, L.P.	1995	20	3	5	-0.20	0.3

2.3 Towards a Solution: MIRR

Modified IRR (MIRR)

The textbook solution is to use NPV for choosing among projects/funds. Practitioners use this rule more now than in the past for corporate projects (see Damodaran p. 312) but still use IRR and other rules of thumb. In private equity, all fund raising performance reports I have seen use multiple and IRR, never NPV. A typical report reads like Calpers report (see Table 2.4). Only multiple and IRR are reported.

There are two main reasons why NPV is not used in practice. First, practitioners do not want to *assume* a cost of capital, as its value is somewhat subjective. In a corporate finance situation, this is not really a valid excuse because the IRR needs to be compared to a benchmark to decide what to do and this benchmark is in fact the corporation (or division) cost of capital. In an investment context, the case is more difficult. It would clearly be unpractical if each fund chose its discount rate (cost-of-capital) and then reported the NPV given that cost of capital to investors. Nonetheless, most funds charge carried interest (incentive fees) with a 8% hurdle rate. This suggests that there is a quasi consensus that 8% is a good hurdle rate. All funds could then use this 8% as a constant discount rate, making performance comparable across funds. Another solution would be for all funds to use a broad and fairly universal market index such as the S&P 500. Hence, we can overcome the first obstacle to the use of NPV.

The second obstacle is that NPV is an abstract value and scale dependent. In fact NPV is very tangible as it is a cash amount; it is the size of the 'free lunch' (and if negative, how much money was burned). Nonetheless, we can overcome this obstacle by using a modified IRR. To compute a modified IRR, one assumes that the capital committed to a fund is put on an 'account' that earns the hurdle rate (e.g. 8% per year). The capital called by a fund is taken out of this account and capital distributed goes to this 'account'. When the fund liquidates, the MIRR is computed by taking the amount on the account at liquidation and dividing it by capital committed, everything raised to the power one divided by duration. This basically boils down to calculating NPV but give a per annum number.

In Table 2.1, I show the MIRR of the four funds. Fund X has an MIRR of 17% compared to a 68% IRR and, also of interest, MIRR improves the performance of fund Z from -8% to 2%. As I mentioned above, fund Z was unfairly penalized by the IRR assumption that the $50 million distributed half way was invested at -8% per year. The average MIRR is now 11%, which is about half of the average IRR and approximately equal to the stock-market return. It is also close to the IRR of the aggregated cash-flows.

But most practitioners object using MIRR because they say they over-commit to private equity funds and know which funds are good ex-ante, hence can re-invest the dividend in such top funds. First of all, if this claim is true, the MIRR computed on the entire track record of the investor will show this ability. Second, for high IRRs, the above claim is simply unrealistic. A simple reality check is whether anyone investing $100 million in private equity ended up with $18 billion 10 years down the road (multiple of 180). This is what a 68% rate of return means. And it turns out that such multiples are more rare than

the number of funds showing IRRs above 68%. In Calpers report, 20% of the funds have an IRR above 30% but only 5% of the funds have a multiple above 3.7 (which is what an investor earning 30% per year for 5 years would obtain).

In addition, it may be helpful to see what is necessary to make the 68% rate of return come true even with perfect foresight. Our investor has $100 million and got her full $100 million in fund X. The following year, our investor receives $150 million. She now needs: i) that a type X fund is available that year, ii) that she spots a type X fund, i.e. perfectly knows which fund is top, and iii) manage to invest $150 million in it (a steep 50% increase in the allocation to private equity in only one year). And every year goes like this. After 10 years, it is a whopping $18 billion that needs to be invested in a type X fund. Clearly, this is not feasible and thus 68% is not a return that will be achieved. It is simply an illusion and this type of objection to MIRR thus does not resist common sense.

Issues with MIRR

Fund X has a MIRR of 17%. To compute this number, I assume that all the proceeds received by the investor (year 1 and 3) went to a 12% rate of return account until year 12. This may be unfair. An alternative solution is to stop when the fund is done, i.e. at year 3. In this case the MIRR is 34%, which I label IMIRR (Isolated Modified IRR).

Why are they so different and what do they mean? IMIRR assumes implicitly that once the fund is liquidated, a similar fund is available for investment. So intermediate dividends get invested at a pre-determined rate and once the fund is liquidated, the money can be fully invested into a similar fund. Let's continue the example with fund X. The investor invests $150 million for two years at 12%. When the fund liquidates, in year three, the investor can invest the $238 million into fund X again. She then receives $357 million one year later. Continuing like this forever, the rate of return obtained will be 34% per annum – which is the IMIRR.

To gain further intuition, let's go back to the example shown in Table 2.3 when we saw the perverse incentives provided by IRR. IMIRR ranks the first option (liquidate all immediately) the most valuable. This is because IMIRR assumes that if everything is liquidated the same investment opportunity (one that asks for 100 and pays 150 a year later) will be available immediately. Obviously, in such a scenario, liquidating everything is the preferred option. IMIRR thus always solves the issue with unwanted intermediate dividend payments, but still faces a challenge for strategic final liquidation. As a consequence, it seems best to report IMIRR for the individual investments of a fund and to report MIRR for the whole private equity fund. This is detailed and shown below.

2.4 Towards a Better Private Equity Industry Standard for Performance Reporting

Let us start with the whole fund performance measure. To compute MIRR, we first need to choose a starting date and a final date. It seems most natural to start at the time of fund inception and terminate at the contracted termination date of the fund. Next, I suggest

to assume that the full amount of capital committed is put on a separate and fictitious account at inception and earn the hurdle rate. This assumption has several advantages. First, it gives the right incentives. If a fund calls capital but cannot put it at work above the hurdle rate, its performance will be negatively affected. Similarly, if a fund can put capital at work above the hurdle rate but does not do so, its performance will also be negatively affected. Third, this assumption makes calculations simple and more transparent.

Thus, when the fund calls money (including fees), it is as if it drew from this account. Similarly, when there is a divestment, the money goes to the S&P account. At the end of fund's life, both the MIRR and incentive fees can be calculated. MIRR is simply the amount of money on the fictitious account at liquidation divided by the amount of capital committed to the power one over fund duration. For incentive fees, the following rule appears simple and fair:

i) ci%*(Capital Committed)*(MIRR *minus* hurdle rate) if MIRR > hurdle rate
ii) zero otherwise

The hurdle rate can be the S&P 500 index fund geometric average return over the same period or a fixed number like 8%. The carried interest "ci" could be any number; for example, 20%.

Table 2.5: A New Performance Report Format
Hypothetical cash flows from N investments made by one fund (Panel A). S&P 500 rate of return set to 18% p.a. Assume capital committed is 100. Fund multiple is sum distributed divided by capital committed.

Panel A: Generated Cash Flows

Dates	Inv. 1	Inv. 2 to N-1	Inv. N		Fund
Mar-91	-10	0	0		-10
Mar-92	50	-20	0		30
Aug-92	0	-20	0		-20
Apr-93	0	-20	0		-20
Jan-94	10	0	0		10
May-94	0	-20	0		-20
Jun-95	0	20	0		20
Jul-96	0	20	0		20
Jun-97	20	0	0		20
Aug-97	0	20	0		20
Jan-98	0	0	-10		-10
Sep-98	0	20	0		20
Jan-99	0	0	-10		-10
Oct-99	0	20	0		20
Nov-00	0	20	0		20
Dec-00	0	0	10		10

Panel B: Traditional Performance Measures

	Start date	End date	IRR	Multiple
Investment 1	1 Mar-91	1 Jun-97	405%	8.0
…	…	…	…	…
Investment N	1 Jan-98	1 Dec-00	-25%	0.5
	Start date	**End date**	**IRR**	**Multiple**
Fund performance	1 Mar-91	1 Dec-00	43%	1.9

Panel C: Summary Performance Report Format

	Start date	End date	IMIRR_S&P	IMIRR_8%
Investment 1	1 Mar-91	1 Jun-97	56%	46%
…	…	…	…	…
Investment N	1 Jan-98	1 Dec-00	-17%	-20%
	Start date	**End date**	**MIRR_S&P**	**MIRR_8%**
Fund performance	1 Mar-91	1 Dec-00	19%	13%

In Table 2.5 – Panel A, I show hypothetical cash flows realized on *N* investments and their aggregation at the fund level. For the sake of the example, I ignore fees. In Table 2.5 – Panel B, I show the usual performance measures. IRR is 43% and multiple is 2. This is a fairly usual outcome for private equity funds and typically seen as an excellent one as the IRR is compared to average S&P 500 over the same period (18%). The MIRR of this fund is, however, 19% when using the S&P 500 (MIRR_S&P). MIRR is even lower when using the 8% hurdle rate (MIRR_8%) as it goes to 13%.[10] The verdict about this fund is that it outperformed the S&P 500 slightly and outperformed by 5% p.a. the 8% flat benchmark. So the answer naturally depends to a certain extent on what investors think the right benchmark is but the conclusion does not change dramatically despite a large difference between the S&P rate of return and 8%.[11]

As mentioned above, IMIRR seems more appropriate at the individual investment level. The reason is that there is no capital committed per investment and investments should be treated the same irrespective of the time at which they were started in fund's life. However, as we saw above, with IMIRR, fund managers have an incentive to fully liquidate good projects too early and delay too much the final liquidation of poor projects (as long as an intermediary dividend was paid). However, if they do so, the fund level performance will be negatively affected because it is computed with MIRR. So this

10 The logic is that the hurdle rate for incentive fees should be the cost of capital. If investors agree that the level of risk requires a flat 8% hurdle rate then this is the hurdle rate.

11 Note that the multiple which is often used in practice is equal to (1+MIRR)^(duration) when the re-investment rate is set to zero percent. In this example it is 7%.

should not be a concern. I show the results for investment 1 and *N* in Table 2.5 – Panel C. As observed above, the IMIRR provides more reasonable performance numbers. The IRR of investment 1 is above 400% while IMIRR is between 46% and 56% depending on the hurdle and the IRR of investment *N* is a low -25% while IMIRR is between -17% and -20%.

IMIRR and MIRR are serious improvements on IRR. They align incentives between manager and investors and provide a more accurate picture of performance. In addition, MIRR, unlike IRR, is always uniquely defined and does not require any optimization algorithm. It is trivial to compute. One of the issues with MIRR is that it is a geometric return. It is therefore not a number that can be used for optimal portfolio allocation. To get an arithmetic return, one needs to observe a large cross-section of projects to estimate the expected return (over a given period). Methods such as those designed by Cochrane (2005), Driessen, Lin and Phalippou (2007) and Korteweg and Sorensen (2007) achieve this. For the portfolio allocation decision, one needs also to determine alpha, volatility and correlation. However, in practice, it is investor dependent (David Swensen would use different estimates than the average investor). In addition, it is often unwise to perform such an analysis for non-traded alternative investments such as real estate funds and private equity funds. Not only the Mean-Variance solution is bound to be noisy, but investment opportunities vary significantly over time. It then seems better to allocate as a function of the number of spotted positive NPV funds. The rule is to invest in any positive NPV fund.

The use of MIRR would prevent some additional potential games. First, some funds report investment duration but sometimes calculate it as "date-of-first-divestment" minus "date-of-first-investment". Hence an investment may last for 10 years, but as long as it pays a dividend after 1 year, the reported duration is one year. A multiple of say 2 or 3 then looks good given the 1 year holding period, but it is obviously misleading. Second, some fund computes different IRRs. The main alternative is time-zero IRR. Funds may then report the IRR that looks better. With MIRR these issues become irrelevant.

Finally, it seems fair to have performance of the overall fund reported net of fees and all cash flows to be reported at the date they were actually paid to investors (not always the case – sometimes announcement dates are used). Performance should be shown separately for all funds (no pooling, nor insertion of investments done when working for another firm). It also seems important to enforce a fixed duration window for funds (e.g. 8-12 years). It prevents some potential gaming at the cost of less flexibility. However, with the development of a secondary private equity investment market, the cost of forcing liquidation may be minimal.

2.5 Conclusion

One of the most central question that Finance theory answers is whether a project should be undertaken or not. For investment professionals, this question reads "should a given project have been undertaken or not." This is performance measurement; an often overlooked field and yet central to the success of asset managers. In this article, a challenging

aspect of it is presented. Namely, how to measure performance when all we have is a stream of cash flows generated by an asset or a manager.

Academics advise NPV while practitioners prefer IRR. Survey evidence shows that decision makers prefer to use rules such as IRR or cash multiples to decide whether they should invest in a project or not. Graham and Harvey (2001) report that 75% of surveyed CFOs use NPV (always or almost always) but an equal fraction use IRR (always or almost always). The situation is very similar for private equity funds. When raising capital, funds provide track records expressed in terms of IRR and cash multiples exclusively. This state of the world often puzzles academics but to be fair, implementing NPV is actually trickier than it seems from textbooks. In this article, it is first shown that IRR is probably the worst performance metric one may use in a private equity investment context. It exaggerates the variation across funds, exaggerate the performance of the best funds, can be readily inflated and provide perverse incentives to fund managers. Next, a way to implement NPV in practice via the use of MIRR is put forward. A framework is proposed for performance reporting based on MIRR for private partnerships. The objective is to open a debate and to invite more work towards a more acceptable performance reporting standard for the benefits of all private equity practitioners and of those providing the money.

Appendix: *Other known pitfalls of IRR*

IRR has some other known pitfalls. The first one is computational difficulties. Computation of the IRR involves an iterative search procedure that may not converge and can lead to multiple solutions. The computational difficulties are presented in almost all the finance textbooks. It also happens that Excel cannot find a solution, while more advanced software do. In private equity, not finding a solution happens frequently, especially at the individual investment performance level. Multiple solutions are, however, rare despite the fact that private equity cash flows alternate positive and negative signs.

The second pitfall often mentioned is that of the 'Lending versus Borrowing Problem.' If a project start with a small investments, then returns quickly a large amount of capital and then takes on a number of additional investments that do not lead to any distribution, then the IRR may be high even though more capital is invested than is returned. It is as if the computer thinks that you are the one receiving the money for the project and not the one paying (see Brealey and Myers, 2000, p. 101). Hence, receiving less than you paid becomes good news. In our example, if fund X pays 400 in dividends instead of 150 at date 1 and then invests 400 at date 2, the IRR is 40%, while the NPV is negative and the fund has invested more than it distributed.

The third known pitfall is that it does not rank projects correctly in many situations. Corporate Finance textbooks show extensive example when this happens due to difference in project scale. In private equity, as each fund has many investments and divestments this issue is always present and IRR-based ranking always differ from what the optimal ranking would be according to the NPV or MIRR.

The fourth known pitfall is that IRR cannot be compared to a rate of return. The IRR of private equity funds is frequently compared to the average rate of return of stock market indices over the same time period but this comparison is not proper (see Damodaran, 2001, p. 301). Not only one cannot compare IRR to an average hurdle rate, but also the amount invested at any point in time is different for private equity compared to the stock-market index. The private equity industry had much larger amounts invested in the late 1990s and early 2000s than in the 1980s, it is thus unfair to compare private equity performance to something that gives the same weight to each time period.

3 Bias in Existing Private Equity Benchmarks

3.1 Introduction

Private equity industry associations (e.g. NVCA, EVCA) announce aggregate performance every quarter (see Appendix A and Figure 3.1 for the most recent US release). Invariably, these returns are above those of public equity markets over long horizons (e.g. the previous 10, 15, 20 years). Such a consistent outperformance makes private equity a very special asset class.

Figure 3.1: Latest Performance Report
US Venture Capital Index Returns for the Periods Ending
9/30/2009, 6/30/2009 and 9/30/2008

For the period ending	Qtr.	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
September 30, 2009	2.3	-12.4	1.3	4.9	8.4	36.6	23.1
June 30, 2009	0.2	-17.1	1.3	5.7	14.3	36.3	22.7
September 30, 2008	-2.9	-0.9	10.2	10.7	40.2	33.3	22.2
Other indices at September 30, 2009							
DJIA	15.8	-7.4	-3.3	1.8	1.6	8.7	9.2
NASDAQ Composite	15.7	1.5	-2.0	2.3	-2.5	7.0	7.8
S&P 500	15.6	-6.9	-5.4	1.0	-0.2	7.6	8.0

Source: Cambridge Associates LLC

These reports are the unique source of performance information for an asset class worth over $1 trillion. As a result, they are widely disseminated by the press to the investment community (see Appendix B). These performance reports are also widely used for benchmarking and for deciding on asset allocation by institutional investors. In addition, not only may these reports directly influence bonuses and staffing of the private equity divisions but they may also influence other divisions. If the reported returns are inflated, more resources would be (wrongly) devoted to the private equity team and less to the other teams and vice versa.

As seen above, two academic studies have used the same underlying data as those used by the industry associations but different methodologies (Kaplan and Schoar, 2005, and Phalippou and Gottschalg, 2009). Both find results that are more sobering: both buyout and venture capital funds have a performance that is at best similar to that of the S&P 500. These studies used data ending in 2001 and 2003 respectively. More recent performance may be higher, but in those years (2001-2003), the industry associations were also posting strong outperformance of private equity compared to public equity (see appendix A). Hence, difference in methodology is probably an important explanation for the discrepancy in results.

The common belief is that the current industry approach leads to lower returns than the true returns because of the conservativeness of Net Asset Values (NAVs). In addition, it is believed that the effect of NAVs decreases over longer horizons. Hence, as the horizon increases, the return converges towards its true long term average. In this paper, I show that the opposite is true. The current methodology generates upward biased returns because of (not despite) the conservativeness of NAVs. Over long horizons, the bias usually gets larger (not smaller). There is, therefore, no convergence. In addition, the sensitivity of returns to NAVs is larger (not smaller) at long horizons. Small and plausible changes in NAVs lead to dramatic changes in the long-horizon performance.

The reason for this is that the current industry approach measures performance from one point to the other (called end-to-end returns or point-to-point returns). Thus it uses NAV at the beginning and at the end of the period. If NAV under-estimates market value then there are two opposite effects. The effect on initial NAV exaggerates performance and the effect on final NAV under-estimates performance. Which effect wins will mainly depend on the horizon and the performance level. Longer horizons and higher performance will make the initial NAV relatively more important and make the measures return more upward biased.

3.2 Measuring Aggregate Performance: The Academic Approach

The academic approach is basically a textbook approach. First, a homogenous group of funds is selected (e.g. all funds raised between 1980 and 1993). This is to minimize sample selection bias. Selecting liquidated funds would create a substantial bias because better funds tend to liquidate more quickly. Second, all the distributions and investments of that group get aggregated as of a given date (e.g. 31 December 2003). This final date should be far enough from the latest vintage so that (one hopes) most investments are liquidated. This way, we do not need to rely (too much) on the reported NAV of non-liquidated investments. The third step is to make a choice about the treatment of these NAVs. NAVs of mature funds can either be treated as market values, or be written down.

Once all the cash flows are computed, a Public Market Equivalent (PME; present value of dividends and final NAV divided by present value of investments, also sometimes called Profitability Index) is computed. PME measures the total added value of this asset compared to that of a benchmark asset (e.g. S&P 500). To obtain a more familiar geometric rate of return one can use a modified IRR (see chapter 2).

3.3 Measuring Aggregate Performance: The Industry Approach

The industry approach consists of (i) choosing a horizon, say 10 years, then (ii) adding up the NAVs of all the funds in the database at the starting date, say 10 years ago, and treating this as the first investment amount; then (iii) computing the aggregate net cash flows (distributions minus investments) every quarter until the final date, say September 2009; then (iv) adding the sum of all NAVs at the final date to the last cash flow; and finally (v) computing an IRR on the resulting stream of cash flows.

This approach is favored by the industry because it gives an up-to-date performance outlook. If private equity firms distribute a lot of dividends in 2009, this will increase the returns posted at the end of 2009 compared to the returns posted at the end of 2008. With the academic approach, this large dividend payment is unlikely to impact the performance reported at the end of 2009 because only funds raised between 1980 and 1999 would be included.

It is well known that NAVs seldom equal market values. This problem is present with any illiquid asset class but, unlike hedge funds for example, private equity firms do not issue or buy shares at NAV, so the accuracy of NAVs should not be a prime concern for a private equity firm. The only exception is every 3-4 years when a new fund is being raised and an up-to-date track record may then be shown.

The filings S1-A of KKR and Apollo (Appendix C) confirm the widely held belief that NAVs are rather subjective. These firms state that their NAVs are based on internal models and made in "good faith". Because what is "good faith" for one person may not be "good faith" for another, investors frequently witness that different private equity firms in club-deals have different valuations for the same deal. As a result, there is quasi unanimity that NAV is not a reliable proxy of market value and the substantial efforts to make it become one (e.g. FAS 157) are still falling short on concrete results.

Another important feature of NAVs in private equity is that they tend to be conservative, especially in the first 5 years (the investment period). This is because most recent investments are held at cost in the books and because the expected return (conditional on the investment not being exited) is most probably above zero. In addition, the continuous growth in capital allocation such as that witnessed by private equity over the last 30 years means that most of the non-liquidated investments are recent and so most of the aggregate NAV at any point in time represents investments held at cost, and thus undervalued. As a result, it is reasonable to think that, in practice, the aggregate NAV of all existing funds is below the aggregate market value at any point in time.

Table 3.1 shows the data on which the Thomson private equity benchmark is based. For readability, I display only the first and last two rows. The initial and final NAV are 9,486 (September end 1989) and 75,182 (September end 2009) respectively. In addition, I show the total of the take-downs (i.e. investments), cash distributions and stock distributions. The total amount of cash distributed over 20 years is 82,771 and the total amount of stocks distributed over 20 years is 77,646. Interestingly, the three figures (cash dividend, stock dividend and final NAV) are of similar magnitude. But to really compare like with like cash flows should be discounted to a common date. This is because one cannot add a $1 payment in January 1990 to a $1 payment in 1999 and say the total payment is $2. A basic principle of finance (time value of money) is that cash flows at different dates need to be discounted to a common date so that they can be added up. When all cash flows are brought to the same date, the importance of final NAV is naturally reduced compared to the intermediary cash flows. Final NAV is then 13% of the total dividend (using a 12% discount rate; not tabulated). This shows that the final NAV is small but, contrary to common arguments, it is not negligible even at the 20 years horizon.

The same applies to the initial NAV. The present value of the investments is less than

40,000 (with a 12% p.a. discount rate). Therefore the initial NAV is 20% of the value of the investments.

To conclude, the size of NAV is not negligible in size even over long horizons. The next step is to show that conservative NAVs can lead to an upward bias in performance (and not a downward bias.) The fact that NAVs are not negligible will then mean that the bias will be economically important.

Table 3.1: Underlying Data for Industry Performance Report
The table shows the beginning and end of the cash-flow and NAV times-series from the Thomson dataset. Data are from September-end 1989 to September-end 2009. All vintage years are included. Take downs are the payments from LPs to GPs, including fees. Distributions are net of carry. Only independent US venture capital funds are included (Thomson classification.)

	Take down	Dividend cash	Dividend stock	Net cash-flow	NAV
Sept. 1989					9,486
…					
June 2009	752	457	87	-208	74,189
Sept. 2009	1,020	551	24	-445	75,182
Total (Sept. 89 – Sept. 2009)	146,663	82,771	77,646		

3.4 The Bias in Performance Calculations: An Illustrative Example

To show that the under-valuation of market values (i.e. conservative NAV) can lead to an upward bias in performance, I begin with a simple example. Assume that at the end of each year, one investment of $1 is made and is held for 5 years. The investment then gives a dividend of $2. All non exited investments are held at cost. Thus, in this example, NAVs are conservative. All investments have a geometric average return of slightly less than 15%.

After a few years, the initial NAV is $5 at any horizon because there are always 5 non-liquidated investments, each valued at cost. Every year, the net cash flow is $1 ($2 of dividend from the expiring investment and $1 of new investment). The final cash flow is $6 ($5 of final NAV and $1 of net cash flow). These data are shown in Table 3.2.

In this simple setting, IRR is exactly 20% when investments are valued at cost (Table 3.2, column 1); this would be the case irrespective of the horizon (e.g. 5, 20 years). This means that the error is more than 5% per year, which is substantial.

To be convinced that the problem comes from NAVs, assume that instead of being conservative, NAVs are market values. The market value in this example is the present value of receiving $2 each year for 5 years with a 15% discount rate. The answer is $6.73. Hence NAV with investments held at cost was 74% of the market value. Table 3.2 column 2 shows that if the market value had been used, then the IRR would be 15%. Hence, the industry

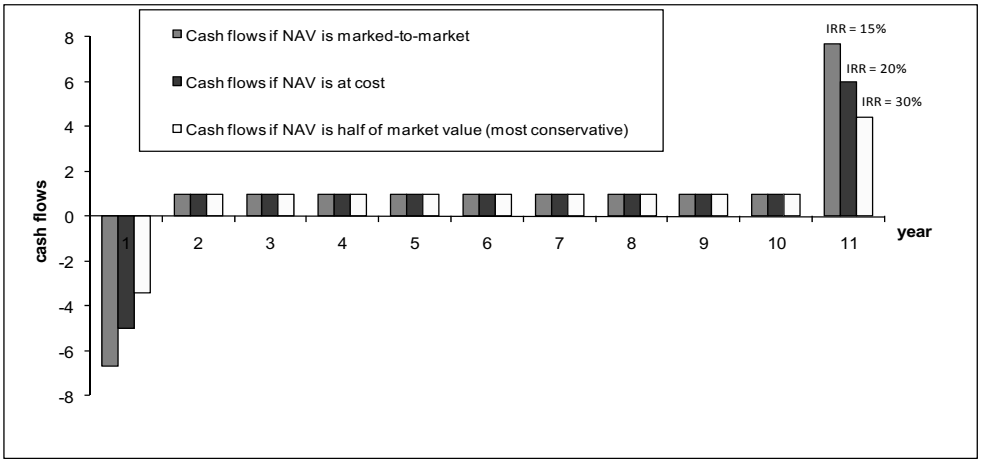
approach would have reached the right figure if NAV had reflected market value.

Finally, to further see that more conservative NAVs lead to higher returns, assume that NAV is 50% of market value instead of 74%. Results are shown in the third column of Table 3.2. IRR reaches a staggering 30%, meaning a reported return twice as much as the true return. This simple example thus illustrates how large the error can be and the fact that conservative accounting does not necessarily lead to lower performance.

Table 3.2: A Simplified Private Equity Economy
The table shows hypothetical cash flows from a simple private equity economy described in the text. Non-liquidated investments are either valued at cost, at market value, or at half of the market value.

Date	NAV valuation at cost	NAV marked-to-market	NAV half of market value
31-Dec-00	-5.0	-6.7	-3.4
31-Dec-01	1.0	1.0	1.0
31-Dec-02	1.0	1.0	1.0
31-Dec-03	1.0	1.0	1.0
31-Dec-04	1.0	1.0	1.0
31-Dec-05	1.0	1.0	1.0
31-Dec-06	1.0	1.0	1.0
31-Dec-07	1.0	1.0	1.0
31-Dec-08	1.0	1.0	1.0
31-Dec-09	1.0	1.0	1.0
31-Dec-10	6.0	7.7	4.4
IRR	20%	15%	30%

Figure 3.2: IRR and Accounting Conservativeness
This figure illustrates graphically the data and results in Table 3.2.



3.5 Why is There a Bias?

The underlying reason is that if NAVs are conservative, both the initial and final cash flows are underestimated. An underestimated initial NAV means too large a return whereas an underestimated final NAV means too small a return. Hence, with NAV diverging from market values, the return is biased and the direction depends on the relative importance of the initial NAV compared to the final NAV.

In the example above, the initial NAV is greater than the present value of the final NAV. If they both decrease by the same factor, performance increases. In other words, the more conservative the NAV is, the higher the return. Note for example that in the extreme (and unrealistic) case where NAV would always be set to zero (all non-liquidated investments are written off, the most conservative approach), then the return would be infinity. In a more realistic case, where all investments except the most recent one were written-off, then the return would be a staggering 100%.

As just mentioned, however, the bias could go in the other direction. If the present value of the final NAV is higher than the initial NAV then a more conservative accounting would lead to a lower return than the true return. Since the bias can go either way in practice, it is important to establish the direction using empirical data. This is what I turn to next.

3.6 Actual Cash Flow and NAV Data

I use the cash flow and NAV data from Thomson One Banker. These data are those used by Thomson to calculate their benchmark and this has been the benchmark published by the National Venture Capital Association (NVCA) until last year (see Appendix A). In non-tabulated results, I could exactly replicate the previously reported Thomson returns with the current data download.

The NVCA has recently switched from Thomson to Cambridge Associates (C.A.) as a data provider. As I do not have access to C.A. data, all the calculations are based on Thomson data.

Results are shown in Table 3.3. Table 3.3 - Panel A shows the performance calculated with the industry approach as of September 2009. For convenience, the first line shows the figures from Cambridge Associates (also available in Figure 3.1). The second line contains those obtained with Thomson data. For my calculations I select independent US venture capital funds (all vintages) in Thomson. This means that, unlike for the official Thomson's benchmark, captive funds are removed. As shown below, this slightly improves overall returns.

A first remark is that, except for the one year horizon, Thomson performance is significantly lower than that of Cambridge Associates. For the 20 years horizon, Cambridge Associates return is 23.1% and Thomson return is 17.9%.

Regarding the main test, if actual data resemble those in the example above, an increase in NAV should lead to lower and not higher performance. Hence, I change initial and final NAV by the same factor. I multiply them by either 0.66 or 1.33. The

idea is that if NAV is aggressive then true market value would be lower (say two thirds of reported NAV) and if NAV is conservative then the true market value would be higher (say one third more than reported NAV).

The explanation given above predicts that conservative accounting is more likely to lead to an upward bias over long horizons and when returns are high. This is because as return increases or as the horizon lengthens, the present value of the final NAV reduces, all else being equal. It is therefore more likely to be lower than the initial NAV, which is when conservative NAV leads to even higher returns. Over short horizons and especially when returns are low, the present value of the final NAV is more likely to be larger than the initial NAV. In this case, the bias should change direction.

The results are shown in the last two lines of Table 3.3 – Panel A and are in line with the predictions. For the past 10, 15 and 20 years returns, performance is lower when NAV is more aggressive. This is similar to what happened in the example above.

The bias is indeed larger when returns are larger. For the 15 years horizon, the return is 40.8% with very conservative NAV and 18.5% with least conservative NAVs. Hence, this change in the value of NAV affects returns dramatically; it more than doubles it. For the 10 years horizon, these returns are 8% and 6.5% respectively. For the 20 years horizon, these returns are 22.2% and 14.8% respectively. The sensitivity to NAV change is much smaller here because the returns are smaller. Yet, for the 20 years horizon the spread is not negligible. The increase in NAV value decreases return by 7.4% per year. Finally, for short horizons (1 year and 5 years), the bias is in the opposite direction.

In Table 3.3 Panel B, I show the same calculations as in Table 3.3 Panel A but as of September 2008. The results are the same in that the bias is negative for the 1 and 5 year horizons but positive for the 10, 15 and 20 year horizons. The bias is still large, although less than in Panel A. The 15 year horizon return decreases from 34.9% to 20.6% when the NAV value increases and the 20 year horizon return decreases from 20.5% to 16% when the NAV value increases. This shows that the size of the bias varies quite substantially over time.

From this empirical exercise we learn four main things. First, actual data have the same characteristics as the data in the simple economy above at long horizons. Hence, the conservativeness of NAVs means that reported returns are too high (beyond year 5). Second, this effect is more pronounced at long horizons and when returns are higher. Hence, the bias changes from one quarter to the next and one horizon to the next. Third, the returns of C.A. differ from those of Thomson; they are significantly larger. Fourth, because NAV is imprecise, the returns are imprecisely estimated, particularly so at long horizons.

Table 3.3: Performance as of September 2009 – Industry Method
The table shows IRR over different horizons (1, 5, 10, 15 and 20 years). In the last two rows the reported final NAV is multiplied by 0.66 and 1.33 respectively. The sample consists of independent US venture capital funds. Panel A shows returns as of September end 2009 and Panel B shows returns as of September end 2008.

Panel A: Performance as of September 2009

	Past 1 year	Past 5 years	Past 10 years	Past 15 years	Past 20 years
IRR from Cambridge Associates	-12.4	4.9	8.4	36.6	23.1
My calculations (based on Thomson data; independent U.S. venture capital funds only):					
IRR with current NAV	-5.1	4.3	6.9	25.7	17.9
IRR with NAV*0.66	-6.1	3.3	8.0	40.8	22.2
IRR with NAV*1.33	-4.6	4.7	6.5	18.5	14.8

Panel B: Performance as of September 2008

	Past 1 year	Past 5 years	Past 10 years	Past 15 years	Past 20 years
IRR from Cambridge Associates	-0.9	10.7	40.2	33.3	22.2
IRR from Thomson (all funds)	-2.1	6.7	17.9	n.a.	16.4
My calculations (based on Thomson data; independent U.S. venture capital funds only):					
IRR with current NAVs	0.3	7.2	17.6	24.5	17.5
IRR with NAV*0.66	0.6	5.5	21.5	34.9	20.5
IRR with NAV*1.33	0.1	8.1	16.2	20.6	16.0

3.7 Towards a Solution

I now discuss what could be done in practice to improve these performance reports. As shown above, the main problem lies with the initial NAV and final NAV. Eliminating the initial NAV is fairly easy. If we want the performance from 1989 to 2009, then we select only funds with vintage 1989 and later. This way the initial NAV (Jan 1st 1989) is zero. This is usually called "since-inception return."

The problem with since-inception returns is that they are usually too low. This is because the final NAV is too low. What makes it too low is the presence in the sample of recent funds whose NAVs are close to the amount they invested, mechanically bringing the overall return close to zero. We should, therefore, eliminate young funds on the basis that it is too early to trust their NAVs. Since most funds have an investment period of 5 years (and a life of 10-13 years), a natural cut-off seems to be year 5. Thus, we would select only funds with vintage 2004 or earlier. For instance, the 20 years horizon performance would be computed with all funds raised between 1989 and 2003, as of September 2009.

The cut-off proposed here is arbitrary but for the treatment of final NAV, unfortunately, there is no ideal solution. This would be the simplest and "least bad" solution. The problem with the final NAV is not gone; it is simply reduced. The other advantage of this

approach is that if the current attempt to have NAVs equal to market values is successful, then the so-derived performance will be accurate.

Once the 1989-2003 funds are selected, sensitivity tests to final NAV can be performed. We can write-off final NAV to obtain the lowest boundary on performance and we can mark up NAVs by a given factor to obtain some sort of upper boundary. What can also be done is to build a model for NAVs by using NAVs reported at age 5, 6, 7 … years of now mature funds and the subsequent cash-flows. We then obtain coefficients for each age (e.g. 1.4x for age 5, 1.1x for age 8, 0.8x for age 10). Next, final NAVs of each vintage can be multiplied by these coefficients. The performance obtained with that NAV would be the best estimate available of aggregate historic returns.

For a 1 to 5 year horizon performance, the method above cannot be used. As shown above, however, NAV to NAV calculations for short horizons are neither strongly biased nor sensitive to NAV assumptions. The resulting performance will be simply smoothed and probably not very informative, but private equity is a long-term asset class so we have to live with the fact that short term returns are not really available.

Some empirical results are shown in Table 3.4. The method described above is used for the past 10, 20 and 30 years. The vintages that are used are thus 1999 to 2003, 1989 to 2003 and 1979 to 2003 respectively. Four different IRRs are computed. The first IRR uses the reported NAV, the second IRR writes it off (hence represents a lower bound), the third and fourth IRR is computed with NAV times 0.66 and 1.33 respectively, as in Table 3.3. In addition it shows the results with an MIRR. For MIRR, I assume either a 2% (or a 3%) per quarter re-investment/financing rate and I take as initial investment the present value of the first five years of cash-flows. The reported NAV is assumed to be equal to the final market value.

The cycles are now very clear. The 1999-2003 batch is known to have low performance. The figure is not yet final and a reasonable range can be given by comparing NAV*0.66 and NAV*1.33 for example: returns would be between -5.2% and 2.1%. In the worst case scenario, return would be -25.4%. Adding the 1990s batch increases returns substantially because US venture capital funds raised in the 1990s had very high returns thanks to the appetite of investors for tech IPOs. The final performance still depends on NAV but now much less. A reasonable range is now 19.7% to 22.1%. It is much narrower than for the past 10 year returns. The worst case scenario is 15.7%, which shows that this group will have high (absolute) returns even if all NAVs were written off. Finally, the past 30 years show a lower return. This is because the 1980s vintages have not returned as much as the 1990s vintages. The return range further narrows to 14.3% to 15.4%. The worst case return is 12.7%. Even for the 30 years horizon there is a sensitivity to NAV, but it is much smaller than that found above. Note that MIRR gives similar answers (although less extreme) and the re-investment rate plays a modest role.

Table 3.4: Performance as of September 2009 – New Approach
The table shows the IRR and MIRR of three groups of funds. Data are from Thomson. Details are provided in the text. The sample consists of independent US venture capital funds.

	Past 10 years 99-03 vintage batch	Past 20 years 89-03 vintage batch	Past 30 years 79-03 vintage batch
IRR with reported NAV	-0.1	21.0	14.9
IRR, NAV written-off	-25.4	15.7	12.7
IRR with NAV*0.66	-5.2	19.7	14.3
IRR with NAV*1.33	2.1	22.1	15.4
MIRR @ 8% p.a.	0.2	17.0	14.9
MIRR @ 12% p.a.	0.4	18.3	15.2

3.8 Additional Considerations

I have proposed a reason for the discrepancy between the academic results and the industry reports about the performance of private equity. In this section, I mention additional issues to be considered when analyzing returns of the private equity industry.

Using IRR

The industry method outlined above uses the IRR as a performance measure. As we have seen in the previous chapter, IRR implicitly assumes that all the cash flows are reinvested at the IRR rate. When IRR is between 5% and 15%, this assumption is not an issue. Outside this range, however, the case is hard to make. As this is an important issue let me reiterate it here with the data at hand. Cambridge Associates reports that as of September 2008 the 10 year horizon return for US venture capital is 40% (Table 3.3 – Panel B). This means that the investor can place each dividend payments at 40% for 10 years and that all non invested capital could be kept in an account that pays 40% p.a. This defies what we could call finance gravity law. The acid test is that, should this 40% return be anywhere close to reality, then the average investor in US venture capital would have achieved a multiple (total amount distributed divided by total amount invested) of 30 over 10 years. This is unheard of, let alone the possibility that this is what the *average* investor would have experienced.

This shows that this 40% return is just a meaningless number. It is an artifact of using IRR. All that this figure says is that the performance is likely to be above that of public-equity. Alpha could be 1% p.a. or 10% p.a..: we just cannot tell from this number. Such a performance figure is rather uninformative and misleading.

In addition, and related to the above demonstration, note that as of September 2009, just one year later, the 40% becomes 8%! This further shows that the industry approach

generates unstable figures. What happened most probably was that in September 1998 the NAVs were very conservative compared to the high dividends of the following 18 months. In September 1999, however, many NAVs were marked up and relatively little dividend was distributed afterwards. So this sharp drop in performance is highly consistent with the conjectures above.

As mentioned in chapter 2, using a modified IRR is preferable. In table 3.4, results are shown with MIRR. They do not dramatically change returns here except for those that were above 20%. As just mentioned, MIRR generates very different results only when IRR is extreme.

Cash Versus Stock Distributions in Venture Capital

As one can see from Table 3.1, there are as many cash dividends as there are stock dividends in US venture capital. This is not the case for buyout or for European venture capital. And as mentioned below, all these other three categories have much lower performance reports.

The treatment of stock distributions is not trivial. In theory, one wants to have the price at which investors managed to cash in. However, different investors will have acted differently and this is not determined by the GP. Taking the stock price at the end of the lock-up period (or the average over the next 5 days) seems the most reasonable option. In practice, the data collector claims they obtain the information from the GP. The GP calculation is usually agreed upon in the contract between the LP and GP (Limited Partnership Agreement). It is this number that is used for the computation of the carried interest. Different GPs will use different rules and we do not know if, on average, the GP value is close to a realistic selling price for an LP or not. Since we do not know, this is an additional reason for taking the reported industry performance with a pinch of salt.

This point is also related to the broader issue that different investors have different returns in private equity. Fees may vary from one investor to the other for instance. Data providers do not detail how they tackle this issue or similar data issues.

In addition, important questions about data collection are to what extent is there backfilling and what happens if an investor stops reporting, etc. Again, data providers do not publicly provide information about these issues that are known to matter considerably for the performance evaluation of other asset classes (e.g. mutual funds, hedge funds).

Cherry Picking

It is customary to distinguish between buyout and venture capital when reporting returns and this makes sense. It is also customary to distinguish between US and non-US, which is less obvious especially nowadays given the globalization of both venture capital and buyout.

It may then be tempting to cherry pick what looks best. For example, the NVCA headline figure is currently that of the performance of US venture capital. No buyout return

is reported. Looking at Thomson data, it turns out that the performance of US buyout is much lower than that of venture capital. The NVCA used to report both (see Appendix A): now they report only the venture capital number.

Similarly, the European Venture Capital Association (EVCA) reports performance figures for Europe. But unlike the US, Europe has poor venture capital returns and relatively good buyout returns. The EVCA press release therefore stresses more the "private equity" returns, meaning the combination of buyout and venture capital (see Appendix B).

Obviously, if one cherry picks to a certain extent, the image is quickly blurred. Mutual funds among others would certainly look rosier if they could report a mutual fund industry return for which they can choose between US and European funds and value versus growth funds. What this means is that the press and investors should look more closely at what is behind the headline number, because it does not refer to the same thing in every continent and over time.

3.9 Conclusion

It is important to stress that the methodological choices made to compute industry benchmarks are reasonable and understandable at first sight. If NAVs were unbiased estimates of market values, like in other asset classes, the method would actually lead to the right answer. The point is to show that this methodology generates significant biases and unstable results because NAVs are imprecise and generally below market values.

I propose a solution. Even if this solution is still sensitive to deficiencies in the NAVs, the effect is very much reduced. Trying to fix industry benchmarks is an important endeavor because having misleading industry returns may generate false beliefs and, in turn, potentially less pertinent financial decisions or regulations.

The results in this paper also have a number of implications that may be worth mentioning. For example, returns reported at the end of the year are more likely to be the lowest, all else being equal, because NAVs tend to be updated (thus closer to market values) at year end. Most importantly, the current efforts (FAS 157 and subsequent rules) to make NAVs closer to market values would lead to a dramatic and exaggerated increase in industry returns if the current methodology is used. This is because the initial NAV would be undervalued and the final NAV would be close to true value. Another related implication is that the new method I proposed above would mean that it would not be necessary to ask funds to produce market values in their first five years of existence. This would make the new rules much less costly for General Partners and would not result in much loss for investors and the wider public in terms of information content. Note also that if the solution proposed above is used, then the adoption of a FAS 157 type of regulation will result in an improved industry benchmark. Again, this would not be the case with the current method.

Appendix

A. Performance Report by the NVCA

Venture Economics' US Private Equity Performance Index (PEPI)
Investment Horizon Returns as of 12/31/2000

Fund Type	3 Mo.	1 Year	3 Year	5 Year	10 Year	20 Year
Early/Seed	-4.8%	51.2%	93.7%	65.5%	35.8%	23.8%
Balanced	-7.3%	33.2%	61.5%	42.9%	27.0%	17.5%
Later Stage VC	-8.1%	19.9%	31.7%	31.1%	25.2%	18.3%
All Venture	**-6.3%**	**37.6%**	**64.8%**	**48.0%**	**29.9%**	**19.9%**
All Buyouts	-2.5%	9.7%	14.3%	17.4%	16.6%	19.2%
Mezzanine	-0.2%	14.9%	10.8%	11.1%	12.4%	11.7%
All Private Equity	**-4.0%**	**20.0%**	**30.3%**	**28.3%**	**22.1%**	**19.3%**
Source: NVCA (see webarchive on http://www.nvca.org)						

Venture Economics' US Private Equity Performance Index (PEPI)
Investment Horizon Performance as of 6/30/2002

Fund Type	1YR	3YR	5YR	10YR	20YR
Early/Seed VC	-35.3	36.9	46.2	32.6	20.2
Balanced VC	-20.8	27.7	26.2	22.4	15.0
Later Stage	-20.5	11.8	17.6	24.1	16.5
All Venture	-27.0	26.5	30.6	26.1	16.9
All Buyouts	-11.4	-1.3	3.4	9.8	12.9
Mezzanine	-4.4	6.0	7.8	11.6	11.4
All Private Equity	-16.5	5.5	10.9	16.1	15.2
Source: Thomson Venture Economics/NVCA					

Venture Economics' US Private Equity Performance Index (PEPI)
Investment Horizon Performance through 06/30/2003

Fund Type	1 Year	3 Year	5 Year	10 Year	20 Year
Early/Seed VC	-26.1	-21.7	47.9	35.7	19.8
Balanced VC	-13.6	-16.5	18.6	21.4	13.9
Later Stage VC	-45.1	-22.0	7.3	19.5	14.3
All Venture	**-27.4**	**-20.0**	**24.2**	**26.2**	**16.1**
All Buyouts	2.6	-6.1	0.6	8.8	12.1
Mezzanine	3.7	1.7	6.1	8.4	9.8
All Private Equity	**-6.9**	**-9.9**	**6.1**	**14.2**	**13.8**
NASDAQ	10.8	-25.8	-3.1	8.7	12.7
S&P 500	-1.5	-12.5	-3.0	8.0	11.6
Source: Thomas Venture Economics/National Venture Capital Association					

Venture Economics' US Private Equity Performance Index (PEPI)
Investment Horizon Performance through 09/30/2004

Fund Type	1YR	3YR	5YR	10YR	20YR
Early/Seed VC	-1.9	-11.8	16.6	41.5	19.3
Balanced VC	17.7	-4.6	11.1	21.3	13.7
Later Stage VC	12.9	-3.0	2.5	15.9	13.7
All Venture	**8.9**	**-7.4**	**10.5**	**26.9**	**15.8**
Small Buyouts	30.6	1.8	1.3	8.6	27.9
Med Buyouts	14.6	-0.2	1.0	9.2	17.3
Large Buyouts	17.7	6.6	4.0	11.2	14.7
Mega Buyouts	17.0	5.8	2.6	6.7	8.7
All Buyouts	**17.3**	**5.2**	**2.7**	**8.1**	**12.5**
Mezzanine	11.8	1.8	4.4	7.4	9.3
All Private Equity	**15.0**	**1.3**	**4.7**	**12.5**	**13.7**
NASDAQ	6.2	8.2	-7.1	9.5	12.05
S&P 500	11.9	2.3	-2.8	9.2	12.35
Source: Thomson Venture Economics/NVCA					

Venture Economics' US Private Equity Performance Index (PEPI)
Investment Horizon Performance through 9/30/2007

Fund Type	**1YR**	**3YR**	**5YR**	**10YR**	**20YR**
Early/Seed VC	23.6	6.8	3.1	34.5	20.8
Balanced VC	38.0	14.4	9.9	15.1	14.3
Later Stage VC	41.4	10.5	8.4	8.3	13.8
All Venture	**32.3**	**10.4**	**6.7**	**17.9**	**16.4**
NASDAQ	14.2	12.2	17.9	4.8	9.4
S&P 500	10.8	10.7	13.1	4.9	8.1
All Venture (through 6/30/2007)	**23.5**	**10.5**	**4.8**	**19.3**	**16.4**
All Venture (through 9/30/2006)	**8.2**	**9.3**	**-1.0**	**20.8**	**16.6**
Source: Thomson Financial/National Venture Capital association					

B. Press Coverage and Press Releases

Wall Street Journal, March 26, 2010:
"The case for investing in private-equity firms can be put pretty simply. Analysts will tell you that over several decades private-equity investments have outperformed the public markets."

Financial Times, March 14, 2008:
"The European private equity association (EVCA) will today publish performance data (…) Pooled average returns from all forms of European private equity, including buy-outs and venture capital, was 11.7 per cent, compared with a 2006 figure of 12.5 per cent. (…) European private equity funds were still able to use this strong performance record to continue raising large amounts of money, which was increasingly concentrated in the hands of a few of the biggest buy-out firms.(…) About 120 funds were raised last year in Europe, averaging Euros 560m (Dollars 872m)."

Financial Times, July 1, 2007:
"Apax Partners, Europe's second biggest private equity group, has hit back at the industry's critics in its 2007 report on the latest global private equity environment rankings from the Economist Intelligence Unit, Private Equity in the Public Eye.(…) Apax Partners drew attention to figures released by the European Private Equity and Venture Capital Association (EVCA) in March 2007 showing that upper-quartile buyout funds generated returns of 37.6 per cent in 2006. The average US buyout fund returned 20 per cent, according to the National Venture Capital Association (NVCA). Longer-term, private equity funds on average generated net annual returns of 10.3 per cent over the 10 years to end-2006. "The ultimate beneficiaries of this out-performance are the millions of individual investors that commit to the pension funds which are our largest investors," said Apax Partners' chief executive Martin Halusa."

Financial Times, February 27, 2006:
"Most private equity professionals expect returns to be above 15 per cent this year, a poll has showed. A vote of about 1,000 delegates last week at the SuperReturn private equity conference in Frankfurt also revealed that more than a quarter expected returns to be higher than 20 per cent. This compared with an annual 12.4 per cent return in the 10 years to September, according to NVCA and Thomson Venture Economics. Returns for the year to September were 27 per cent."

EVCA press releases (www.evca.eu) - 17 June 2009:
"The long term performance of the European private equity industry remains robust according to final data for 2008, despite a difficult exit environment and downward pressure on valuations, according to data compiled by Thomson Reuters in association with EVCA. However, macro-economic volatility over the past year has caused a slump in short-term horizon returns."

C. The Setting of NAVs by Private Equity Firms

Extract from KKR & Co, LP S1A filing Oct 31 2008, p. 182:
Approximately 82%, or $25.9 billion, and 73%, or $14.2 billion, of the value of the investments in our consolidated private equity funds were valued in the absence of readily observable market prices as of December 31, 2007 and December 31, 2006, respectively. The majority of these investments were valued using internal models with significant unobservable market parameters and our determinations of the fair values of these investments may differ materially from the values that would have resulted if readily observable market prices had existed. Additional external factors may cause those values, and the values of investments for which readily observable market prices exist, to increase or decrease over time, which may create volatility in our earnings and the amounts of assets and partners' capital that we report from time to time.

Our calculations of the fair values of private equity investments were reviewed by Duff & Phelps, LLC, an independent valuation firm, who provided third-party valuation assistance to us, which consisted of certain limited procedures that we identified and requested it to perform. **Upon completion of such limited procedures, Duff & Phelps, LLC concluded that the fair value, as determined by us, of those investments subjected to their limited procedures *did not appear to be unreasonable*. The limited procedures did not involve an audit, review, compilation or any other form of examination or attestation under generally accepted auditing standards.** The general partners of our funds are responsible for determining the fair value of investments in good faith, and the limited procedures performed by Duff & Phelps, LLC are supplementary to the inquiries and procedures that the general partner of each fund is required to undertake to determine the fair value of the investments.

From Apollo Global Management S1A, August 2008, p. 185:
We are ultimately responsible for determining the fair value of our private equity fund portfolio investments on a quarterly basis in good faith. We have retained Duff & Phelps, LLC, an independent valuation firm, to provide third party valuation consulting services to the company which consist of certain limited procedures that the company identifies and requests them to perform. **Upon completion of the limited procedures, Duff & Phelps, LLC assesses whether the fair value of those investments subjected to the limited procedures *do not appear to be unreasonable*. The limited procedures do not involve an audit, review compilation or any other form of examination or attestation under generally accepted auditing standards.**

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