

PERFORMANCE MEASUREMENT

JUST HOW BAD IS IRR?

THE FRIGHTENING TRUTH IS FINALLY UNVEILED

“You can’t eat IRR.” Many private equity (PE) investors have read or heard this phrase somewhere. And as will be demonstrated below, IRR truly is a highly problematic measure of PE performance. Our results provide compelling arguments to come up with something much better urgently. Fundamentally, this insight is not new. Leading MBA finance textbooks dedicate entire chapters to the shortcomings of the IRR measure in general¹ and academics specializing in PE performance measurement have made powerful arguments warning investors about the possible biases in any IRR-based performance assessment². The most dangerous bias in IRR is related to the fact that the IRR calculations give too much weight to returns generated early over the life of a fund or investment, as early net proceeds are assumed to be reinvested at the rate of return generated until that point in time.

Still, investors continue to rely on this performance measure and one wonders why they are doing so. One of the reasons may be that we know that (in theory) IRR can be biased, but, until now, there has been little evidence as to how substantial this bias really is. In this study, PERACS and HEC Paris provide such evidence and the results are somewhat frightening.

¹ See, for example, Brealey, R. and S. Myers, 2001, *Principles of Corporate Finance*, Sixth Edition, McGraw Hill.

² See Gottschalg & Phalippou (2007) Truth About Private Equity Performance, *Harvard Business Review*, Dec 01, 2007 (<http://hbr.org/2007/12/the-truth-about-private-equity-performance/ar/1>) or Phalippou, The Hazards of Using IRR to Measure Performance: The Case of Private Equity (<http://ssrn.com/abstract=1111796>).

In collaboration with several leading LPs, including Munich-based Golding Capital Partners, the PE Observatory at HEC Paris has assembled a unique set of data on the detailed PE performance for over 5000 realized investments made by 422 private equity funds. We have been able to leverage this rich data source to assess the magnitude of the IRR bias across a large and diversified sample of investments and funds.

Based on the analysis of the exact timing and amount of cash flows for each of these deals, we have been able to compare results from the standard IRR method to those of a simple but vastly superior performance measure, the *PERACS Annualized Rate of Return* (see example at end of this article), which is calculated based on an investment’s total return multiple and its duration, i.e. the average time between takedowns and distributions. This performance measure captures directly how much value has been generated over what period in time, without any need for assumptions regarding reinvestment rates.

The IRR Performance Bias for Individual Private Equity Deals

We have performed these calculations at the deal-level for 5038 realized PE deals made over the past three decades in Europe and North America³. These deals had an average (median) IRR of 32% (28%) and an average (median) total return multiple of 3.4 (2.3). The average (median) duration of

³ To eliminate extreme cases, we excluded deals with a duration of less than 6 months and with an IRR of less than -50% or more than 200%. For these cases, the bias of the IRR methods would be even greater.

these deals is 3.9 (3.5) years⁴. Drawn from a sample of realized investments made by established PE houses, these average performance values are not representative of the entire industry and indicate an upward biased sample. However this data is perfectly suitable to assess the magnitude of distortions attributable to the IRR method.

Comparing IRR and *PERACS Annualized Rate of Return* for the 5038 deals, we find that in 12.8% of this sample, the IRR measure deviates by more than 10% (in relative terms) from the more accurate *PERACS Annualized Rate of Return* measure. This implies that whenever you see a quoted deal IRR of, say 30%, there is a chance of one to eight that the real performance (based on the *PERACS Annualized Rate of Return*) is greater than 33% or less than 27%. Not exactly a negligible deviation. For 3.7% of the deal sample (still 186 real-world investments), the distortion even exceeds on fourth of the stated IRR, so if one of these deals has a 20% IRR, its actual performance was below 15% or above 25%.

It is further interesting to observe that the IRR bias can go either way, as IRR may be above or below the *PERACS Annualized Rate of Return*. However we find that given the actual cash flow patterns in PE, it is much more common to find an upward bias. For 75% of the 645 deals with an IRR bias of greater than 10%, this bias was upward, creating an average upward bias of these 645 deals of +12% (in relative terms) over their actual performance as measured by the *PERACS Annualized Rate of Return*.

The IRR Performance Bias for Private Equity Funds

IRR is equally widely used as a fund-level performance measure in private equity. As the streams of cash flows for PE funds are generally longer and

more irregular than for those of single investments, one would expect the distortions of the IRR performance measure to be even greater at the fund level. To verify this expectation empirically, we analyzed fund-level cash flows for 422 PE funds in our database. All these funds have made at least 10 (realized or unrealized) investments and we consider the final net-asset-values for the unrealized deals as a final cash flow.

Replicating the prior approach to calculate both the standard IRR and the *PERACS Annualized Rate of Return* for these 422 funds, we find indeed that the use of IRR as a performance measure is even more problematic at the fund level. We observe that for over 30% of the funds, IRR deviates from the *PERACS Annualized Rate of Return* by more than 10% (in relative terms). For 44 funds (or a good 10% of our sample), this distortion exceeds even 50%! In other words, if a fund reports a 25% IRR, then there is a 30% chance that its actual performance as captured by the *PERACS Annualized Rate of Return* is below 22.5% or above 27.5% ... and with a 10% probability it will be below 15% or above 45%.

One can easily imagine how such difference may wrongly put a fund in a given performance quartile relative to its peers. The danger lies in the fact that these biases occur almost at random, largely driven by the cash flows that occur early in the life of a fund (or deal). If a fund's performance turns out to be misrepresented by the IRR measure, the fund managers can hardly be blamed ... in many cases they may not even be aware of it ... and after all they only apply the most standard performance measure of the PE industry, wrongfully assuming that this would lead to a correct apples-to-apples comparison. But given the findings from our study, it may be high time to change this standard!

⁴ The observation that 50% of our deals have a duration of more than 5 years or less than 2.3 years illustrates that it is not an option to simply use the Return Multiple alone as performance indicator. After all, it makes a huge difference of one "doubles the money" in two or in five years.

Example: A simple comparison of IRR and PERACS Annualized Rate of Return in a Hypothetical Fund

Year	2004	2005	2006	2007	2008	2009	IRR	Total Takedowns	Total Distributions	Multiple	Cap Wtd Avg Investment Date	Cap Wtd Avg Distribution Date	Cap Weighted Duration (yrs)	Annualized Return (%)
Cash Flow (CF) Date	1/1/04	1/1/05	1/1/06	1/1/07	1/1/08	1/1/09								
Deal 1 Takedowns	-120	0	0	0	0	0								
Deal 1 Distributions	0	180	20	0	0	15								
Deal 1 CF	-120	180	20	0	0	15	61.9%	-120	215	1.79	1/1/04	5/16/05	1.38	52.8%
Deal 2 Takedowns	0	0	-50	0	0	0								
Deal 2 Distributions	0	0	0	20	0	50								
Deal 2 CF	0	0	-50	20	0	50	15.3%	-50	70	1.40	1/1/06	6/6/08	2.43	14.8%
Aggregate Takedowns	-120	0	-30	0	0	0								
Aggregate Distributions	0	180	0	20	0	65								
Aggregate Cash Flow	-120	180	-30	20	0	65	51.0%	-150	265	1.77	5/26/04	2/18/06	1.73	38.8%

The impressive IRR of Deal 1 (61.9%) is largely driven by the significant return generated largely after the first year. According to the IRR “reinvestment assumption”, the standard IRR formula assumes that interim excess cash flows (e.g., the excess 60 that results from the 180 returned after the first year given the initial investment of 120) will continue to generate the same return over the life of the entire fund, as if that excess cash flow was reinvested in a hypothetical investment that somehow generated the same return (in this case, 50%) over the life of the entire fund. This hypothetical investment, combined with the actual realizations in the following years pushes the overall IRR of Deal 1 to 61.9%, which would suggest a return multiple over the five years of 11.1, i.e. $(1+0.619)^5$, whereas the actual return multiple was “only” 1.79 over this period. Clearly, the excess cash flows are not fully invested over 5 years and thus that sort of return multiple was not realized.

Alternatively, we could consider the deal’s *duration*, i.e. the capital weighted difference between the investment and realization dates. Deal 1’s duration is only 1.38 years. Even if we consider the capital weighted duration instead of the simple holding period, the resulting return multiple of 1.94, i.e. $(1+0.619)^{1.38}$, still falls short of the actual return multiple of 1.79. The simple but powerful solution is to reject the IRR measure altogether, as it is simply unsuitable for private equity investments with

interim cash flows and to calculate the *PERACS Annualized Rate of Return* based on multiple of investment and duration as follows⁵:

$$\text{PERACS Annualized Rate of Return} = (\text{Multiple}^{(1/\text{Duration in years})}) - 1$$

This *PERACS Annualized Rate of Return*, 52.8% in our case, in an unbiased and accurate measure of performance at the deal-level. We see that deal one has an upward biased IRR of 8.9% in absolute terms, i.e. 17% relative to the *PERACS Annualized Rate of Return* of 52.8%. Note that for deal two with only a small intermediate cash flow, the IRR bias is substantially lower. If we combine the two deals in this example, the difference between IRR (51%) and *PERACS Annualized Rate of Return* (38.8%) becomes even larger, as the 12.2% difference in absolute terms corresponds to over 1/3rd of the *PERACS Annualized Rate of Return*. As our empirical analysis of actual data from 5,038 deals and 422 fund shows, such performance distortions due to the use of the inappropriate IRR measure are much more frequent than one would have expected.

⁵ This performance measure has been used to assess PE fund performance in leading academic research on the topic, including Phalippou and Gottschalg, “The Performance of Private Equity Funds”, *Review of Financial Studies* (2009) 22 (4): 1747-1776. Available at: <http://ssrn.com/abstract=473221>