PERFORMANCE

Unlisted fund returns: what do we really know?

Simon and Jessica Wilde, in the second of a series of articles, find that unlisted returns, when put in context, are not always as good as they are cracked up to be

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I n our previous article, published in *Infrastructure Investor*'s June edition, we discussed Norway's decision not to invest in unlisted infrastructure due to insufficient investment performance data and track record.

On the other hand, there are currently 107 funds[1] on the road whose managers are confidently asserting the prospect of attractive risk-adjusted returns. We look to address this dichotomy by analysing infrastructure fund performance using both traditional measures, such as IRR and money multiples, and newer approaches developed to assess private equity returns, including Public Market Equivalent and Modified IRR.

IRR remains the most commonly used investment performance metric in infrastructure. This is not surprising as IRR is also the most widely used measure in corporate investment appraisal. Part of its appeal lies in it being an intuitively understood,

"Infrastructure funds underperform the wider equity market and private equity buyout funds", the Wildes argue

annualised return figure. However, it has significant flaws that have been well documented for many years.[2]

IRR is calculated as the discount rate applied to a set of cashflows, negative for invested capital and positive for investment returns, that results in a zero net present value (NPV). There are a number of issues with its mathematical properties. For example, there can be more than one IRR solution for certain cashflow patterns, with no clear rule as to which is 'correct'. Also, IRRs cannot be accurately averaged across multiple funds, and for investments of different duration, they are not strictly comparable.

More seriously for investors, IRR implicitly assumes that all interim cashflows received during the investment period are re-invested at the same return. If an investment has a single pay-off this is not a problem, but for infrastructure funds, which typically make interim payments over many years during the fund's life, this can cause serious distortions. In order for investors' realised returns to be equal to the IRR, they need to be able to re-invest the interim cash received on terms as favourable as in the current fund. If a fund manager sells its best performing asset midway through the fund, it is unlikely that this condition will be met (as the best asset return will, by definition, be the hardest to replicate).

Modified IRR (MIRR) was developed to address the re-investment issue by requiring an explicit assumption about the expected return on cashflows received during the investment, which seems reasonable, as any outperformance from re-investing these cashflows is due to that follow-on investment decision, not the original fund investment. MIRR accurately calculates the investor's actual return if interim cashflows earn the assumed re-investment return.[3]

ARE IRRs HYPED?

A simplified example demonstrates the danger of overstatement of actual returns if IRR is used. Assume three different infrastructure funds (A, B and C) received £100 in year zero, and each fund makes two £50 investments that have an 8 percent cash yield. One investment is 'good', and becomes worth twice invested capital, and one is 'average', where the capital value doesn't increase. Fund A keeps both investments for its full 10-year life. Due to the year 10 capital gain, its IRR is 10.6 percent. The fund investors don't earn this though, if the nine annual £8 interim payments are re-invested at 8 percent. In fact, the investors would realise a return of 9.9 percent, which is the MIRR, as shown in Table 1.

Fund B, whose manager perhaps realises the marketing benefits of a higher IRR, chooses to sell the 'good' investment in year five for twice invested capital (i.e. for £100). In the subsequent years, the interim pay-outs are half and the 'average' investment is sold in year 10 for its £50 invested capital. By realising the £50 gain sooner, investors do benefit and their actual return (i.e. their MIRR) does increase, by 0.7 percent to 10.6 percent. Fund B's IRR shows an even bigger increase, rising 2.3 percent to 12.8 percent. However, unless the investors can suddenly increase their re-investment returns to this level, their actual realised return will be less than the IRR, potentially considerably less. And as mentioned before, if investors can earn higher than expected returns on their re-investments, this is not due to the ability of Fund B's manager.

The table also shows Fund C, where the manager sells the 'average' asset early and keeps the 'good' asset until the end of the fund life. Here both IRR and MIRR are marginally worse than in Fund A, where both assets are kept. The IRR though is far worse than in Fund B's strategy, which shows an incentive towards early sale of better assets and could give rise to concerns over the quality of fund NAVs, where invested capital is often an important benchmark for the appraisal value of illiquid assets.

As part of PhD research undertaken at the University of Bath, the cashflows of a sample of 66 unlisted infrastructure funds with vintages from 2002-2015 were analysed. The IRRs and MIRRs of the 47 funds raised up to 2012, which therefore

TABLE 1: ILLUSTRATIVE IRR AND MIRR CALCULATIONS FOR PRIVATE EQUITY FUNDS			
Cashflow (£)	Fund A	Fund B	Fund C
Year 0	-100	-100	-100
Year 1	8	8	8
Year 2	8	8	8
Year 3	8	8	8
Year 4	8	8	8
Year 5	8	100	50
Year 6	8	4	4
Year 7	8	4	4
Year 8	8	4	4
Year 9	8	4	4
Year 10	150	50	100
IRR	**10.6%**	**12.8%**	**10.5%**
MIRR	**9.9%**	**10.6%**	**9.6%**
Reinvestment rate			**8%**

Source: Author

have several years of data, are summarised in Table 2, where they are also compared to IRRs of a wider universe of funds.

Comparing the sample funds' IRRs by vintage with the wider universe, there are clearly some issues over how representative the sample is, although in most cases the sample IRRs lie within Preqin's inter-quartile range and the overall average IRRs are close (11.7 percent versus 11.1 percent). This issue could be addressed by analysing the cashflows of a larger sample of infrastructure funds.

As the fund sample's detailed cashflows are available, MIRRs can be calculated. For these funds, this enables a more accurate estimation of investors' actual realised returns. The volatility of fund IRRs is 'smoothed' by the assumption that interim cashflows will be reinvested at 8 percent. Although this is an assumption, we argue it is more realistic than assuming they would be re-invested at, say, either less than 0.5 percent or over 20 percent, as would be implied by taking the average vintage IRRs at face value. The average MIRR, of around 8.5 percent, would increase to 10.1 percent if the re-investment returns are changed to 10 percent, showing the importance of this assumption. Nevertheless, incorporating a range of MIRRs (based on different re-investment assumptions), would be a welcome addition to infrastructure marketing and analysis, in our opinion.

INFRA UNDERPERFORMS EQUITIES

A similar reassessment is recommended for the second commonly used investment return benchmark, the 'money multiple', also known as 'net return multiple' and 'total value to paid in' (TVPI). TVPI is calculated as the ratio of the sum of all positive cashflows received (plus an estimate of the fund value, normally taken as the latest NAV), divided by the sum of all cash paid in. If the TVPI exceeds one, then cash proceeds plus value are greater than the sum invested and suggests value has been created. It is important to note that TVPI doesn't take into account when

TABLE 2: COMPARISON OF IRR AND MIRR FOR UNLISTED INFRASTRUCTURE FUNDS						
	Fund sample			**Preqin database**		
Vintage	**Number**	**IRR**	**MIRR***	**Average IRR**	**1st quartile**	**3rd quartile**
2002-5	7	15.8%	10.4%	15.7%	25.0%	9.2%
2006	5	2.7%	6.7%	8.0%	10.5%	4.9%
2007	5	9.5%	7.7%	5.0%	11.7%	1.3%
2008	2	0.4%	5.6%	8.3%	10.6%	3.5%
2009	5	14.3%	8.9%	13.0%	18.6%	9.8%
2010	7	10.8%	9.1%	9.6%	23.0%	8.1%
2011	10	11.1%	8.3%	15.1%	20.0%	8.8%
2012	6	20.4%	9.2%	14.0%	20.0%	10.0%
Average		11.7%	8.5%	11.1%		

* Assuming 8% re-investment rate for MIRR calculation

Source: Preqin, author's research

investments and distributions are paid and hence doesn't consider the time value of money. It is also dependent on NAV accurately reflecting the fund's current value, which is not necessarily true, particularly with the IRR bias to sell better investments noted previously.

In addition, TVPI (like IRR and even MIRR) does not assess the opportunity cost of capital, i.e. what returns could have been made from other investments, such as investing in listed equity markets. To address this, private equity researchers have developed the concept of Public Market Equivalent (PME).[4] PME is calculated by adjusting positive and negative cashflows by the movements in an index of total returns.

> "Unlisted funds may underperform the equity market as a whole"

The most commonly used indices are broad listed market measures such as the S&P 500 or MSCI World Equity. A PME of greater than one imply cashflow returns superior to the index, with less than one implying underperformance. Time value of money is taken into account, as the index itself will (typically) be increasing over time.

A recent study of private equity funds found that US buyout funds have positive PMEs, averaging 1.22-1.27 for the period 1984-2008, implying an annual outperformance of the S&P 500 of approximately 3 percent per annum[5]. However, determining the right index to use for private equity has been disputed, with some suggesting the size of typical buyout transactions makes a smaller cap index more appropriate, which would imply poorer PMEs (given small stocks deliver higher returns on average)[6]. A look at TVPI for infrastructure funds indicates the choice of indices for the asset class faces similar challenges.

Preqin report TVPIs for their universe of unlisted infrastructure funds and show an average of 1.21 for all funds (see Table 3). This indicates that for every £1 of capital invested in funds, £1.21 has been returned as cash distributions or exists as current fund

value. However, as time value of money is not taken into account this is a fairly meaningless figure in isolation. Likewise, it should (and does) vary over the life of a fund, as cumulative distributions and fund value build up over time. Hence early vintages have TVPIs close to or above 1.5, whereas TVPI is nearer 1 for more recent funds.

Our fund sample has similar TVPIs to the Preqin universe, with averages of 1.23 and 1.21 respectively. As we have detailed cashflow profiles for our sample, we are able to calculate PMEs based on a range of indices. First, we index fund performance against the S&P 500 ("PME-Mkt" in Table 3), to allow comparisons to be made with findings from other asset classes. The average S&P 500-indexed PME for our sample is 0.96, implying slight underperformance against US equities. Note, we adjust for currency effects where funds are not US dollar denominated but use a single index for comparability. We observed similar effects if funds are indexed against other equity market indices.

On this measure, infrastructure funds underperform the wider equity market and private equity buyout funds. This is not to say infrastructure investments are poor, especially as they may have benefits such

as diversification and different risk profiles, but the in-sample underperformance is a useful reality check to, and contrast with, the high stated IRRs.

Alternatively, by selecting a listed infrastructure index as a benchmark, it is possible to compare unlisted and listed equity investments in infrastructure. Here we use the Global Infrastructure Index in our PME calculations ("PME-Infra"). The average PME versus listed infrastructure is 1.04, implying a cumulative 4 percent outperformance over the life of the funds. While these are not huge annual excess returns, given the average sample fund life is six years, it is nevertheless positive and is after fees, providing support for unlisted funds as a vehicle for investors. It is also interesting that for almost all vintages, PME-Infra is close to one, suggesting a clear correlation between unlisted and listed infrastructure performance.

CONCLUSION

By using additional, relatively easy-to-compute measures such as MIRR and PME, investors are able to more objectively assess infrastructure performance. With even a limited data sample of less than 70 funds, we can draw a number of preliminary conclusions. First, investors should be wary of track records marketed solely on the basis of IRR and TVPI as these measures can be misleading and flatter performance. Second, with MIRRs in excess of 8 percent and PMEs greater than one, benchmarked against listed infrastructure, funds do seem to be delivering on their aim of relatively stable returns from the sector. However, unlisted funds may underperform the equity market as a whole, and therefore a wider case for asset allocation needs to be made looking at other measures, including overall impact on portfolio risk-adjusted returns, which lies beyond the capability even of these additional return metrics.

In conclusion, we see a continued need for both more data – analysing cashflows from additional funds, using MIRR and PME – and for more metrics – ideally a robust time series of returns that allow the correlations

with other assets held in investors' portfolios to be assessed, along with wider portfolio impacts and risk-adjusted return comparisons. In fact, researchers have started to adopt this approach in private equity but in order to do so they have used datasets of over 600 funds.[7] This brings us back to the need for more data, and we see an opportunity here for newly established industry associations such as the Global Infrastructure Investor Association and Long Term Infrastructure Investors Association to take a leading role for the benefit of all investors, including current sceptics such as the Norwegian sovereign wealth fund. ∎

1. According to Preqin Infrastructure Online
2. See for example Phalippou, L. (2008) "The hazards of using IRR to measure performance: The case of private equity", Journal of Performance Measurement, vol.12 pp.55–66
3. See Lin, S. (1976) "The modified internal rate of return and investment criterion", The Engineering Economist, 21(4), pp.237-247, which also explains the calculation of MIRR in detail. For an n period investment, MIRR equals the n-th root of the future value of positive cash flows divided by the present value of negative cash flows
4. Used here is the PME approach from Kaplan, S. and Schoar, A. (2005) "Private Equity Performance: Returns, Persistence, and Capital Flows", Journal of Finance, vol. 60 pp. 1791–1823. PME is calculated by dividing cumulative distributions (and current fund value) by cumulative fund capital calls, with all cash flows discounted by realised index returns over the period from cash flow to the present.
5. Harris, R., Jenkinson, T. and Kaplan, S. (2014) "Private Equity Performance: What Do We Know?", Journal of Finance, vol.69, iss.5, pp.1851-1882.
6. Phalippou, L. (2013) "Investing in Private Equity Funds", CFA Private Equity Seminar, 18 June 2013

Simon Wilde is a senior managing director at Macquarie Capital, senior lecturer in Finance at Bristol Business School and PhD researcher at the University of Bath. He is writing in a personal capacity and views expressed in these articles do not necessarily represent those of the above organisations. Jessica Wilde is an independent research consultant, with experience in the energy industry and alternative investment sector.

TABLE 3: TVPI AND PME FOR UNLISTED INFRASTRUCTURE FUNDS				
	Fund sample			Preqin avg
Vintage	TVPI	PME-Mkt	PME-Infra	TVPI
2002-5	1.72	1.32	1.24	1.78
2006	1.18	0.85	0.97	1.41
2007	1.31	0.90	1.04	1.27
2008	1.02	0.72	0.82	1.30
2009	1.45	0.96	1.12	1.17
2010	1.45	0.95	1.10	1.26
2011	1.20	0.92	1.03	1.13
2012	1.22	1.02	1.10	1.16
2013	0.94	0.87	0.92	1.02
2014	1.00	0.94	1.00	0.91
2015	0.91	0.91	0.92	0.94
Average	**1.23**	**0.96**	**1.04**	**1.21**

Source: Preqin, author's research