

How Informative Are Interim IRRs?



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The internal rate of return (IRR) is a key performance metric. This is especially true for closed-end funds for which IRR is usually the way returns are reported, the primary measure by which investors judge the success of their investments (often alongside various ratios), and the key determinant of incentive fees paid to fund managers.

A closed-end fund has a limited life, and ultimately, the IRR of the fund at the end, once it has been liquidated, is the barometer of the return investors in the fund earned. But typically, closed-end funds report interim IRRs to investors during the life of the fund to indicate what the return has been thus far. How important or informative are these interim IRRs to investors? An interim IRR, like all returns, is backward-looking; for a fund that might have a ten-year life, it is the return that has already been earned over the first one, two, three, or more years. But does the return earned over the first few years give any indication of what returns might be during the rest of the life of the fund? IRRs report on the past, but do they give any insight into the future?

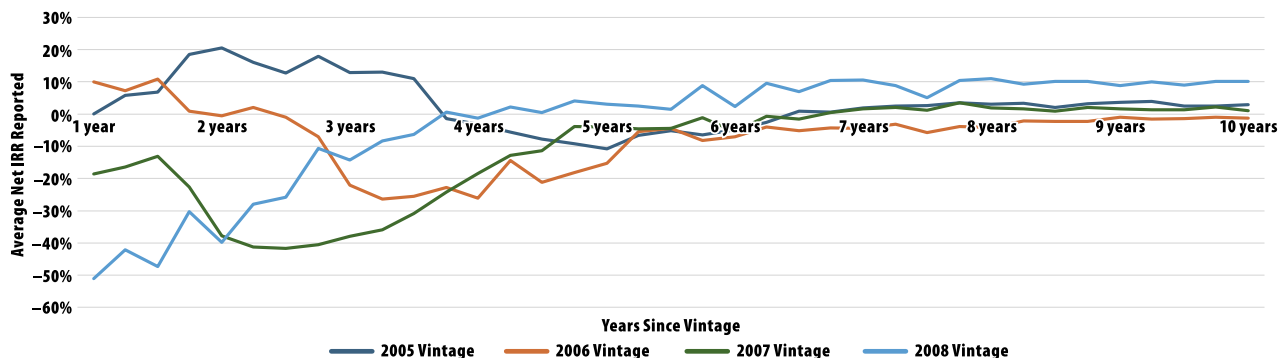
Exhibits 1 and 2 show net IRRs by vintage, as reported by Preqin, on average across value-added and opportunistic, US-focused, closed-end funds that have been fully

liquidated (2013 is the last vintage presented because there is a relatively small number of liquidated funds with data after that). The horizontal axis indicates the passage of time since the start (i.e., vintage) of the fund to indicate how reported IRRs develop over the life of funds on average. The global financial crisis had a significant effect on how IRRs developed over time for funds, so for clarity in the charts, I break the sample into two and show the pre-financial crisis vintages (2005 to 2008) in Exhibit 1 and post-financial crisis vintages (2009 to 2013) in Exhibit 2.

Exhibit 1 clearly shows the effect of the financial crisis on real estate fund returns: 2008-vintage funds started with large negative reported returns as they launched directly into the financial crisis, but they ultimately posted the highest returns after ten years, presumably helped by being able to take advantage of the market dislocation that was occurring when they launched. Conversely, 2006-vintage funds were the only ones to end up with negative IRRs after ten years. Despite beginning with the highest returns of the four vintages in the chart, many of these funds were already close to fully invested when the crisis hit and did not fully recover their losses.¹

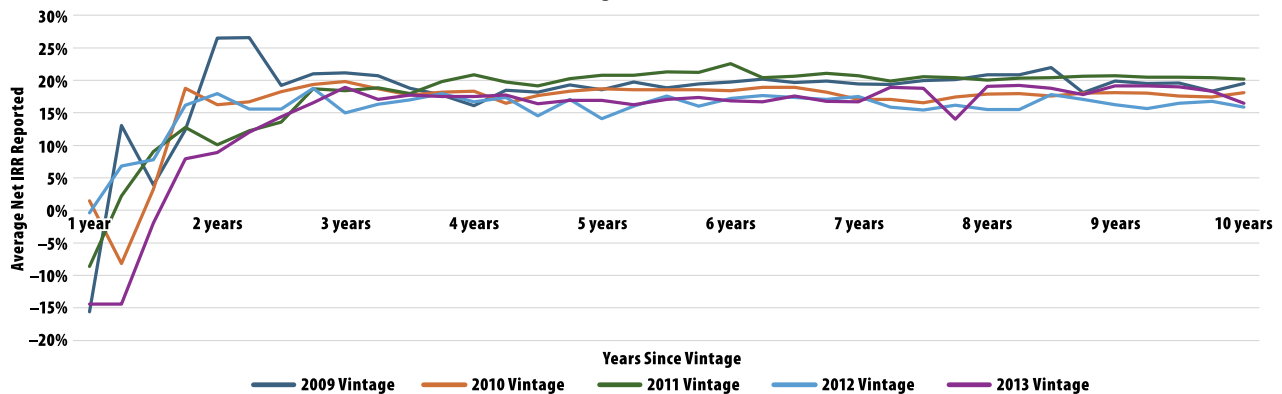
1. Note that not all funds reached final liquidation prior to the ten-year horizon shown in the charts, but for purposes of the charts, I track returns out to only ten years. In the overall sample, the median lifespan of funds is a little more than 11 years. Hence, almost half the funds in the charts reached their end before ten years. However, extending the charts past ten years would include a rapidly decreasing number of active funds and not be all that informative.

Exhibit 1: IRRs Over the Life of Funds, Pre-Financial Crisis Vintages



Source: PREA Research based on data from Preqin

Notes: Vintage is defined as the year of first investment or drawdown from investors. The chart assumes the first quarter of the year after vintage is one year after the start of the fund. Not all funds reported IRRs for all periods, so the sample varies over time.

Exhibit 2: IRRs Over the Life of Funds, Post–Financial Crisis Vintages

Source: PREA Research based on data from Preqin

Notes: Vintage is defined as the year of first investment or drawdown from investors. The chart assumes the first quarter of the year after vintage is one year after the start of the fund. Not all funds reported IRRs for all periods, so the sample varies over time.

The post–financial crisis vintages in Exhibit 2 all show roughly similar patterns. Beginning with low or negative returns over the first year to 18 months (the J-curve effect), average fund returns turned positive by year two, and by the end of the third year, the reported IRRs became relatively stable over time. Note that relatively in the last sentence is an important word; reported IRRs still saw swings of 250 to 600 basis points from high to low after year three—a substantial and important amount for investors—but are still far less volatile than in the early days after the launch of the funds.²

Exhibit 2 seems to indicate that the early returns to a fund in the first three years bear little resemblance to the final IRR earned by investors at the end of the fund, but returns reported in year three and onward may contain some information about the ultimate IRR (keeping in mind that the IRR can still vary considerably after year three).

Although looking at how IRRs tend to develop over the life of a fund is interesting, two issues with Exhibits 1 and 2 emerge in terms of whether interim-reported IRRs contain information about future performance. First, the exhibits look at average IRRs across funds (within a vintage). However, most investors care more about whether the interim IRR of a fund they’ve invested in predicts its future returns than about the average performance of all similar funds. Second, the interim IRR reported after, say, year three has a direct impact on the IRR reported after ten years (at or near the end of most funds). This is because the ten-year period includes the first three years; performance

during the first three years will obviously have an impact on the performance reported over ten years.

Looking at whether early, interim IRRs can help predict final IRRs is an interesting and useful exercise. But in this article, I am interested in a slightly different definition of “future performance”: Do early-reported IRRs (after one, two, three, four, or five years) provide any information on how the fund will perform after that interim IRR is reported? In other words, if a fund performs particularly well over the first three years, does that tend to indicate it will perform well over the period from year four to the end of the fund, indicate it will perform poorly in that future period, or tell you nothing at all about what may happen going forward?

Does Past Fund Performance Predict the Future?

I begin with all value-added and opportunistic closed-end funds in Preqin’s database that are now fully liquidated and have vintages between 1994 and 2017 (later, when presenting results by vintage, I limit it to those between 2005 and 2013 because there is a relatively small sample of liquidated funds with available data outside those years).

2. Exhibits 1 and 2 both include funds that liquidated before ten years, carrying them at their final reported IRR. This tends to dampen the volatility in IRRs seen over time because these funds show constant IRRs after liquidation. I continue to include these funds to make the exhibits representative of an investor’s taking an equally weighted position in all funds of a vintage. I repeat the process while dropping those funds that reached the end of their life, and the results do show somewhat greater volatility over time and a wider dispersion across vintages. However, the general pattern is the same—average reported IRRs rose quickly at the beginning of fund life and stabilized substantially after about three years.

To ensure the funds are reasonably comparable, I limit the sample to closed-end funds that are US-focused. After omitting funds for which there is no reported IRR data in Preqin, I get a total sample of 620 funds. (Not all funds report IRRs for all periods, so in the analysis that follows the size of the sample varies from period to period.)

Comparing the interim-reported IRR at a certain point in time with the returns the fund earned after that point in time has implications not only for investors in the fund curious about what interim IRRs might tell them about the future but also for others, such as secondary market investors, who may wonder what past reported IRRs of a fund might imply about future returns on a position in that fund (assuming that position could be purchased at net asset value, or NAV).

Now for some gentle math for those who are interested: To accomplish the above, I simply take the final IRR for the fund, IRR_{final} , compound it out to get the total return over the full life of the fund, and then back out the total return up to an interim period, t , so that what is left is what was earned from the interim IRR until the end of the life of the fund:³

$$\frac{(1 + IRR_{final})^T}{(1 + IRR_{t,interim})^t}$$

where T is the number of years in the life of the fund. I then annualize the result to get the annualized return from period t , when the interim IRR was reported, to period T , the end the fund:

$$IRR_{post-interim} = \left(\frac{(1 + IRR_{final})^T}{(1 + IRR_{t,interim})^t} \right)^{\frac{1}{T-t}} - 1$$

In this, $IRR_{post-interim}$ is the return earned after the reported interim IRR.⁴

The analysis simply looks at the correlation between the reported $IRR_{interim}$ and the return that occurs from that point onward, $IRR_{post-interim}$, to determine whether an interim-reported IRR contains any information about what returns will be on the fund from that time onward. I do this for a number of different periods to see whether the information of interim IRRs varies over time as the fund progresses through its life.

Because I combine closed-end funds of different vintages, for each fund I subtract the average $IRR_{interim}$ and $IRR_{post-interim}$ for its vintage from that fund's interim and post-interim IRRs. That means the analysis is essentially

asking this: If a fund has so far out- or underperformed its peers of the same vintage, does that indicate anything about how much it will out- or underperform its vintage peers for the remainder of its life?

Exhibit 3 shows the results—that for almost all time periods up to five years into the life of a fund, previously reported interim IRRs actually have a negative correlation with what returns will be from that point onward. For example, the correlation between the third-year reported interim IRR and fund returns after year three is -0.32 . This indicates that if a fund has underperformed its peer funds of the same vintage over the first three years, it will tend to do better compared with its peers over the remainder of its life (and vice versa). The strength of the relationship between past and future returns starts to decline around three and a half years into the life of a typical fund and ends up at a correlation close to zero after five years. (Note that two of the latter correlations on the chart are small positives, but only one of those is judged by a statistical test to be reliably different from zero.) After those first few years, there is little to no relationship between past and future returns.

Although for Exhibit 3, I use returns above or below the vintage average to calculate correlations, it is

3. Preqin does not report the date a fund becomes fully liquidated. I assume the first period in which an IRR is reported that does not subsequently change (i.e., the IRR hits a number and then doesn't change after that) is the end of the fund's life. Similarly, I take the reported IRR in that period as the final IRR for the liquidated fund.

4. Readers familiar with the vagaries and drawbacks of IRRs may note that what I call the IRR after the interim period is not actually an IRR and, in fact, is not technically correct. This is because any IRR calculation assumes that cash flows during the life of the investment are reinvested at the IRR (that is why it is called an internal rate of return). So the calculation of IRR_{final} assumes cash flows are reinvested at IRR_{final} but $IRR_{interim}$ assumes they are reinvested at $IRR_{interim}$. Essentially, this is an apples-to-oranges problem in the equation shown. Unfortunately, this is something that is in the nature of IRRs and illustrates one of the difficulties of working with them. Fund cash flows could actually be used to calculate the IRR from the interim period to the end of the fund, but that would involve its own reinvestment rate assumption and still be inconsistent with the other IRRs. The only way to have a consistent system of IRRs (up to the interim period, from the interim period to the end of life, and over the full life) would be to use a modified IRR and find the reinvestment rate that makes the three IRRs consistent with one another. However, that would entail making a different assumption on the reinvestment rate of cash flows for every fund, so there is no way to find the "true" IRR for the period after the interim IRR is reported that is totally consistent with the other numbers without making some large assumptions. I admit that the IRR for the post-interim period shown in the equation is an approximation. Fortunately, the approximation is of the same sign and same general magnitude as the "true" IRR would be, and therefore the approximation seems to be as good as possible given the peculiarities of IRR as a measure of return.



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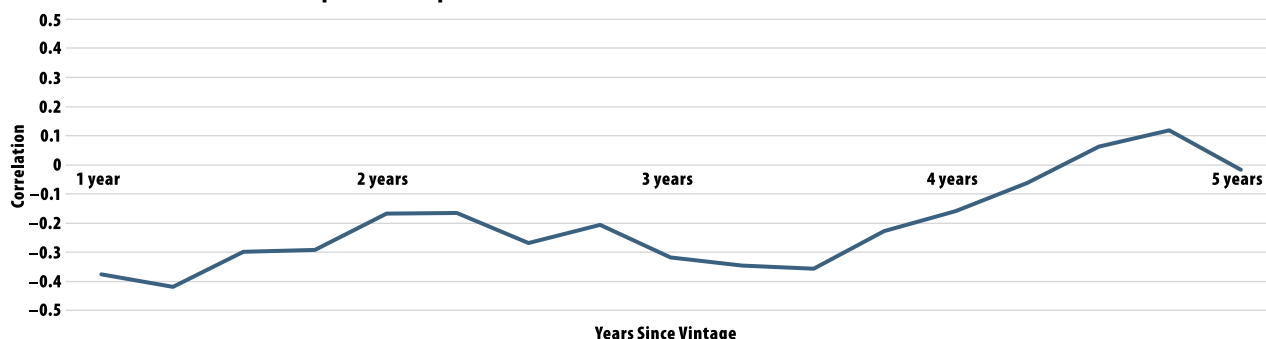


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Exhibit 3: Correlation Between Reported IRR Up to a Point in Time and Fund Return After That Time



Source: PREA Research based on data from Preqin

Notes: The chart assumes the first quarter of the year after vintage is one year after the start of the fund. Not all funds reported IRRs for all periods, so the sample varies over time. Correlations are based on returns that have been normalized by subtracting the vintage average.

Exhibit 4: Correlations Between Past and Future Returns, by Vintage

		Years After Fund Launch That Interim IRR Is Reported				
		1 Year	2 Years	3 Years	4 Years	5 Years
Fund Vintage	2005	-	-	-	-	0.42
	2006	-0.45	-0.48	-0.59	-0.63	-0.64
	2007	-0.64	-	-0.70	-	0.34
	2008	-0.99	-0.62	-0.66	-	-
	2009	-	-	-	-	-
	2010	-0.34	-	-	-	0.78
	2011	-0.79	-	-	0.68	0.70
	2012	-	-	0.63	-	0.70
2013	-0.54	-	-	-	0.69	

Source: PREA Research based on data from Preqin

Notes: Exhibit reports correlations between the interim IRRs reported at various intervals and the return to the fund from that time to the end of fund life. “-” indicates the correlation is small enough that a statistical test has determined it is indistinguishable from zero (using a 15% significance level).

important to see if the nature of the correlation changes with different vintage funds. Exhibit 4 provides the correlations separately for funds of each vintage year from 2005 to 2013 (before and after that period there are not enough funds in the sample to reliably calculate the correlations).

The general patterns in the correlations by vintage are similar to those seen across all funds in Exhibit 3—namely, early-reported performance over the first three years tends to have a zero or negative correlation with performance going forward. One difference between Exhibits 3 and 4, however, is that looking at each vintage separately, interim IRR performance reported after five years is quite strongly positively related to

future performance (other than for 2006 vintage funds). At least for the vintages shown in Exhibit 4, early-reported returns are negatively related to going-forward performance, but good returns reported at five years are a signal of continued good performance from that point on.

Good and Bad Interim Performances Are Different—And Not Just in the Obvious Way

So the relative performance of a fund, based on its reported return in its first three years, is negatively related to its relative performance after those three years. This is an interesting result, but before jumping to any conclusions about what might be causing this, it is important to consider whether this may be an artificially



induced phenomenon and not reflective of actual investment performance.

An obvious possibility is that this simply reflects the J-curve, in which assets acquired early require investments and those investments do not pay off until down the road. Another possibility is that this is simply a result of valuation policies that can change when funds recognize returns. Although typically, assets held by these funds increase in value over time, funds commonly keep them on the books, for purposes of reporting NAV, at cost or perhaps at cost plus an allowance for capital expenditures to date. Hence, it is not uncommon for reported closed-end fund NAV to not represent an up-to-date market value; managers have significant leeway in marking investments to market, and commonly, the NAV underestimates the true economic value of the fund's portfolio.

This can create the types of correlations observed in fund returns: Funds that carry assets at a steeper-than-average discount to market value often report lower

interim IRRs but then report higher returns during the rest of the fund's life as they write those assets up to market. Lags in writing up assets can dampen returns early in the life of the fund but then create a bounce in later years, leading to the negative correlations shown. The size of the potential effect is not small; a research paper in the 2015 PREA-sponsored special real estate issue of the *Journal of Portfolio Management* found that interim NAVs reported by European closed-end funds underestimated value by 20% on average.⁵

If the correlations are because stale NAV marks early in a fund's life are updated later, the expectation is that poor early-reported returns would be followed by good performance later (rather than good early performance being followed by poor performance). Exhibit 5 looks at whether there is a difference in the relationship between interim-reported IRRs (i.e., past fund performance)

5. Sami Kiehelä and Heidi Falkenbach, "Performance of Non-Core Private Equity Real Estate Funds: A European View," the *Journal of Portfolio Management*, 2015, Vol. 41, No. 6, pp. 62–72.

Exhibit 5: The Difference Between Over- and Underperformance in Reported Interim IRRs

If interim IRR is 1% higher, the average impact on IRR after the interim period is the following:			
		If relative interim IRR was positive	If relative interim IRR was negative
Interim IRR Reported After	1 year	–	–0.46%
	2 years	–	–0.29%
	3 years	–	–0.87%
	4 years	–	–0.72%
	5 years	0.34%	–0.41%

Source: PREA Research based on data from Prequin

Notes: All IRRs are normalized by subtracting the average for the fund's vintage; "–" indicates the coefficient is small enough that a statistical test has determined it is indistinguishable from zero (using a 15% significance level).

and future fund performance depending on whether the fund reports an above- or a below-average interim IRR (relative to funds of the same vintage).⁶

The exhibit shows that for the first five years of a fund's life, interim IRRs below vintage average are associated with higher relative IRRs later in the life of the fund. For example, if the IRR reported three years into a fund's life is 1% below average for its vintage, it will tend to earn 0.87% above the vintage average over the remainder of the fund's life. On the other hand, better-than-average performance over the first four years provides no information on what returns might be going forward. It appears that correlations between past and future fund performance over the first four years are really only there when initial performance is relatively poor (and future performance is relatively good); this is consistent with the above explanation in which this relationship is simply because of the accounting and valuation processes the funds use.

On the other hand, a little further into the life of the fund, good performance after five years is actually associated with continued good fund performance after that point. Early positive returns for a fund may not be very informative about what the future will look like for the average fund, but five years in, once the fund is more firmly established and perhaps close to fully invested, a good interim IRR tends to be a signal that the fund will continue to outperform going forward.

Implications

The explanation for why the correlations may be what they are is, in a sense, irrelevant to the central question:

What can the consumers of fund financial reports, i.e., the limited partners, learn about the future of a fund from its reported performance? What might the interim IRR up to year X imply about returns to the fund after year X?

Obviously, everyone prefers good performance to bad, and all else being equal, I would always prefer to see a good IRR reported than a poor one. But the implications of the above are that poor reported IRRs in the early life of the fund (i.e., the first three to four years) tend to be at least partially offset by better performance after that point. Conversely, good early performance, while obviously good to see, does not tell investors much about what performance will be like going forward. But once the fund has seasoned a bit (i.e., five years in), good reported IRRs tend to be associated with good performance on a going-forward basis.

Do interim-reported IRRs contain information about future fund performance? Yes, at least sometimes, but the information is time- and situation-specific; investors need to carefully think about what the numbers are or are not telling them. ■

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6. For those curious about the methodology behind Exhibit 5, I simply use a regression (separately for each time period) of $IRR_{post-interim}$ on $IRR_{interim}$ (both normalized by subtracting vintage average) but with $IRR_{interim}$ broken into two variables based on whether it was positive or negative. The exhibit reports the coefficients on the two $IRR_{interim}$ variables.



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