Austin M. Long, III

Alignment Capital Group, LLC
2101 Hawksbury Way
Cedar Park, TX 78613
Cell 512 750-8534

along@alignmentcapital.com

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ILPA draft

As a preliminary comment on the ILPA draft as a whole, its focus seems to be on hedge funds or similar vehicles. Alignment Capital Group works only in the illiquid private markets (buyouts, venture capital, distressed debt, mezzanine, energy (mostly oil & gas), etc.

Representative Portfolio or Composite Returns

p. 3 From a private market perspective, selecting a representative portfolio is an invitation to cherry-pick in pursuit of the most attractive results. Whenever possible, **complete (i.e., since-inception) private market track records should be the goa**l and part of the performance attribution presentation should be the contribution of each of the individual fund track records in achieving the results of the complete track record. One important outcome of applying performance attribution analysis to a complete track record is to examine the general partner's skill in managing markets, staff and strategies over time. For example, in my experience it has been common for mezzanine managers to switch to an equity strategy in the wake of market conditions that switch to disfavor mezzanine transactions. In the mezzanine market, such switching, a strategic decision on the part of the manager, almost always has a negative effect on the track record as a whole. Failure to incorporate both a mezzanine strategy and an equity strategy into the complete track record obscures this aspect of the manager's strategy over time.

The statement in the last paragraph of p. 3 that "Using composites greatly increases the complexity of attribution calculations" is simply wrong, at least as far as the illiquid private market goes, as I hope I can show in the paragraphs below. In the same paragraph, while it is true that the composite/total track record changes over time, using the complete track record means that the changes are caused by additional investments and/or funds, **not** adding and removing

portfolios. And finally, still in the same paragraph, composite/complete track record attribution analysis should incorporate the same cash flows and valuations as used in performance analysis, and therefore the performance attribution results should reproduce the results of performance analysis.

Answer to Question 1: use of a complete, since-inception track record obviates the need for a policy for selecting representative portfolios (a/k/a cherry-picking). An ILPA recommendation that managers disclose how a representative portfolio is calculated serves to promote cherry-picking. In any event, any analysis that uses a representative portfolio should be in addition to an analysis that uses the entire track record.

Gross of Fees vs. Net of Fees

p. 4 Attribution should be done both with and without fees, since comparing the two can be an important measurement of the economic slippage involved from the limited partners' perspective. The accuracy of the statement that "…use of gross-of-fees provides a more comparable picture of performance relative to the benchmark because neither gross-of-fees returns nor benchmark returns have been reduced by fees" depends upon the benchmark and the source of its data. If the benchmark is private market performance versus a liquid investment opportunity cost (e.g., the NASDAQ, the MSCI ACWI, the S&P 500 or any other index in the liquid markets), requires translation of the benchmark from TWROR to IRR, whether using the Long-Nickels PME, the Kaplan-Schoar PME, Direct Alpha or any of the myriad other benchmark calculations for the purpose currently in use in the private markets.

Question 2: Alignment Capital shows attribution of the entire since-inception track record, as well as the track records of the individual funds that make it up.

Question 3: Alignment Capital's attribution calculations are annualized for periods less than one year (Excel's XIRR function always produces an annualized result) but ARE cumulative for periods longer than one year.

Time Periods

No comments.

Segment Returns

The Alignment Capital equivalent of a segment return is the return to a particular fund in a succession of funds that aggregate to the total track record. I agree that all segments (not just "representative" segments) should be incorporated into attribution analysis.

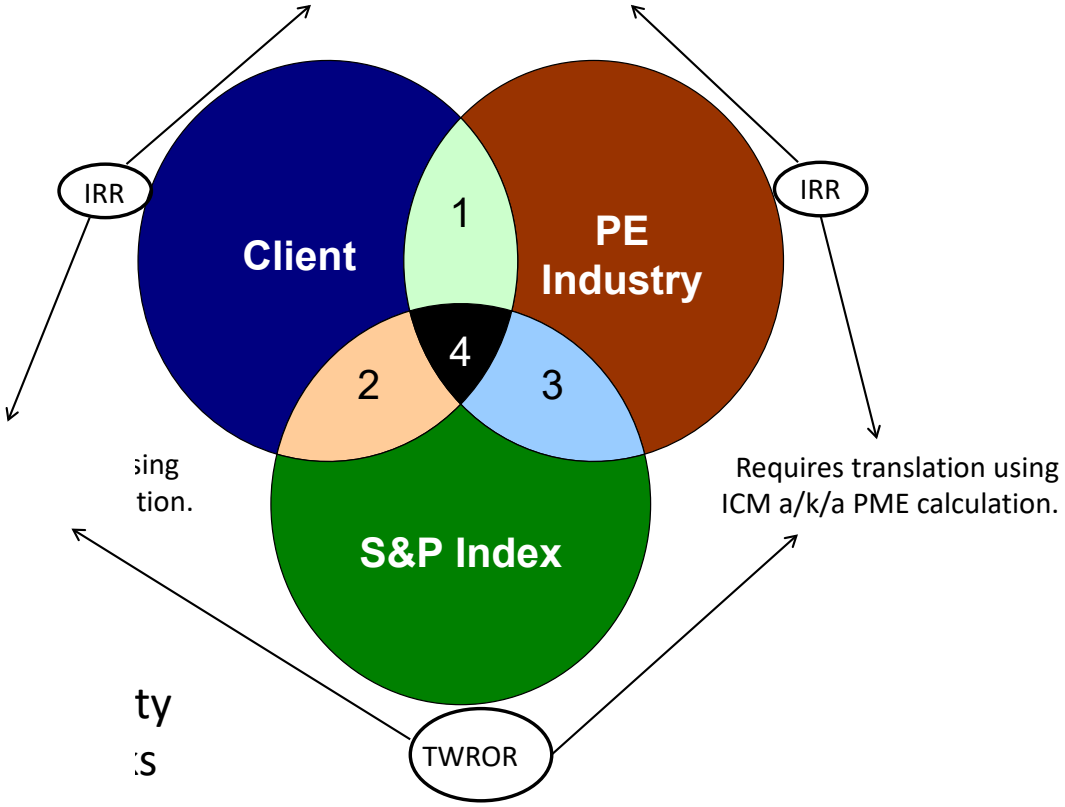
Segment Weights

As explained in detail below, in Alignment Capital's attribution analysis, all segments receive (1) equal weight and also (2) the weights implied by their dollars (or other currency) invested in each segment. In addition, all segments are measured (1) from the earliest date of the earliest

investment in the segment (zero-base time) and also (2) the actual dates of all investments in the same segment. These four measurements can be manipulated to reveal what proportion of a manager's performance versus the opportunity cost outcomes of a public market index comes from selection skill (i.e., he ability to put the most capital into the best investments versus the index), and from timing (a/k/a luck).

Benchmark

There are four potential benchmarks in private equity:



Benchmark 1 can be calculated directly, since by convention both are measured by IRR. Benchmarks 2, 3 and 4 require a translation of the time-weighted return public market index into a return directly comparable to the IRR of the private equity fund or track record under analysis. This can be done using the Long-Nickels PME, Direct Alpha or any one of the myriad translation methods available in the current market.

Alignment Capital developed the Long-Nickels PME in order to answer the question of whether or not a manager has demonstrated the ability to outperform the cash flows invested into and distributed from the manager's track record.

Attribution Effects

Return Contribution

The article below, published in The Journal of Performance Measurement (Fall 2008), p. 8, contains a detailed description of the Alignment Capital approach to performance attribution:

Performance Attribution in Private Equity

Because there is no investible index for private equity, and because TWRR is not equal to (or even reconcilable with) IRR in most cases, the current body of finance literature does not include a reliable method for performance attribution in the private markets. In this article, the author puts forward a new method and means for determining performance attribution in the private markets that addresses the lack of an investible index and incorporates the time/cash flow attributes of the IRR computation.

Austin M. Long, III
is a former cochair of the Institutional Limited Partners Association, a coinventor of the Index Comparison Method (ICM), cofounded what was to become the private investment group of the University of Texas Investment Management Company (UTIMCO), and cofounded Alignment Capital Group. Mr. Long received his B.A. from Baylor University, his Master's in Professional Accounting from the University of Texas, and his J.D. from DePaul University. He is a Certified Public Accountant and has been admitted to the bars of Illinois and Texas. He was appointed to the GIPS Private Equity Working Group, and he participates in the IRR Study Group, which will promulgate recommendations for the calculation of IRR in various settings. He is a frequent speaker at industry gatherings and a published author.

INTRODUCTION

In the public markets, time weighted rate of return (TWROR) performance attribution has been refined to enable the analyst to determine the relative contribution of the stock index, sector allocation, and stock selection in order to derive the manager's contribution to investment return. This is shown in Exhibit 1, in which W_M represents the weight of the market segment; R_M, the return to the market segment; W_P, the weight of the portfolio segment; and R_P, the return to the portfolio market segment. Public market performance attribution analysis depends, in part, on the availability of an index as the investible alternative; and, in part, on the fact that performance is measured by TWROR, which ignores the timing of interim cash flows. Neither of these critical factors applies to the private markets – there is no investible index in the private markets; and the IRR computation, which is required for private equity performance presentation by the Global Investment Performance Standards (GIPS) of the CFA Institute (CFAI), does take into account the timing and weights of all interim cash flows. As Exhibit 2 makes clear, TWROR is therefore not equal to IRR in most cases with interim cash flows.

Exhibit 1

Sector	W_M	R_M	I. $W_m * R_m$	II. $R_M * W_P$	III. $W_M * R_P$	W_P	R_P	IV. $W_P * R_P$
Consumer	30.0%	15.0%	4.5%	1.5%	5.4%	10.0%	18.0%	1.8%
Technology	10.0%	20.0%	2.0%	6.0%	2.5%	30.0%	25.0%	7.5%
Cyclical	35.0%	30.0%	10.5%	4.5%	7.0%	15.0%	20.0%	3.0%
Energy	25.0%	-5.0%	-1.3%	-2.3%	1.3%	45.0%	5.0%	2.3%
	100.0%		15.75%	9.75%	16.15%	100.0%		14.6%

I. Index return	15.8%
II. Index and portfolio allocation returns	9.8%
III. Stock selection	16.2%
IV. Portfolio return	14.6%

Attribution

Market index	I.	15.8%
Asset allocation	II - I	-6.0%
Security selection	IV - II	4.8%
Manager's total return	IV	14.6%
Manager's contribution	IV - I	-1.2%

Exhibit 2

Period	Beginning Value	Amount (In)/Out	Ending Value	Index Return	End of Period Index	IRR CF
0					1	
1	$100.00	($100.00)	$110.00	10.0%	1.100	($100.00)
2	$110.00	($100.00)	$220.92	5.2%	1.157	($100.00)
3	$220.92	($100,000.00)	$89,998.39	-10.2%	1.039	($100,000.00)
4	$89,998.39	$89,000.00	$1,131.17	13.3%	1.177	$89,000.00
5	$1,131.17	$0.00	$1,197.91	5.9%	1.247	$0.00
6	$1,197.91	$0.00	$1,102.08	-8.0%	1.147	$1,102.08

TWROR	IRR
2.3%	-9.8%

The IRR Calculation

It is well established in the literature of finance that the internal rate of return (IRR) of an investment is calculated by:

$$IRR = r \text{ where } \sum_{i=1}^{n} \frac{CF_i}{(1+r)^n} = 0 \qquad (1)$$

In Equation 1, CF_i is the cash flow at period i (using natural signs, so that investments of capital are negative and both distributions of capital and terminal valuations are positive), and n is the total number of cash flow periods. In Excel's XIRR function, which was used for all of the examples below, n is

expressed in days and XIRR therefore calculates IRR using individual dates for each cash flow.[i] If the investment is unrealized, the terminal cash flow, CF_n, is taken to be a distribution (*i.e.,* a positive cash flow) equal to its valuation on the terminal date.

It is also common knowledge in the finance industry and literature that the discount rate for actual IRR (r) and the discount rate for a pro forma IRR using the same cash flows multiplied by any constant k (r_{pf}) are the same:

$$r = r_{pf} \text{ where} \qquad (2)$$

$$\sum_{i=1}^{n} \frac{kCF_i}{(1+r_{pf})^n} = 0 \quad . \qquad (3)$$

This is so because the relative weights of the cash flows are unchanged as a function of time when multiplied by a constant.

Another way to understand why multiplying each cash flow by a constant does not change the IRR of an investment is to look at the original investment as a bond and the IRR as its yield to maturity. It is obvious that buying two identical bonds at the same price on the same date and with the same cash flows (and thus the same yield to maturity) would result in a portfolio with the same yield to maturity as that of the underlying bonds. The same would be true of buying four bonds or k bonds. It is a small extension of the principle to apply the same notion to fractional bonds and thus to all the cash flows multiplied by any constant k. It is important to note that k can be negative, as well as positive, without affecting IRR.

Finally, another technical definition of IRR is the discount rate required to make the positive cash flows (*PCF*) resulting from the investment equal to the negative cash flows (*NCF*) expended in acquiring the investment:

$$\sum_{i=1}^{n} \frac{NCF_i}{(1+r)^n} = \sum_{i=1}^{n} \frac{PCF_i}{(1+r)^n} \quad . \qquad (4)$$

It is therefore mathematically obvious that

$$\sum_{i=1}^{n} \frac{kNCF_i}{(1+r)^n} = \sum_{i=1}^{n} \frac{kPCF_i}{(1+r)^n} \quad . \qquad (5)$$

The Zero-Base Time (ZBT) IRR

An alternative method of IRR computation is referred to in the private equity industry as the zero-base time or time-zero method. In the ZBT IRR method, all investments in a portfolio are presumed to begin on the same date (the zero date, or first investment date for the oldest investment in the portfolio or track record). In a 1995 white paper entitled *Opportunistic Investing: Performance Measurement, Benchmarking and Evaluation*, Richards and Tierney, a well-known consulting firm, argued that the ZBT method is the best way to determine stock selection ability, since it neutralizes the relative timings of the various acquisitions in a private market portfolio. In other words, the ZBT method, by moving all

investments up to a common start date, minimizes the effect of an early winner, which, in the usual IRR calculation, can come to dominate return since inception.

Exhibit 3 illustrates the problem of a very successful early investment that dominates a portfolio's return since inception, as well as the effect of applying the ZBT method to the same cash flows.

Exhibit 3

	Actual		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ -	$ (8.0)	$ (8.0)
1/1/2002	$ -	$ 20.0	$ 20.0
1/1/2004	$ (20.0)	$ -	$ (20.0)
1/1/2006	$ 25.0	$ -	$ 25.0
	$ 5.0	$ 12.0	$ 17.0
IRR	12%	58%	42%
TVPI	1.3	2.5	1.6

	Zero-Base Time		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ (20.0)	$ (8.0)	$ (28.0)
1/1/2002	$ 25.0	$ 20.0	$ 45.0
1/1/2004	$ -	$ -	$ -
1/1/2006	$ -	$ -	$ -
	$ 5.0	$ 12.0	$ 17.0
IRR	12%	58%	27%
TVPI	1.3	2.5	1.6

The Neutrally Weighted Portfolio (NWP) IRR

In a diversified portfolio setting, although the IRR of *each investment* is unchanged when all its cash flows are multiplied by a constant, we discovered that multiplying or dividing each of the *i* period cash flows of each of *j* investments in a portfolio of *m* investments by a scaling factor $f_{s,,}$ changes the IRR of the *portfolio* to a constant value IRR_k while leaving the IRR_j of each investment unchanged, as shown in the following equations:

$$IRR_k = r_{pf} \text{ where } \sum_{i=1}^{n} \frac{\sum_{j=1}^{m} f_s CF_{i,j}}{\left(1+r_{pf}\right)^n} = 0 \text{ and } f_s = \frac{k}{\sum_{i=1}^{n} NCF_j} \quad . \quad (6)$$

Note that, in Equation 6, NCF_j represents the net cash flow of period *j*. Some periods may have more than one cash flow, in which case they are netted together to result in a single cash flow for the period. The allocation factor *f* is calculated to result in scaling each of the investments in the portfolio to contain the same amount of invested capital. The neutrally weighted portfolio IRR is a constant because the relative weight of each investment's contribution to the portfolio's cash flows is the same as a function of time. Since the relative weights are the same no matter what constant is used to scale the cash flows of the individual investments, the IRR of the neutrally weighted portfolio is a constant, as is its total value to paid-in ratio (TVPI), calculated as Distributions + Ending Value / Paid-In Capital. This is so, without regard to the value of *k*, including negative values. The numerical examples in Exhibit 4 make it clear that a neutrally weighted portfolio, in which the cash flows of all investments in a portfolio are scaled to a common constant, has two important financial and mathematical characteristics: the IRRs of the individual investments are unchanged, and the portfolio's IRR and TVPI measures are constant, no matter what factor is used to scale the portfolio to a neutral weight.

Exhibit 4

	Actual					Pro Forma Scaled to Mean			
Period	Invstmnt 1	Invstmnt 2	Portfolio	Times Earned	Period	Invstmnt 1	Invstmnt 2	Portfolio	Times Earned
1/1/00	$ (4)	$ -	$ (4)		1/1/00	$ (3.7)	$ -	$ (3.7)	
1/1/01	$ 2	$ (2)	$ -		1/1/01	$ 1.8	$ (2.2)	$ (0.4)	
1/1/02	$ (8)	$ 3	$ (5)		1/1/02	$ (7.3)	$ 3.3	$ (4.0)	
1/1/03	$ -	$ (8)	$ (8)		1/1/03	$ -	$ (8.8)	$ (8.8)	
1/1/04	$ 14	$ -	$ 14		1/1/04	$ 12.8	$ -	$ 12.8	
1/1/05	$ -	$ 35	$ 35		1/1/05	$ -	$ 38.5	$ 38.5	
	$ 4	$ 28	$ 32	**2.882**		$ 3.7	$ 30.8	$ 34.5	**3.043**
IRR	13.435%	91.074%	**43.1%**		IRR	13.4%	91.074%	**45.9%**	

$ (2.0)	Pro Forma Scaled to Arbitrary			
Period	Invstmnt 1	Invstmnt 2	Portfolio	Times Earned
1/1/00	$ (0.7)	$ -	$ (0.7)	
1/1/01	$ 0.3	$ (0.4)	$ (0.1)	
1/1/02	$ (1.3)	$ 0.6	$ (0.7)	
1/1/03	$ -	$ (1.6)	$ (1.6)	
1/1/04	$ 2.3	$ -	$ 2.3	
1/1/05	$ -	$ 7.0	$ 7.0	
	$ 0.7	$ 5.6	$ 6.3	**3.043**
IRR	13.4%	91.074%	**45.9%**	

	Pro Forma Scaled to Inv 1					Pro Forma Scaled to Inv 2			
Period	Invstmnt 1	Invstmnt 2	Portfolio	Times Earned	Period	Invstmnt 1	Invstmnt 2	Portfolio	Times Earned
1/1/00	$ (4.0)	$ -	$ (4.0)		1/1/00	$ (3.3)	$ -	$ (3.3)	
1/1/01	$ 2.0	$ (2.4)	$ (0.4)		1/1/01	$ 1.7	$ (2.0)	$ (0.3)	
1/1/02	$ (8.0)	$ 3.6	$ (4.4)		1/1/02	$ (6.7)	$ 3.0	$ (3.7)	
1/1/03	$ -	$ (9.6)	$ (9.6)		1/1/03	$ -	$ (8.0)	$ (8.0)	
1/1/04	$ 14.0	$ -	$ 14.0		1/1/04	$ 11.7	$ -	$ 11.7	
1/1/05	$ -	$ 42.0	$ 42.0		1/1/05	$ -	$ 35.0	$ 35.0	
	$ 4.0	$ 33.6	$ 37.6	**3.043**		$ 3.3	$ 28.0	$ 31.3	**3.043**
IRR	13.4%	91.074%	**45.9%**		IRR	13.4%	91.074%	**45.9%**	

Combined Use of the ZBT-NWP Analysis in Private Equity Performance Attribution

The investment meaning of the neutrally weighted portfolio's (NWP) constant IRR can be used as a performance diagnostic by comparing it to the conventional portfolio IRR. The difference between the two is caused by the relative weighting of investments (or, in public stock terms, stock selection). In private market terms, this comparison determines the relative efficiency with which the managers invested their capital. If the neutrally weighted portfolio's IRR is less than the conventional portfolio IRR, the managers invested more money in the best performing transactions and less money in the worst performing transactions. Conversely, if the neutrally weighted portfolio IRR is greater than the conventional portfolio IRR, the managers invested more money in the worst performing transactions and less money in the best performing transactions. Obviously, the former is preferable to the latter in terms of investment efficiency. It is also important to note that, for all the reasons cited above as to why the neutrally weighted portfolio's IRR is constant, the total value to paid-in ratio (TVPI) is also different from actual and is also a constant. In the same fashion as cited in the previous paragraph, a TVPI measure in the actual portfolio that is greater than that of the neutrally weighted portfolio indicates that the managers invested more money in the best performing transactions and less money in the worst performing transactions. Conversely, if the neutrally weighted portfolio TVPI measure is greater than the

conventional portfolio TVPI, the managers invested more money in the worst performing transactions and less money in the best performing transactions.

Again, the former is preferable to the latter in terms of investment efficiency. The paragraphs below show in detail how the neutrally weighted portfolio's constant IRR, and both the zero-based IRR and actual IRR, can be used to analyze performance attribution in the private markets in terms of relative weighting of investments (*i.e.,* stock selection, whether the managers put more money in the better transactions); relative timing of investments (*i.e.,* whether the managers' track record reflects fortunate timing, rather than investment skill); and return against the base portfolio (as defined in the box below).

In order to analyze performance in these terms, we need to know the following:

	Weight	Time	
I	Neutral Weight	Zero-based	Portfolio base return
II	Actual	Zero-based	Actual weights, w/ common start date
III	Neutral Weight	Actual	Neutral-weight portfolio, w/ actual start dates
IV	Actual	Actual	Actual portfolio IRR

Taking up these topics in order:

I. Using both the neutrally weighted portfolio IRR and the time zero IRR together eliminates both time and investment weighting. The return to the portfolio after eliminating the effects of both weighting/investment selection and timing results in what we term the base portfolio. Exhibit 5 shows the result.

Exhibit 5

	Neutral Weight and Zero-Based		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ (3.7)	$ (2.2)	$ (5.9)
1/1/2001	$ 1.8	$ 3.3	$ 5.1
1/1/2002	$ (7.3)	$ (8.8)	$ (16.1)
1/1/2003	$ -	$ -	$ -
1/1/2004	$ 12.8	$ 38.5	$ 51.3
1/1/2005	$ -	$ -	$ -
	$ 3.7	$ 30.8	$ 34.5
IRR	13.4%	91.101%	**52.8%**

II. As mentioned above, the so-called time zero IRR (ZBT) calculation restates all the investments in a portfolio to a common start date. The portfolio effect is to eliminate the relative timing of each of

the investments in determining portfolio IRR. Cash flow weights, on the other hand, remain actual. Exhibit 6 shows the result.

Exhibit 6

	Actual Weight and Zero-Based		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ (4)	$ (2)	$ (6)
1/1/2001	$ 2	$ 3	$ 5
1/1/2002	$ (8)	$ (8)	$ (16)
1/1/2003	$ -	$ -	$ -
1/1/2004	$ 14	$ 35	$ 49
1/1/2005	$ -		$ -
	$ 4	$ 28	$ 32
IRR	13.4%	91.101%	**49.4%**

III. The neutrally weighted portfolio gives equal weight to each investment in a portfolio, eliminating the effect of the relative weight of each investment in determining IRR and thus yielding a constant portfolio IRR. As noted above, if more capital has been invested in the poorest investments, the actual IRR of the portfolio will be less than the portfolio scaled IRR. If the most capital has been invested in the best investments, the actual IRR will be greater than the portfolio scaled IRR. Exhibit 7 shows the result when all cash flows are scaled to a common standard so that each investment's invested capital is the same. The timing of all cash flows is actual.

Since the 45.9% IRR of the neutrally weighted portfolio exceeds the 43.1% IRR of the manager's portfolio, the example shows that the manager's stock selection (i.e., relative weighting of the investments in the portfolio) actually detracted from returns. In other words, naïve or neutral

weighting would have yielded returns superior to the actual weighting of the portfolio's investments.

Exhibit 7

	Neutral Weight and Actual Time		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ (3.3)	$ -	$ (3.3)
1/1/2001	$ 1.7	$ (2.0)	$ (0.3)
1/1/2002	$ (6.7)	$ 3.0	$ (3.7)
1/1/2003	$ -	$ (8.0)	$ (8.0)
1/1/2004	$ 11.7	$ -	$ 11.7
1/1/2005	$ -	$ 35.0	$ 35.0
	$ 3.3	$ 28.0	$ 31.3
IRR	13.4%	91.074%	**45.9%**

IV. The actual portfolio return (i.e., the IRR using both actual cash flow weights and actual cash flow timing), using the numerical example cited above, is shown in Exhibit 8.

Exhibit 8

	Actual Weight and Actual Time		
Period	Invstmnt 1	Invstmnt 2	Portfolio
1/1/2000	$ (4)	$ -	$ (4)
1/1/2001	$ 2	$ (2)	$ -
1/1/2002	$ (8)	$ 3	$ (5)
1/1/2003	$ -	$ (8)	$ (8)
1/1/2004	$ 14	$ -	$ 14
1/1/2005	$ -	$ 35	$ 35
	$ 4	$ 28	$ 32
IRR	13.435%	91.074%	**43.1%**

With all of these figures known, we can analyze the manager's performance in Exhibit 9. Note carefully that the IRRs total properly to the manager's return in this analysis, a property derived from the fact that

the selection IRR and timing IRR each have only a single changed parameter, whether dollar weight or time, from the line immediately preceding. There are thus no intervening unexplained factors.

Exhibit 9

	Weight	Time	Explanation	
I	Neutral Weight	Zero-based	Portfolio base return	52.8%
II	Actual	Zero-based	Actual weights, w/ common start date	49.4%
III	Neutral Weight	Actual	Neutral-weight portfolio, w/ actual start dates	45.9%
IV	Actual	Actual	Actual portfolio IRR	43.1%

I	Base Return	52.8%
II - I	Selection (relative weighting)	-3.3%
IV - II	Timing	-6.4%
IV	Manager's return	43.1%
IV - I	Manager's contribution	-9.7%

USING ZBT-NWP PERFORMANCE ATTRIBUTION ON AN ACTUAL PORTFOLIO

In the example shown in Exhibit 10, performance attribution analysis of a real-world portfolio shows that the portfolio manager did put the most money into the best investments (**II – I** = 112 bps. of value added over the base portfolio). Timing was also good (**IV – II** = 95 bps. of value added), but timing is the investment aspect least controllable by the manager in the private markets. The total manager contribution was positive (**IV – I** = 207 bps.), although it is important to keep in mind that this addition to performance came on top of an excellent base portfolio return of 20.5 percent. In other words, the manager did extremely well, obtaining a 20.5% IRR and then adding 207 bps. in additional return, although only 112 bps. of the added return was attributable to factors within the manager's control. In portfolios with lower base returns, selection and timing begin to dominate the portfolio's return, thus putting a premium on manager skill (in the case of selection return) and/or luck (in the case of timing return).

Exhibit 10

	$	Time	Explanation	
I	Neutral Weight	Zero-based	Index of portfolio	20.54%
II	Actual	Zero-based	Actual weights, common start date	21.66%
III	Neutral Weight	Actual	Neutral-weight portfolio, actual start dates (timing)	23.73%
IV	Actual	Actual	Actual weights, actual timing (conventional IRR)	22.61%

I	Portfolio index	20.54%
II - I	Selection (relative weighting) against portfolio index	1.12%
IV - II	Timing	0.95%
IV	Manager's return	22.61%
IV - I	Manager's contribution	2.07%
IV - III	Selection (relative weighting) against actual outcome	-1.12%

ATTRIBUTION OF ADDITIONAL ASPECTS OF PERFORMANCE

In addition to calculating the return to selection and timing for the IRR, whether it be of an individual investment or any aggregation of investments, ZBT-NWP portfolio analysis can analyze the performance of any of these relative to a public market index in the same way. When analyzing opportunity cost return in this way, ZBT-NWP analysis takes on a new meaning in which performance attribution has to do with the influence of market conditions and timing on performance of a private equity portfolio relative to the public market. These are critical insights into the quality of the manager's earnings relative to the public market index. This would include how much of the return relative to the index was the result of selection skill, indicated by the weights of the investments in the portfolio and how much was the result of timing - a measurement of luck - since the manager cannot influence the performance of the market over any time period.

In Exhibit 11, the performance of a private equity investment relative to the S&P 500 index was calculated using the original Long-Nickels method later adopted by Venture Economics as the public market equivalent (PME) return. Note that ZBT-NWP analysis makes it possible to separate the performance over the index attributable to investment weight and the performance over the index attributable to the timing with which the investment cash flows occurred. In the example in Exhibit 11, the portfolio base return performed extremely well against the index, outperforming by 942 basis points. However, the relative weights of the investments in the portfolio, a measure of selection skill, actually subtracted 814 basis points of performance versus the index. If these two elements are taken together, the return over the index attributable to elements of return within the manager's control is 128 bps. (942 bps. – 814 bps. = 128 bps.).

Exhibit 11

	Money	Time	Explanation	Return > Index
I	Neutral Weight	Zero-based	Portfolio base return	9.4%
II	Actual	Zero-based	Actual weights, common start date	1.3%
III	Neutral Weight	Actual	Neutral-weight portfolio, actual start dates	50.9%
IV	Actual	Actual	Actual weights, actual timing	20.8%

		Return > Index
I	Portfolio base return	9.4%
II-I	Selection	-8.1%
IV-II	Timing	19.6%
IV	Manager's return	20.8%
IV-I	Manager's contribution	11.4%

The return to timing in Exhibit 11, however, is an enormous 1,956 basis points over the index. This return was not within the manager's control, since it would be impossible to know in advance how the market would behave in order to time the private equity portfolio's cash flows to conform to the market's performance. The conclusion these outcomes point to is that this manager's performance versus the index, while truly outstanding (a total of 2,084 bps. over the index), was predominately the result of timing and therefore attributable almost exclusively to factors outside the manager's control. To state the obvious, the track record of a manager whose performance versus the index is the result of advantageous timing is not as strong as the track record of a manager whose performance is the result of factors within the manager's control, including the relative weights of the investments in the portfolio. ZBT-NWP analysis therefore provides an important screening tool in reviewing private equity deal flow.

USES OF ZBT-NWP PRIVATE EQUITY PORTFOLIO PERFORMANCE ATTRIBUTION

One use of ZBT-NWP private equity portfolio performance attribution is in the screening of deal flow. While it might seem obvious to say so, it is critically important to understand the origins of a private equity investment manager's returns and perhaps even more important to understand the manager's returns against the relevant public market index (or any combination of indexes serving as a custom benchmark). Great performance, including great performance versus the index, is not as impressive when it was generated by factors not in the manager's control. Conversely, great performance, including great performance versus the index, that has been generated by factors within the manager's control represent the best hope that the manager will likely be able to replicate those returns in the future. This is particularly the case when a manager can demonstrate a lengthy track record of generating excellent performance using replicable elements of return. Viewed in this light, the manager featured in Exhibit 11 represents an example of excellent returns versus the index that are attributable principally to the vagaries of timing and not to factors within the manager's control. ZBT-NWP performance attribution thus provides an objective means for discerning the truth of a track record, as opposed to taking at face value the various claims made by managers attempting to present their returns in the most positive light.

Another important use of ZBT-NWP performance attribution is to monitor the staff's contribution to the returns of an institutional investor's private equity portfolio. The only difference between using ZBT-NWP analysis for this purpose, as opposed to deal flow screening, is that in deal flow screening performance analysis is done at the deal level, while in monitoring staff contribution to a private equity portfolio the analysis is done at the fund level. In other words, ZBT-NWP analysis can isolate the returns (and the returns relative to the index) stemming from weighting vintages, asset classes, or individual funds within the institutional private equity portfolio, and the returns (and the returns relative to the index) stemming from the timing of the same vintages, asset classes, or individual funds. While subjective factors will always be important in determining institutional staff incentive compensation, ZBT-NWP performance attribution can provide senior management, or the board of trustees, an objective view of private equity performance attribution that separates returns due to timing (*i.e.,* good fortune) from returns due to selection (*i.e.,* superior judgment). Presumably, most boards would choose to compensate the latter more liberally than the former.

Intellectual Property Rights in ZBT-NWP Performance Attribution Analysis

Recent Developments and Additional Considerations

The original performance attribution analytical structure outlined and explained above was expressly designed to analyze IRR-based performance attribution. Over the years it has been applied also to three additional performance measurement statistics: value > index, zero-coupon equivalent return (ZCER) and Direct Alpha. These updates to QuanTrack, ACG's production software, make it possible to calculate and display all three at the same time.

Value > index uses the Long-Nickels PME methodology to calculate the ending total value of an investment relative to the ending value of the index at the valuation date (or the terminal cash flow, if the investment has been realized). The difference between the two can be negative if the index outperforms the private investment, or positive if the private investment outperforms the index. One important aspect of this calculation is that the total value > index of a fund is the sum of the value > index outcomes of its portfolio of investments. Similarly, the total track record value > index is the sum of the value > investment outcomes of the funds that make it up. This property of value > index makes it easy to determine at a glance which of the funds in a track record or investments in a fund portfolio have been most important in the overall outcome.

ZCER is the implied compound rate of return obtained by solving $FV = (1 + i)^n$ for i to obtain $i = \sqrt[n]{FV} - 1$. This operation assumes that all invested capital was invested on the first day of the investment and all other cash flows, including the terminal valuation, occur on the last day (i.e., the valuation date, unless the investment has already been realized, in which case the quantity used as FV is the sum total of distributed capital). This simplification reduces cash flows and valuations to result in the compound rate that is implied by producing the observed multiple (turning $1 into FV) over the time period of the investment. The idea is to contrast a performance measurement statistic with no reinvestment (ZCER) with a performance measurement statistic that assumes constant reinvestment (IRR).

Direct Alpha is mathematically fearsome, but the process for producing it is straightforward. For each of a series of cash flows, look up the price of the index on that date, then divide it into the cash flow to obtain the number of shares of the index acquired or liquidated on that date. Finally, calculate the IRR of the shares (not the cash flows), which represents the delta, in IRR terms, between the private investment's returns and the return of the opportunity cost outcomes of the index.

There is one additional modification to ACG's original algorithm: in addition to calculating performance attribution forwards in the original way, QuanTrack also calculates it backwards:

		Forwards
I	Base Return	$3,425.6
II-I	Selection	($1,232.7)
IV-II	Timing	($410.7)
IV	Manager's return	$1,782.2

		Backwards
IV	Manager	$1,782.2
IV-III	Selection	($1,138.0)
III-I	Timing	($505.4)
I	Base	$3,425.6

A least squares regression of the forwards/backwards pairs makes it possible to quantify the confidence level that the analysis is usable for analytic purposes. In the example below, an R^2 of 0.9 or greater is highlighted in yellow.

		Value > Index				
		Total	**Fund 1**	**Fund 2**	**Fund 3**	**Fund 4**
			Forwards			
I	Base Return	$64,358.0	$3,425.6	$7,127.4	$9,616.2	$2,987.0
II-I	Selection	($28,021.6)	($1,232.7)	($1,388.3)	($757.7)	($235.1)
IV-II	Timing	($9,343.5)	($410.7)	($232.9)	($890.7)	$98.8

F-B Regression		
	Forwards	Backwards
Beta	1.022	0.939
Alpha	($12.7)	$6.2
r	0.991	0.957
R-squared	**0.982**	**0.916**

The Total column measures the performance at the total track record level, answering the question of whether the manager has invested the most capital in the best funds. The fund calculations answer the question of whether the manager has invested the most capital in the best investments within that fund.

	ZCER > Index				
	Total	**Fund 1**	**Fund 2**	**Fund 3**	**Fund 4**
		Forwards			
Base Return	**7.99%**	**5.11%**	**11.64%**	**19.44%**	**25.30%**
Selection	**-2.87%**	**-1.55%**	**-1.34%**	**-1.60%**	**-0.38%**
Timing	**-1.93%**	**-0.96%**	**-1.49%**	**-3.75%**	**-1.22%**
Manager's return	**3.19%**	**2.60%**	**8.81%**	**14.09%**	**23.69%**

F-B Regression		
	Forwards	Backwards
Beta	0.996	1.037
Alpha	**0.00%**	**0.04%**
r	0.943	0.927
R-squared	0.888	0.859

Note that the negative Selection returns in ZCER terms point to the same conclusions as the Value > Index version above...

	Direct Alpha				
	Total	**Fund 1**	**Fund 2**	**Fund 3**	**Fund 4**
		Forwards			
Base Return	**32.80%**	**23.48%**	**23.44%**	**27.21%**	**51.72%**
Selection	**-7.56%**	**-6.90%**	**-3.52%**	**-0.80%**	**-1.98%**
Timing	**-9.95%**	**-4.12%**	**-1.17%**	**-6.06%**	**14.72%**
Manager's return	**15.28%**	**12.46%**	**18.75%**	**20.36%**	**64.45%**

	F-B Regression	
	Forwards	Backwards
Beta	0.811	1.210
Alpha	**-0.67%**	**0.36%**
r	0.895	0.994
R-squared	0.801	**0.987**

…as does the Direct Alpha version.

Taken together the three consistent views of performance attribution above provide critical perspective on the manager's performance versus the index over time, whether viewed as a succession of funds…

	Net		Remaining	Multiple Earned				IRR				Duration		Value >	Val > Index	ZCER		
	Invested	Realized	Valuation	Realized	Valuation	Total	Index	Fund	Index	Fund > Index	Direct Alpha	Fund	Index	Index	/ Amt Inv	Index	Fund	Fund > Index
Fund 1	**$2,417.3**	**$4,621.9**	**$2.6**	**1.91 X**	**0.00 X**	**1.91 X**	**1.18 X**	**16.76%**	**4.37%**	**12.39%**	**12.46%**	**4.2**	3.8	**$1,782.2**	**0.74**	**0.85%**	**3.45%**	**2.60%**
Fund 2	**$2,019.8**	**$7,385.8**	**$660.8**	**3.66 X**	**0.33 X**	**3.98 X**	**1.26 X**	**30.35%**	**10.91%**	**19.44%**	**18.75%**	**5.2**	2.2	**$5,506.1**	**2.73**	**1.67%**	**10.48%**	**8.81%**
Fund 3	**$2,800.4**	**$8,325.1**	**$2,355.3**	**2.97 X**	**0.84 X**	**3.81 X**	**0.97 X**	**32.43%**	**-100.00%**	**132.43%**	**20.36%**	**4.8**		**$7,967.9**	**2.85**	**-0.31%**	**13.78%**	**14.09%**
Fund 4	**$589.0**	**$2,655.9**	**$724.5**	**4.51 X**	**1.23 X**	**5.74 X**	**0.90 X**	**86.23%**	**-100.00%**	**186.23%**	**64.45%**	**2.8**		**$2,850.6**	**4.84**	**-1.22%**	**22.47%**	**23.69%**

…or as the cumulative performance of the track record as a whole:

	Net		Remaining	Multiple Earned				IRR				Duration		Value >	Val > Index	ZCER		
	Invested	Realized	Valuation	Realized	Valuation	Total	Index	Fund	Index	Fund > Index	Direct Alpha	Fund	Index	Index	/ Amt Inv	Index	Fund	Fund > Index
Total Track Record	**$26,749.2**	**$30,044.5**	**$30,284.4**	**1.12 X**	**1.13 X**	**2.26 X**	**1.25 X**	**23.82%**	**9.43%**	**14.39%**	**15.28%**	**3.8**	**2.4**	**$26,992.9**	**1.01**	**1.16%**	**4.34%**	**3.19%**

Return Attribution Calculations, etc.

I defer to David Spaulding's unrivaled expertise in conventional return attribution calculations, and I concur in the entire contents of his comments on this ILPA draft.

My thanks in advance for your consideration of my comments. Please feel free to contact me at your convenience if you have any questions about this submission.

Yours,

Austin Long

Alignment Capital Group, LLC