An intrinsic approach to performance measurement of portfolio manager skill

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This presentation should not be considered as financial advice.

Introduction

- Given active funds management is based on the premise that securities can be mis-priced (sometimes for long periods) it is therefore somewhat incongruous that the standard measure for assessing the performance of the active funds management industry is based on the change in market value of the portfolio from start of period to end of period.

Introduction

- Warren Buffett's 1997 letter to shareholders "*If you expect to be a net saver during the next five years, should you hope for a higher or lower stock market during that period? Many investors get this one wrong. Even though they are going to be net buyers of stocks for many years to come, they are elated when stock prices rise and depressed when they fall. This reaction makes no sense. Only those who will be sellers of equities in the near future should be happy at seeing stocks rise. Prospective purchasers should much prefer sinking prices*".

Introduction

- If a share price has fallen the key thing to determine is if the fundamentals of the business have deteriorated or if the company has become cheaper. Assuming the market is not fully efficient, the share price move on its own will not tell you which of these is true.

- Benjamin Graham observed that "*In the short run, the market is a voting machine, but in the long run it is a weighing machine*".

Market efficiency

- Fama's efficient market is *described as "competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value…..Although uncertainty concerning intrinsic values will remain, actual prices of securities will wander randomly about their intrinsic values"*

Market efficiency

- The paper does not attempt to debate the degree of market efficiency in investment markets. The active fund management industry relies upon identifying inefficiencies in markets, and the paper is focused on measuring the success, or otherwise, of active management through the use of fundamental intrinsic value measures.

- The success of active managers will depend upon a number of factors, including the sophistication of other participants in the market in which they operate.

- Active fund managers also need to create sufficient value to offset their generally higher management fees, transaction costs (including the market impact of demanding liquidity and brokerage costs) and taxation costs.

Portfolio management

- Portfolio Managers are able to 'manage' the purchase and sale of securities in a way to purchase an initially undervalued portfolio and then grow the underlying intrinsic value of their fund. Subject to the holding period, those that do this well will create value for their investors and those that do this badly will destroy value for their investors.

- Warren Buffet's long-term economic goal (subject to some qualifications) is "*to maximise Berkshire's average annual rate of gain in intrinsic value on a per-share basis*".

Intrinsic value

- Berkshire Hathaway - "*Intrinsic value is an all-important concept that offers the only logical approach to evaluating the relative attractiveness of investments and businesses. Intrinsic value can be defined simply: It is the discounted value of the cash that can be taken out of a business during its remaining life*"

- "*The calculation of intrinsic value, though is not simple. As our definition suggests, intrinsic value is an estimate rather than a precise figure, and it is additionally an estimate that must be changed if interest rates move or forecasts of future cash flows are revised.......That is one reason we never give you our estimates of intrinsic value. What our annual reports do supply, though, are the facts that we ourselves use to calculate this value*".

Intrinsic value

- Investors will make their own estimates of intrinsic value using either explicit or implicit forecasts of free cashflows and discount rate assumptions. Intrinsic value will, however, only become evident over time as the cashflows are paid to shareholders. As such, ex ante, intrinsic value can only be estimated – but clearly companies with strong free cashflows and the ability to reinvest some or all of their cashflows at high marginal return on capital will have significantly more intrinsic value than those with poor free cashflows which are reinvested at low marginal return on capital.

Decomposing investment performance into its components

Relative investment performance

= [PMt / PMo] - [BMt / BMo]

where PMt is the portfolio's market price at time t; and

BMt is the benchmark's market price at time t

In log space, for n periods, this relative outperformance can be expressed as:

$$\alpha = ln\,[PMn / PMo] - ln\,[BMn / BMo]$$

Decomposing investment performance into its components

This relative investment performance can be broken into three components:

i.   The relative growth of the portfolio's intrinsic value versus the benchmark's growth in intrinsic value

ii. The relative initial cheapness of the portfolio versus the benchmark's initial cheapness

iii. The relative degree of convergence between the market value of the portfolio and benchmark to the respective intrinsic value of the portfolio and benchmark.

Decomposing investment performance into its components

The first component, the growth of the portfolio's intrinsic value relative to the growth of the benchmark's intrinsic value, will be the ratio of

[PIVt / PIVo] to [BIVt / BIVo]

where

PIVt is the portfolio's intrinsic value after t periods; &
BIVt is the benchmark's intrinsic value after t periods

Decomposing investment performance into its components

In log space, for n periods, this can be expressed as:

$$\alpha_{Ig} = ln\left[\frac{PIV_n}{PIV_0}\right] - ln\left[\frac{BIV_n}{BIV_0}\right]$$

$$= ln\left[\left(\frac{PIV_n}{PIV_0}\right) \div \left(\frac{BIV_n}{BIV_0}\right)\right]$$

$$= ln\left[\left(\frac{PIV_n}{PIV_0}\right) \times \left(\frac{BIV_0}{BIV_n}\right)\right]$$

Provided that the intrinsic value of the portfolio continues to grow at a rate in excess of that of the growth in intrinsic value of the benchmark, this term, when annualised by dividing by n, will not tend to zero as n becomes large.

Decomposing investment performance into its components

The second component, the relative initial cheapness of the portfolio versus the benchmark's initial cheapness, will be driven by the ratio of PIVo / PMo to BIVo / BMo.

This term, when annualised by dividing by n, tends to zero as n increases, but may still be important, even over medium term time horizons, where the relative initial cheapness of the portfolio is sufficiently large.

In log space, this can be expressed as:

$$\alpha_{I_0} = ln\left[\frac{PIV_0}{PM_0}\right] - ln\left[\frac{BIV_0}{BM_0}\right]$$

$$= ln\left[\left(\frac{PIV_0}{PM_0}\right) \div \left(\frac{BIV_0}{BM_0}\right)\right]$$

$$= ln\left[\left(\frac{PIV_0}{PM_0}\right) \times \left(\frac{BM_0}{BIV_0}\right)\right]$$

Decomposing investment performance into its components

The third component, the relative degree of convergence between the market value of the benchmark and portfolio, to the respective intrinsic value of the benchmark and portfolio will be driven by the ratio of BIV_n / BM_n to PIV_n / PM_n.

This component is out of the control of the Portfolio Manager.

This term, when annualised by dividing by n, tends to zero as n increases, but again may be important depending on the relative degree of convergence of the portfolio and benchmark to intrinsic value.

In log space, this can be expressed as:

$$\varepsilon_{In} = ln\left[\frac{BIV_n}{BM_n}\right] - ln\left[\frac{PIV_n}{PM_n}\right]$$

$$= ln\left[\left(\frac{BIV_n}{BM_n}\right) \div \left(\frac{PIV_n}{PM_n}\right)\right]$$

$$= ln\left[\left(\frac{BIV_n}{BM_n}\right) \times \left(\frac{PM_n}{PIV_n}\right)\right]$$

Decomposing investment performance into its components

The addition of the above three components can be shown to equal the market value based alpha, or relative investment performance of the portfolio.

$$\alpha_{Ig} + \alpha_{I0} + \varepsilon_{In} = ln\left[\left(\frac{PIV_n}{PIV_0}\right) \times \left(\frac{BIV_0}{BIV_n}\right)\right] + ln\left[\left(\frac{PIV_0}{PM_0}\right) \times \left(\frac{BM_0}{BIV_0}\right)\right] + ln\left[\left(\frac{BIV_n}{BM_n}\right) \times \left(\frac{PM_n}{PIV_n}\right)\right]$$

$$= ln\left[\left(\frac{PIV_n}{PIV_0}\right) \times \left(\frac{BIV_0}{BIV_n}\right) \times \left(\frac{PIV_0}{PM_0}\right) \times \left(\frac{BM_0}{BIV_0}\right) \times \left(\frac{BIV_n}{BM_n}\right) \times \left(\frac{PM_n}{PIV_n}\right)\right]$$

$$= ln\left[\left(\frac{PM_n}{PM_0}\right) \times \left(\frac{BM_0}{BM_n}\right)\right]$$

$$= ln\left[\left(\frac{PM_n}{PM_0}\right) \div \left(\frac{BM_n}{BM_0}\right)\right]$$

$$= ln\left(\frac{PM_n}{PM_0}\right) - ln\left(\frac{BM_n}{BM_0}\right)$$

$$= \alpha$$

Decomposing investment performance into its components

- The conclusion is that, over long time periods, the key driver of portfolio management alpha generation is the ability to grow the intrinsic value of a portfolio at a rate in excess of the growth in intrinsic value of the broader market. Over long periods this is the main component of portfolio manager 'skill'.

- There is also a component of 'skill' in acquiring the initial portfolio at relatively cheap prices, although this component becomes less important over longer periods of time.

- Finally, there is a component of performance out of the control of the Portfolio Manager. This is the component of performance driven by the degree of convergence between BM_n to BIV_n and PM_n to PIV_n. This component becomes less important over longer periods of time.

Measurement of intrinsic value

- PIV and BIV need to be measured in order to assess portfolio management 'skill'. They should be calculated on an accumulation basis (ie. including dividends) and be adjusted for cashflows (ie. time weighted).

- A Portfolio Manager wishing to manage a portfolio's intrinsic value at a rate above the market will have either an explicit or implicit view on PIV and BIV. Explicit views may well be in the form of a proxy measure of intrinsic value.

- The degree of accuracy in estimating intrinsic value from external data sources is a key issue.

- Applying consistent macro criteria (eg. bond yields, discount rates, economic outlook) between the calculations of PIV and BIV is also an important consideration.
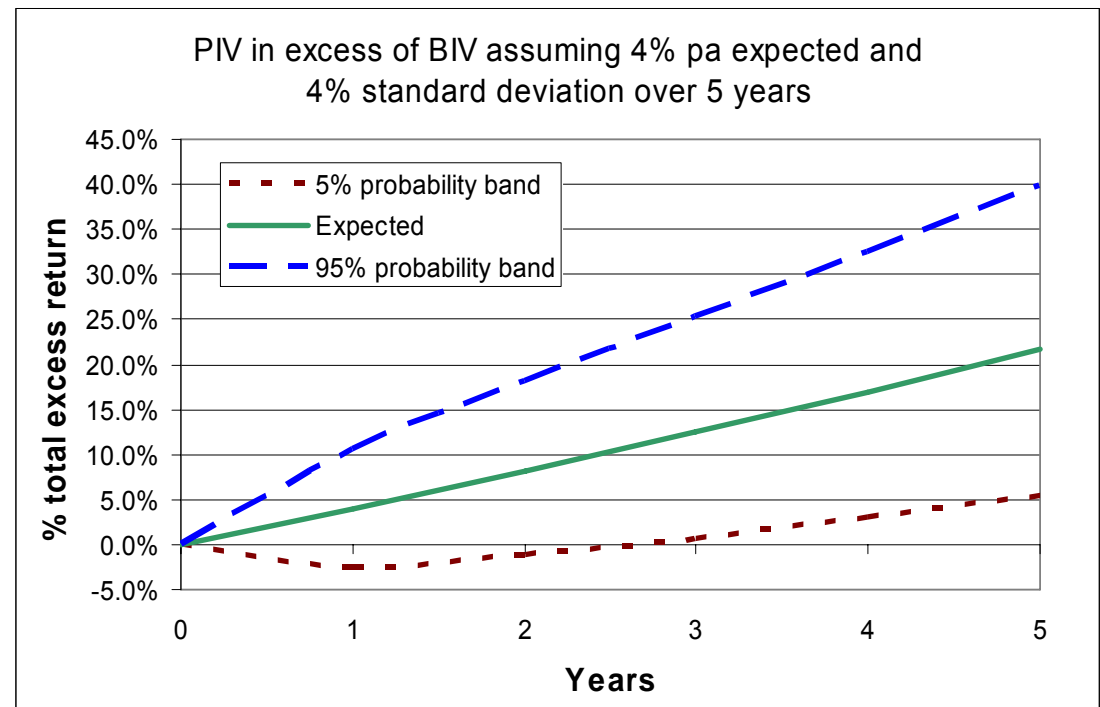
Profile of a 'skilled' Portfolio Manager

- Let us say a skilled Portfolio Manager may be able to grow PIV > BIV at around 4% per annum over a long period of time. However, over shorter periods the Portfolio Manager is in some years likely to add more than 4%, some years add modest amounts, but in other years grow PIV below that of BIV – as even a skilled Portfolio Manager will make some mistakes.

- Effectively a skilled Portfolio Manager has an 'expected' ability to grow PIV > BIV, with a 'volatility' around its delivery.

Profile of a 'skilled' Portfolio Manager

- The chart shows the 5%-95% probability band (assuming a normal distribution) for the growth in a Portfolio Manager fund's intrinsic value over the growth in intrinsic value of a market benchmark assuming a 4% 'expected' growth of PIV > BIV with a 4% standard deviation.

- There is around a 5% probability that it may take at least 3 years for a 'skilled' Portfolio Manager to grow PIV in excess of BIV. After 5 years a 'skilled' Portfolio Manager should have grown PIV in excess of BIV by at least 5% (ie. around 1% pa) with a 95% confidence interval.

PIV in excess of BIV assuming 4% pa expected and 4% standard deviation over 5 years

Legend:
- - - - 5% probability band
——— Expected
– – – 95% probability band

Y-axis: % total excess return (−5.0% to 45.0%)
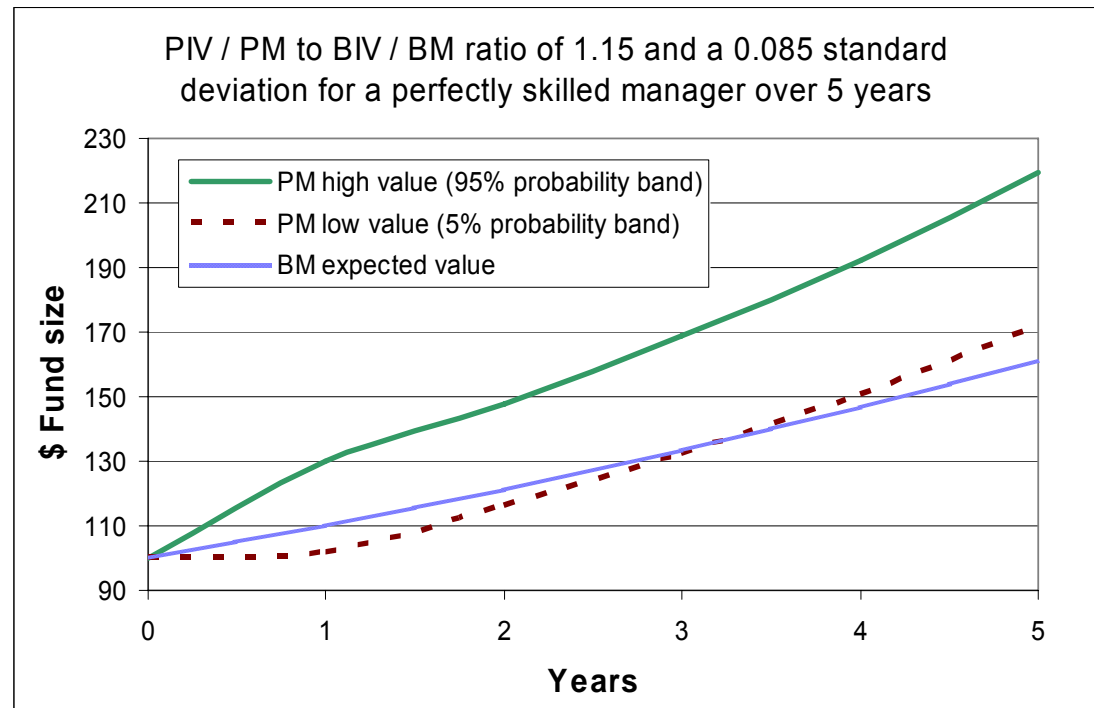X-axis: Years (0 to 5)

Profile of a 'skilled' Portfolio Manager

- A skilled Portfolio Manager may be growing PIV at a greater rate than the growth in BIV, but in the short-term to medium–term this may be 'hidden' to external parties due to the volatility and vagaries of share price movements that don't relate to changes in PIV and BIV.

- PM_t should be 'attracted' to PIV_t, but may be dislocated for a period of time. Similarly, BM_t should be 'attracted' to BIV_t, but again may be dislocated for a period of time.

- It could be expected that $PIV_t - PM_t$ (ie. the cheapness of the portfolio) would be correlated to $BIV_t - BM_t$ (ie. the cheapness of the benchmark) when broader market moves are driven more by sentiment than by fundamentals.

- It is the ratio $[PIV_t - PM_t] / [BIV_t - BM_t]$ (ie. the relative cheapness of the portfolio versus the benchmark) which would create the main 'noise' in measuring relative performance based on market prices.

Profile of a 'skilled' Portfolio Manager

- The following chart shows the 5 year profile of a 'perfectly skilled' Portfolio Manager (ie. one that can grow PIV at 4% pa above the growth in BIV with zero standard deviation) with 5% to 95% probability range of outcomes for PM compared to BM.

- The data assumes that the ratio of PIV / PM to BIV / BM has a mean of 1.15 and a standard deviation of 0.085.

- The charts suggest that it would take 3 to 4 years of market price based investment performance to identify a perfectly skilled manager at the 95% confidence level.

PIV / PM to BIV / BM ratio of 1.15 and a 0.085 standard deviation for a perfectly skilled manager over 5 years

Legend:
— PM high value (95% probability band)
--- PM low value (5% probability band)
— BM expected value

Y-axis: $ Fund size (90 to 230)
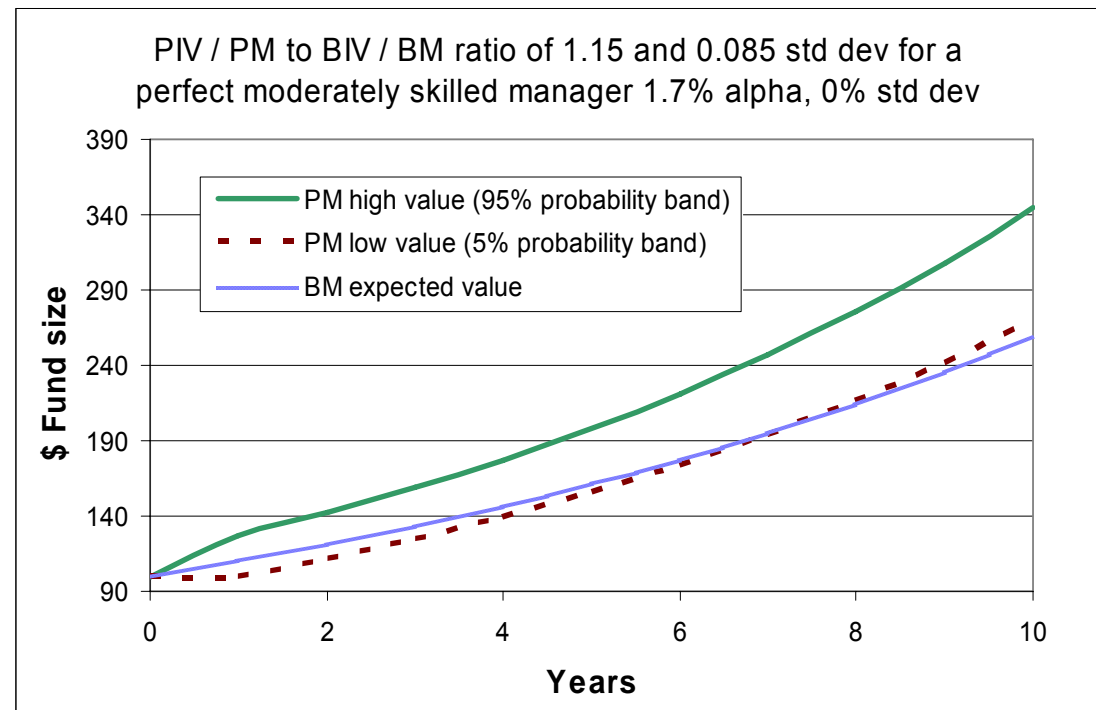X-axis: Years (0 to 5)

Profile of a 'skilled' Portfolio Manager

- The previous charts, however, don't allow for the volatility of a non-perfect 'skilled' Portfolio Manager. In this case it would take longer for the skill of the Portfolio Manager to be identified by market price based investment performance at the 95% confidence level.

- As a 'skilled' Portfolio Manager (expected growth in PIV > BIV of 4% per annum with a 4% standard deviation) at the 95% confidence level will have grown PIV in excess of BIV by at least 1.7% pa after 8 years, we can approximate the combination of volatility in skill and volatility in PIV / PM to BIV / BM, by looking at the 10 year profile of a 'perfect moderately skilled' Portfolio Manager, using a 1.7% per annum 'skill' level.

Profile of a 'skilled' Portfolio Manager

- Portfolio Manager, using a 1.7% per annum 'skill' level with no volatility and the previous assumptions of PIV / PM to BIV / BM with a mean of 1.15 and a standard deviation of 0.085. This combination is shown in this chart.

- The chart suggests that it would take around 8 years of market price based investment performance to identify a skilled manager at the 95% confidence level.

PIV / PM to BIV / BM ratio of 1.15 and 0.085 std dev for a perfect moderately skilled manager 1.7% alpha, 0% std dev

$ Fund size

Legend:
- PM high value (95% probability band)
- PM low value (5% probability band)
- BM expected value

Y-axis: 90, 140, 190, 240, 290, 340, 390

X-axis (Years): 0, 2, 4, 6, 8, 10

Discussion points

- Disclosure of performance attribution into its three components
  - Ability for clients to better understand skill
  - Competitive information
  - Changes to investing behaviour
  - Over-estimation of intrinsic value by Portfolio Managers
- Application for measuring 'sponsor' skill for manager of manager products
  - Timing of cashflows between Portfolio Managers
  - Does the third term become an alpha term for sponsors?