WHITE PAPER #14

Apples-to-Oranges?
Reducing Tracking Error Noise with Fair Value Adjusted Benchmark Indices

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Abstract

Mutual funds have increasingly been employing systematic fair value methodologies to value portfolio securities when reliable market quotations are not readily available. In August 2007, using public Net Asset Value (NAV) data through March 2007 for 166 international funds (representing 166 distinct fund families) we estimated that approximately 91% of the funds employed a systematic fair value methodology.[1] Broadening this sample through March 2008, we now estimate this number to be approximately 93%. Given the prevalent use of systematic fair value methodologies, we wanted to examine the effects on fund performance measurement, specifically on tracking error. Our study suggests that if international funds use benchmark indices that are valued based solely on the local closing prices of international equity securities, an inherent bias towards higher tracking error will persist, which is amplified on days with higher volatility in the markets. Accordingly, a natural extension of the use of fair valuation by international funds would be the fair valuation of international indices, facilitating a more "apples-to-apples" comparison for performance measurement purposes.

Introduction

Tracking error is an estimate of the dispersion (standard deviation) between a mutual fund's returns and the returns of a comparable benchmark index. It is often used by investors to gauge how much risk the fund manager is taking on in order to achieve similar or better returns in comparison to the benchmark index. Relative to comparable funds, a lower tracking error is generally associated with a lower perception of risk in the fund, since it implies that the investment strategy is not taking on more volatility in order to achieve returns to shareholders. This is clearly recognized as it pertains to index funds, which strictly aim to track the returns of certain benchmark indices. For index funds and actively managed funds, examining tracking error is important in the operation of the fund in several capacities, including: identifying a measure of relative risk, attribution analysis, analyzing portfolio management, and overall marketability of the fund.

Our study examines whether tracking error increases as a result of benchmark indices using only local closing prices in their valuation process. Intuitively, we expected a certain level of noise, or variability, which will generally lead to a wider dispersion between the returns of the international fund and the benchmark. Moreover, as volatility in the market increases, the noise should be amplified, creating a perception of increased relative volatility in the fund and higher risk.

To illustrate, consider that Fund A and Fund B are similar actively managed international funds investing in identical securities. Suppose that over the past year Fund A used fair valuation everyday, while Fund B and the underlying benchmark index did not use any fair valuation procedures. The annual returns of Fund A and Fund B were 16%, and the underlying benchmark index was 15%. Now, suppose the daily tracking error between Fund A and the index was 1%, while the daily tracking error between Fund B and the index was 0.25%. Which fund appears to have been a better investment choice? Although the 1% excess return (i.e., 16%-15%) is equivalent for both funds, the higher tracking error associated with Fund A creates a perception that more risk was taken to achieve those excess returns for shareholders.

[1] *See* Robert Haddad, *White Paper #13, What trigger levels are other funds using?* (2007).

In this study, we used public NAV data for 166 U.S. mutual funds (from different fund families) investing in international equities to estimate tracking error over a four year period (April 2004 to March 2008) versus two proxy benchmark indices; one strictly using local closing prices, and one strictly using fair value adjusted prices. Our observations clearly demonstrate the potential reduction in tracking error when fund returns are compared to the fair value adjusted benchmark, suggesting that it may be appropriate to utilize fair value adjusted benchmark indices for performance measurement purposes.

Selecting the 166 Funds and Creating Benchmark Indices

The process we employed to select a sample of funds and create our benchmark indices was very similar to the process previously described in White Paper #13, which we utilized to estimate trigger levels used by mutual funds. We selected our sample of international funds based on their classification by Morningstar® as foreign large blend style, and chose funds with higher net assets under management compared to similar funds in the same family. In addition, we required the funds to have reported daily NAVs over the four year period from April 2004 to March 2008. Given these criteria, we arrived at a sample of 166 funds, and calculated daily NAV returns, adjusted for dividends, over the four year period.[2]

Our next step was to create two time series of proxy benchmark indices, each representing a capitalization-weighted index of 750 international equity securities. One series was constructed using local closing prices every day, called Local750, and the other using evaluated prices from Interactive Data Pricing and Reference Data's Fair Value Information Service, called FairValue750.

Tracking Error Comparison: 166 Funds vs. Local750 and FairValue750

We estimated daily tracking error for each of the 166 funds against the Local750 benchmark index and the FairValue750 benchmark index across four 12-month periods from April 2004 to March 2008. The measurement of daily tracking error was estimated by calculating the standard deviation of daily excess returns between the fund and the corresponding benchmark index. Specifically, we first subtracted the corresponding benchmark index daily return from each fund's daily NAV return to create a series of excess returns for each fund against both benchmark indices. We then measured the standard deviation of each fund's excess return series to estimate the daily tracking error for each of the four 12-month periods.[3] Our results reported in the table below indicate that the percentage of funds with lower tracking error to FairValue750 has increased over the past four years, while at the same time the median tracking error for the funds versus the Local750 benchmark has steadily increased, peaking in the most recent April 2007 – March 2008 period.

Table 1. Tracking Error (TE) Summary Results

Time Interval	*Median TE with Local750 (bps)*	*Median TE with FairValue750 (bps)*	*Percent of Funds with Lower TE to FairValue750 than to Local750*	*No. of Days the change in the S&P 500® exceeded 100 bps*
April 2004 – March 2005	45	45	50.0%	33
April 2005 – March 2006	47	35	77.1%	29
April 2006 – March 2007	60	35.5	88.6%	31
April 2007 – March 2008	107	48	91.6%	89

[2] The same 166 funds from White Paper #13 were used over the period from April 2004 to March 2007. During the period of April 2007 to March 2008, 7 of the original 166 funds were excluded due to a lack of NAV information, and were subsequently replaced by 7 new funds.

[3] Alternatively, another approach often employed to calculate tracking error includes calculating the standard deviation of monthly excess returns, and then multiplying this figure by the square root of 12 to annualize the estimate.

To further illustrate these observations, the following charts represent each fund's tracking error versus both the Local750 benchmark and the FairValue750 benchmark for each of the four 12-month periods. The red dots indicate those funds which experienced a higher tracking error to the Local750 benchmark, while the green dots indicate those funds which experienced a higher tracking error to the FairValue750. These charts show a clear trend, with 91.6% of the funds demonstrating a lower tracking error to the FairValue750 benchmark during the April 2007 – March 2008 window. At the same time, the median tracking error between these funds and the Local750 benchmark is substantially higher than in other periods. For instance, while the percentage of funds with higher tracking error to the Local750 benchmark increased from 88.6% to 91.6% from the period of April 2006 – March 2007 to the period of April 2007 – March 2008, the median tracking error of these funds increased from 60 bps to 107 bps, respectively.[4]

One explanation of this increase in the median tracking error is general market volatility.[5] As the broad markets experience heightened volatility, the frequency with which funds invoke fair value procedures may increase (i.e., movements in relevant market indicators tend to exceed a fund's predefined trigger level threshold more often). For instance, the daily movements in the S&P 500® Index exceeded 100 bps 31 times during the period from April 2006 to March 2007. By contrast, the daily movements in the S&P 500 Index exceeded 100 bps 89 times during the period from April 2007 to March 2008, which is a dramatic increase in volatility. At the same time, the resulting fair value adjustments will generally increase in magnitude as well. This suggests that without a fair value adjusted index, tracking error for international funds that use a systematic fair value methodology will be higher in proportion to the general volatility in the market.

[4] Note that for our index value calculations we used foreign exchange (FX) rates as of 4:00 p.m. ET for the FairValue750 benchmark and the FX rates at a time closely aligned to the local market close for each security in the Local 750 benchmark. For example, we used exchange rates at 11:00 a.m. ET for securities listed on the London Stock Exchange. We believe the general practice among index providers is to use 11:00 a.m. ET FX rates to calculate index values, and that mutual funds generally calculate NAVs using FX rates as of 4:00 p.m. ET. While this difference in convention may contribute to higher tracking error based on fluctuations in the currency markets between 11:00 a.m. and 4:00 p.m. ET, our study suggests that this difference is negligible. For example, during the most volatile period from April 2007 to March 2008, using a 4:00 p.m. ET FX rate to calculate the Local750 benchmark resulted in a median daily tracking error of 107 bps (the same tracking error we calculated using synchronized FX rates), while using an 11:00 a.m. ET FX rate to calculate the Local750 benchmark resulted in a median daily tracking error of 108 bps.

[5] See Appendix, Chart 5: Market Volatility – No. of Days When the Change in the S&P 500® Index Exceeded 100 bps.

Charts 1-4: Daily Tracking Error between each of the 166 funds and both Local750 (y-axis) and FairValue750 (x-axis) in 12-month intervals over a 4 year time period

Chart 1: April 2004 to March 2005

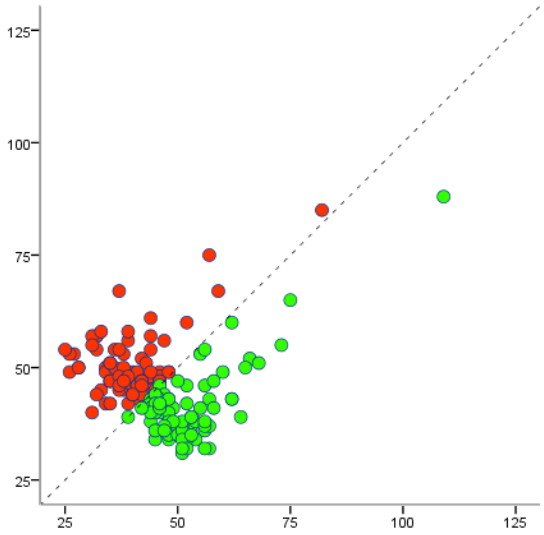


Chart 2: April 2005 to March 2006

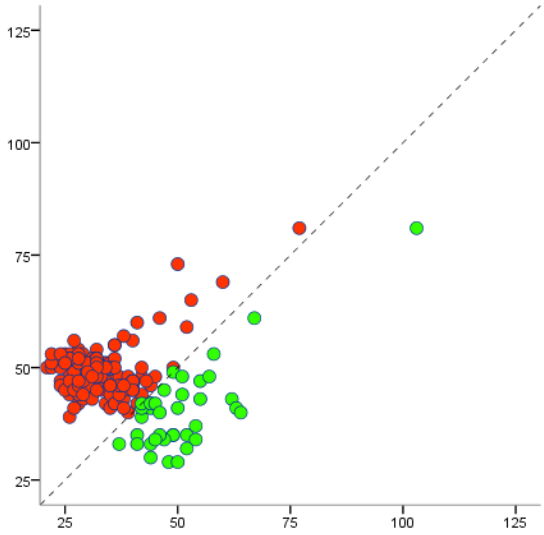


Chart 3: April 2006 to March 2007

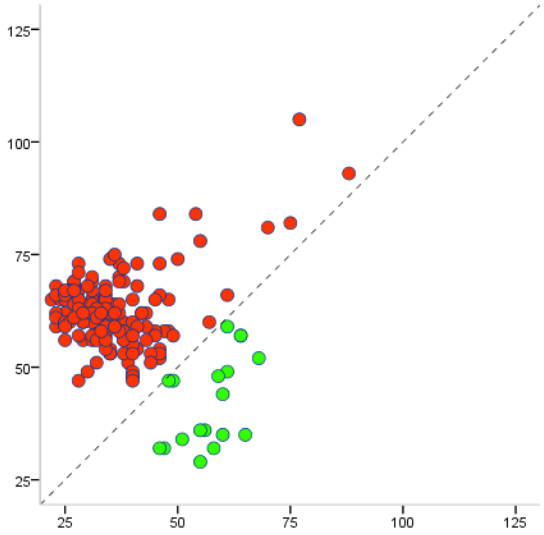
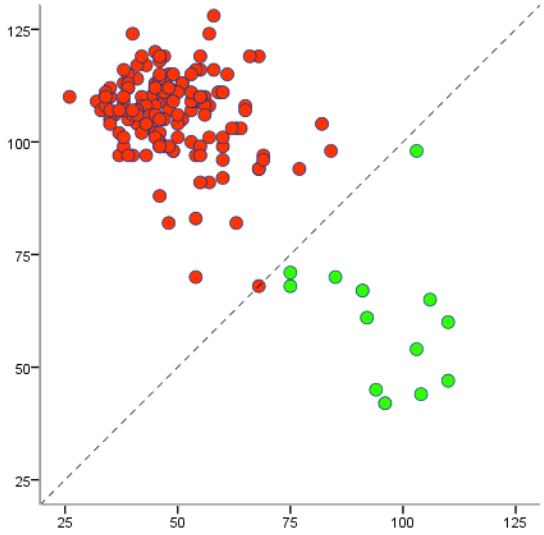


Chart 4: April 2007 to March 2008



Daily Tracking Error with Local750 (in bps)

Daily Tracking Error with FairValue750 (in bps)

Indicates Funds with Higher Tracking Error to Local750

Indicates Funds with Higher Tracking Error to FairValue750

Summary

We estimate that approximately 93% of international funds currently employ a systematic approach to fair valuation. In light of the pervasiveness of this practice, the effects of the use of fair value adjustments on performance measurement needs to be examined. In our study, we used public NAV data for 166 funds, and estimated daily tracking error between each fund and two benchmark index proxies, Local750 and FairValue750, over four 12-month periods from April 2004 to March 2008. The results of our study indicate that tracking error is amplified during times of higher general market volatility and can be significantly reduced when comparisons are made to a fair value adjusted benchmark index. These findings suggest that extending the concept of fair valuation to benchmark indices makes sense, producing a more "apples-to-apples" comparison for relative performance measurement purposes.

APPENDIX

Chart 5: Market Volatility – No. of Days When the Change in the S&P 500® Index Exceeded 100 bps
Quarterly Results from April 2004 to March 2008