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Endpoint Bias

WHITEPAPER
AUGUST 2022

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With few exceptions, capital markets do not provide predictable short term investment returns. Careful examination of capital market history, however, may help investors to make estimates of expected long term returns. These estimates are critical to setting strategic allocations to various asset classes.

In generating expected returns for asset classes using historical data, investors should typically incorporate the longest period possible. However, investors should also examine whether the period includes a variety of market and economic environments and should test multiple sub-periods to mitigate the bias that may result from arbitrary starting and ending points (known as endpoint bias).

Even historical returns for periods as long as 20 years may not prove a useful guide for generating expected returns. To complement a historical analysis of asset class returns, investors may benefit from forward-looking scenario analysis, based on an understanding of the fundamental drivers of historical returns.

Definition and discussion

To avoid huge disappointments and strategic errors, it is crucial that investors understand how much patience and farsightedness the capital markets require.

Periods of 20 years may not be long enough to provide predictable returns. Unfortunately, for many market indices (e.g., emerging markets, high yield bonds), return data do not even extend prior to the mid 1970s. The fewer market environments experienced by a benchmark, the less useful it is as an indicator of long term investment expectations. Therefore, some would argue that it is reasonable to assume that investors should focus on the longest period of data available. However, this is only partially true.

Examinations of data from only the longest period available, from inception to the present day, may suffer from *endpoint bias*. Statistically, endpoint bias refers to the inclusion or exclusion of data that significantly influence results. Practically speaking, endpoint bias refers to investors' tendency to place undue significance on results for measurement periods ending in the present. If the recent past witnessed unusually high or low returns, then long term results can change considerably.

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Endpoint bias caused by changing markets

One might assume that 20 years of data are sufficient to stabilize short-term volatility. However, as illustrated in the following example, 20 year trailing returns can change dramatically, even when as little as 12 months of return experience is added or deleted from the record. In this first example, data are presented for two different endpoints, March 2000 and March 2001, separated by just one year.

	20 Years Annualized as of March 2000	20 Years Annualized as of March 2001
Russell 1000 Growth	18.5%	13.2%
Russell 1000 Value	17.2%	15.3%

FIGURE 1
Source: Bloomberg.

As of March 2000, the Russell 1000 Growth index had outperformed its value counterpart by a 130-basis-point annual margin over the trailing 20 years. Using this data to form expectations, investors might conclude that growth stocks offer a long-term premium relative to value stocks. However, when the 20-year trailing return is measured just one year later, the premium had reversed itself, favoring value stocks by an annualized margin of 210 basis points. Hence, the value minus-growth gap changed by 340 basis points per year, from –130 to +210 basis points, just by shifting the timeframe by 12 months.

As another example, the 20-year period ending February 2008 indicated that the S&P 500 index had earned 3.4% more than the Bloomberg Aggregate, annually. This was fairly consistent with the long-term premium observed for stocks over bonds in the US. However, when measured one year later, investment grade bonds exhibited an annualized 20-year outperformance of 0.2%. Note that this relationship (of bonds outperforming stocks) lasted for only that single month.

	20 Years Annualized as of February 2008	20 Years Annualized as of February 2009
S&P 500	10.8%	7.1%
Bloomberg Aggregate	7.4%	7.3%

FIGURE 2
Source: Bloomberg.

Measured over shorter periods, such as five or ten years, the changes in average annual returns can be even more extraordinary. Figure 3 below, compares the trailing five-year performance for the Russell 2000 Growth and Russell 2000 Value indices as of March 2000 and March 2001. As of March 2000, small growth stocks had beaten small value stocks by an average of 10.8% per year. Yet, 12 months later, the outperformance of small growth stocks over small value stocks had reversed wholesale.

	5 Years Annualized as of March 2000	5 Years Annualized as of March 2001
Russell 2000 Growth	31.8%	11.6%
Russell 2000 Value	21.0%	14.2%

FIGURE 3
Source: Bloomberg.

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Relying solely on data that is biased in this fashion can result in investors making flawed decisions. An investor shifting assets from value to growth early in 2000 in response to the prior five years was punished by a 40% loss for small cap growth stocks and a 43% loss for large capitalization growth stocks during the year beginning April 1, 2000. For both the five- and twenty-year periods examined for growth and value stocks, endpoint bias was significant due to the extraordinary rise and fall of technology stocks.

Often, the time period being measured may be particularly favorable (or unfavorable) for a certain investment style.

The following example emphasizes that reversals of the data (and the conclusions investors are likely to draw) are not uncommon. International investing looked especially enticing based on the experience of the 1980s (see Figure 4). As a result, many investors in the 1990s shifted heavily into non-US stocks. Unfortunately, foreign stocks significantly underperformed US equities over the subsequent decade, mainly because of a disastrous decline for Japanese stocks. However, the relative performance switched again during the 10 years ending in December 2009, and again for the trailing 10 years ending in December 2019.

	10 Years Annualized as of December 1989	10 Years Annualized as of December 1999	10 Years Annualized as of December 2009	10 Years Annualized as of December 2019
MSCI EAFE	22.0%	7.0%	1.2%	5.5%
S&P 500	17.5%	18.2%	-0.9%	13.6%

FIGURE 4
Source: Bloomberg.

Endpoint bias caused by insufficient data

Often, the time period being measured may be particularly favorable (or unfavorable) for a specific investment style. For example, growth stocks were strongly supported by the dot com bubble of the late 1990s. Similarly, the period being measured simply may not have included a financial or economic environment that highlights the true nature of an asset class. Consider bank loans as an example. Bank loans had never experienced more than a 2% loss over a 12-month period until the arrival of the Global Financial Crisis. Yet during 2008, bank loans declined by -28.8% (see Figure 5).

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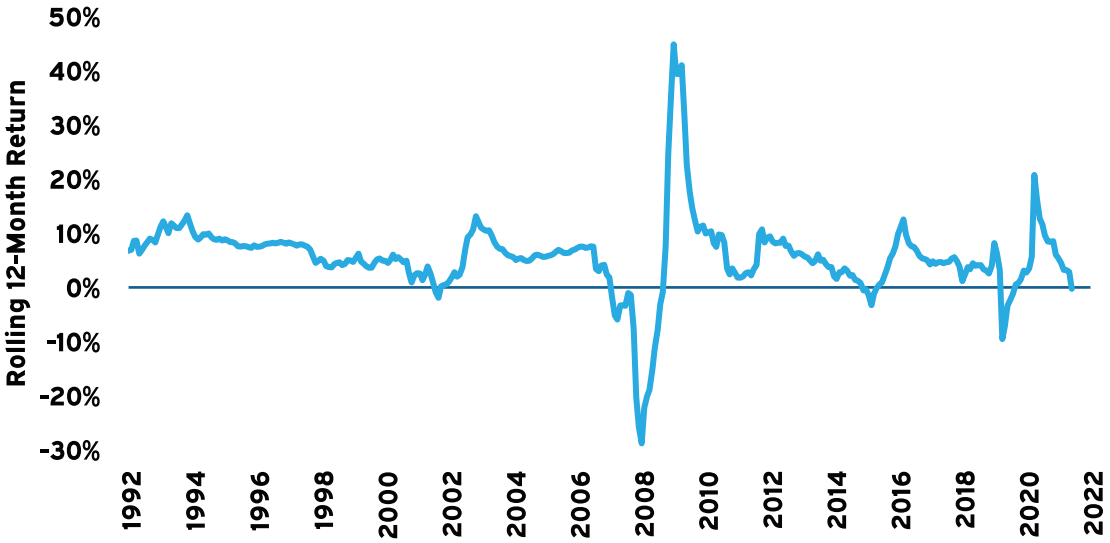

FIGURE 5

One-Year Rolling Returns for Bank Loans, 1992 to 2022

Source: Bloomberg.

Note: Bank loans are proxied by the CS Leveraged Loan index. Data is for the period from January 1992 through June 2022.

On a similar theme, consider the case of commodities. An investor looking at commodities in the decade of the 2000s would likely have found them very attractive relative to stocks based on the performance of the two asset classes between the years 2000 and 2007. However, this encompassed an extended bull market for commodities and a notable bear market for equities (i.e., the Tech Bubble) at the beginning of the time period (note that "starting point bias" is as significant as endpoint bias when dramatic investment results are at the beginning of the period). However, when US stocks are compared to commodities for the full history of the commodities index, the annualized returns favor equities substantially (see Figure 6).

	2000—2007 Annualized	1972—June 2022 Annualized
S&P GSCI	13.2%	6.7%
S&P 500	1.7%	10.5%

FIGURE 6

Source: Bloomberg.

Endpoint bias in active management

The presence of endpoint bias is not restricted to the returns of asset classes. It can also be found in volatility and correlation data as well as the returns of active managers. Figure 7 compares how the median active manager in a particular segment of the market performed versus its benchmark over the previous five years. Unsurprisingly, whether and by how much the median manager outperformed or underperformed changes when viewed at different time periods.

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	Median for 5 Years Ending 12/2008	Median for 5 Years Ending 12/2013	Median for 5 Years Ending 6/2017	Median for 5 Years Ending 6/2022
Large Cap Value	35 bp	97 bp	-54 bp	131 bp
Large Cap Growth	103 bp	-65 bp	-87 bp	-154 bp

FIGURE 7

Annualized Performance versus Benchmark for Large Cap Value and Growth Managers

Data source: Morningstar. Represents annualized manager returns, gross of fees, minus the annualized benchmark return. The benchmarks used were the Russell 1000 Value and Russell 1000 Growth indices. The universes are composed of Morningstar mutual fund returns.

Figure 7 shows that the median value manager has cycled between outperforming to underperforming and back to outperforming their benchmark over the past 20 years. Meanwhile, the median growth manager has gone from outperforming by more than 100 basis points as of December 2008 to underperforming by more than 100 basis points as of June 2022.

Dealing with endpoint bias

Meketa Investment Group recommends four analytical approaches to both gauge and potentially mitigate the effects of endpoint bias:

1. Examine the longest time period available.
2. Examine periods that contain a variety of market and economic conditions.
3. Examine sub-periods and look for cyclicality.
4. Examine the underlying drivers of asset class returns.

The first recommended approach acknowledges the simple statistical fact that more data is typically better when making inferences based on a sample. The second approach addresses the need to use a sample from a representative long-term distribution of returns. For example, if the historical data is from a bull market, it is not reasonable to suppose that analysis based on that data will represent performance during a full business cycle (e.g., both a bull and bear market). The third approach acknowledges that full history endpoints may include periods of extreme volatility and that observing behavior during sub samples or discarding anomalous data points may help to form better estimates of asset class behavior.

Sound investment strategies and concepts should stand the test of time.

The example of feast and famine in the foreign equity markets illustrates the importance of understanding the actual conditions that drove the returns, our fourth recommended approach. For example, foreign equity returns in the 1980s were dominated by a dramatic increase in the Japanese equity market that elevated their 10-year returns. An investor considering a large allocation to non-US stocks in 1990 or 1991 needed to know that much of the prior decade's gains were associated

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with the huge expansion of price-earnings ratios in Japan late in the decade. In the early 2000s, the BRIC nations (Brazil, Russia, India, and China) witnessed a 370% return that dramatically outstripped those of developed markets.[1] Yet, the 2010s saw dramatic outperformance of US equities over emerging market equities, illustrating the cyclical nature of equities. The primary lesson we derive from the return history of the global stock markets over the past four decades is to avoid dramatic shifts in strategy based on results that may appear to be conclusively long.

[1] Source: Morningstar (2016).

Finally, the same considerations hold true for manager evaluation and selection. Managers are sometimes hired and fired because of recent underperformance. Investors often hire managers with strong recent results as those managers typically exhibit attractive performance relative to their peer group over three-, five-, and ten-year periods. Similarly, some fired managers have experienced weak short-term results that significantly impact their three-, five-, and ten-year returns.

The evaluation of asset classes, strategies and managers should be based on rigorous investment analysis and a long-term view, accompanied by skepticism of recent fads and trends. Sound investment strategies and concepts should stand the test of time.

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