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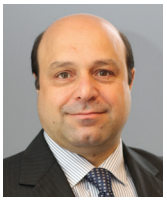

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HIGH-VOLATILITY REALITIES DRIVE LOW-VOLATILITY PHENOMENON

IN BRIEF

- Low-volatility investment strategies have become popular as a defensive equity solution based on an apparent "low-volatility anomaly."
- Explanations for the anomaly — which leads high-volatility stocks to underperform over the long run — include behavioral tendencies and structural developments in the markets.
- Our research suggests the low-volatility anomaly is rooted in the investment characteristics of the most volatile stocks.

Low-volatility investment strategies have gained appeal in recent years as a defensive equity solution. Based on empirical evidence of a "volatility anomaly" that leads high-volatility stocks to underperform over the long run, these portfolios tend to underweight high-volatility stocks while overweighting low-volatility stocks.[1]

Designed for long-term investing, these strategies potentially surrender some relative performance during up markets in order to provide significant outperformance during down markets.

Various explanations for the persistent low-volatility anomaly have been offered based on research studies and industry observations, among them behavioral tendencies and structural developments in the markets. Structural factors include technology and newer investment instruments that can sometimes serve as conduits for volatility.

Our research leads us to view the anomaly from another perspective. We present analysis that suggests that it is rooted in the investment characteristics of the most volatile stocks, *i.e.*, inefficiencies among the most volatile stocks lead to their underperformance. We argue that the anomaly is actually driven by fundamental realities. Avoiding investing in highly volatile stocks is the way to reap the low-volatility dividend.

A summary of the behavioral and structural reasons offered to-date for the low-volatility anomaly are shown in the table below along with the fundamental reasons we present in this paper.

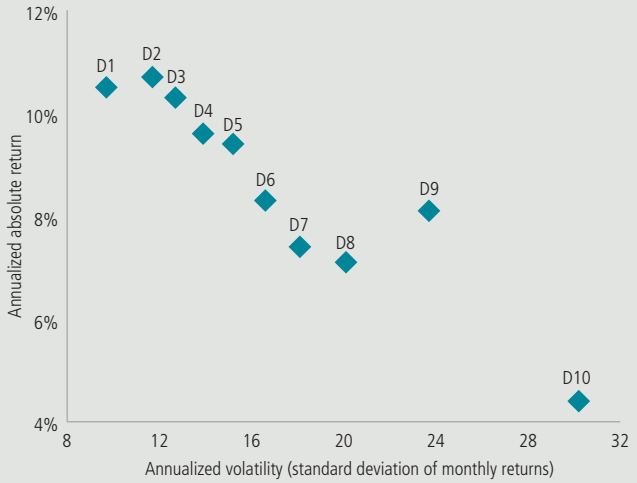
What accounts for the low-volatility anomaly?

Behavioral	Structural	Fundamental
• Lottery effect	• ETFs	• Valuation
• Representativeness	• Derivatives	• Quality
• Overconfidence	• Trading technology	• Earnings instability
• Overoptimism	• Benchmark-driven	• Trading behavior

Risk and returns

The low-volatility phenomenon can be observed in Exhibit 1, which shows that the most volatile 40% of global stocks underperformed the least volatile 60% for the period from December 1989 through December 2014.

Exhibit 1: Global return/risk by volatility decile



Sources: Compustat, WorldScope and FactSet. See Methodology on page 6 for further details.

The long-term underperformance of the most volatile stocks raises questions about their fundamental commonalities: Do highly volatile stocks share certain investment characteristics that differentiate them from low-volatility stocks? For instance, is the higher-volatility group composed of companies with these attributes: lower quality, more earnings uncertainty, expensive valuations or lower market capitalizations?

In this paper, we address these questions by comparing higher-volatility stocks with lower-volatility stocks using common metrics such as valuation, earnings quality, sentiment and liquidity. Our study examines both US and global excluding US (non-US) universes in an effort to highlight potential differences between the two regions (see Methodology on page 6 for details on the composition of these universes).

Quality

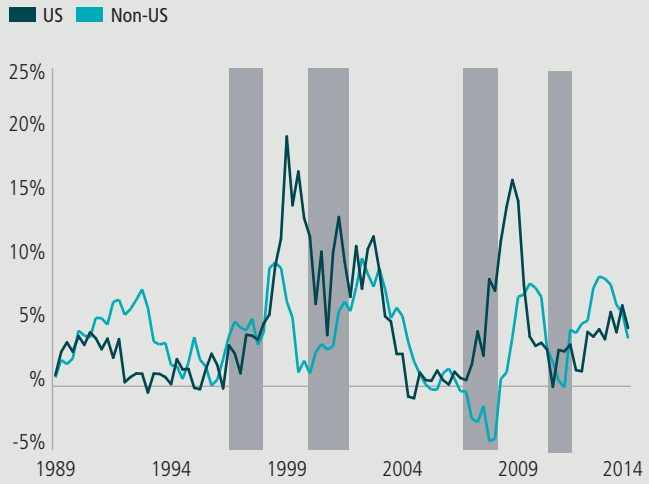
MFS research shows that higher-quality companies tend to outperform over time.[2] Identifying quality companies with strong balance sheets and a history of steady operational performance and lower earnings volatility through market cycles is a key part of the fundamental investment process. To assess a potential difference in quality between lower- and higher-volatility stocks, we focus on two measures that are generally associated with determining quality: return on equity (ROE) and operating margins (OM).

Return on equity (ROE)

ROE calculated for the two groups demonstrates that, over the long term, it trended about 4% higher for lower-volatility stocks than it did for higher-volatility stocks, with absolute ROE averaging 14% and 10%, respectively.[3] This is shown in Exhibit 2, where the difference in ROE between the two groups is depicted. This difference becomes quite pronounced near market inflection points and approaches double digits during crisis periods, when ROE declines more sharply for the most volatile stocks. Furthermore, as one might expect, higher-volatility stocks have shown a greater standard deviation than their lower-volatility counterparts: 4.9% versus 1.4% in the US and 4.7% versus 2.5% in the non-US universe.

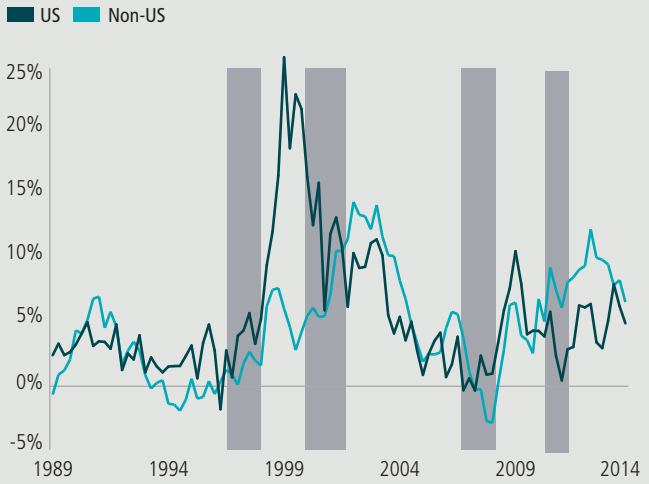
This suggests that higher-volatility stocks are, on average, less profitable and have a less sustainable ROE than lower-volatility stocks.

Exhibit 2: Low volatility–high volatility difference in return on equity (ROE)



Sources: Compustat, WorldScope and FactSet.
Chart Note: The four shaded areas in Exhibit 2 denote these crisis periods: Asian financial crisis (June 1997 – August 1998), MSCI All Country Asia down 47%; technology bubble (August 2000 – September 2002), MSCI World down 47%; global banking crisis (December 2007 – February 2009), MSCI World down 53%; European sovereign debt crisis (August 2011 – September 2011), MSCI World down 15%.

Exhibit 3: Low volatility–high volatility difference in operating margins (OM)



Sources: Compustat, WorldScope and FactSet.
Chart Note: The four shaded areas in the chart denote crisis periods. See Methodology on page 6 for further details.

Operating margins (OM)

Operating income as a percentage of sales is also often regarded as a profitability gauge and quality indicator.[4] Exhibit 3 highlights the difference in OM between lower-volatility and higher-volatility stocks, demonstrating a pattern similar to that observed in the case of long-term ROE. Lower-volatility stocks have had consistently higher margins historically, while the margins for higher-volatility stocks show more dramatic drops leading into and during sharp market declines.

In our analysis, the OM for lower-volatility stocks was about 5% higher than that of higher-volatility stocks, averaging about 19% and 14%, respectively. As anticipated, the higher-volatility universe had a greater standard deviation than its lower-volatility counterpart: 5.8% versus 1.9% in the US, and 4.5% versus 3.0% in the non-US group, respectively.

Stocks that display higher volatility are positioned for lower and less sustainable operating margins.

The lower, less sustainable ROE and OM observed for higher-volatility stocks indicate that they are generally of inferior quality compared with stocks that exhibit lower volatility. These findings seem intuitive, as investors typically seek the safety associated with higher-quality companies — more representative of the lower-volatility group — at times of market stress.

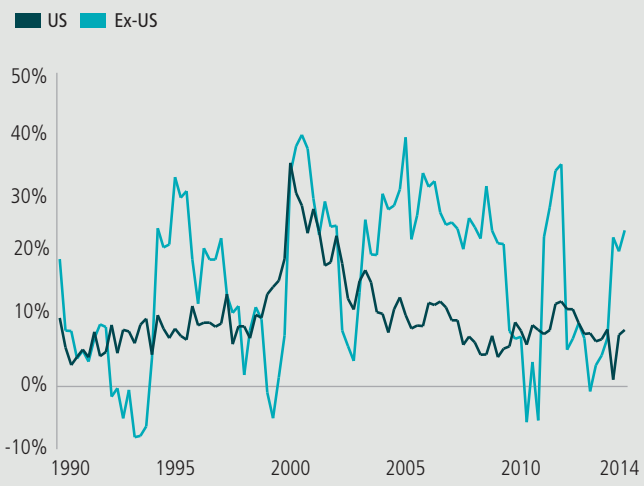
Earnings estimates

Perhaps no metric garners more attention than analyst earnings forecasts. For most companies, quarterly earnings estimates are extensively debated and viewed as the barometer of stock price value until the next quarterly earnings release. In addition to being seen as a way to estimate future growth, earnings forecasts can also provide a sense of the risk associated with that growth. For instance, analysts might agree that a firm will experience positive growth but disagree on the extent and sustainability of that growth. In our research, we sought to compare relative growth expectations as well as analyst earnings consensus for the lower- and higher-volatility stocks.

Expected earnings growth

In the context of earnings forecasts, higher-volatility stocks can be seen as being largely representative of speculative growth stocks. In the United States, higher-volatility companies have averaged 10% more expected growth than lower-volatility companies when 12-month forward earnings growth is measured (see Exhibit 4). Outside of the United States, the incremental growth expectations for higher-volatility stocks are even greater for much of the period, in the region of 30%. In contrast, the non-US stocks exhibited wide cyclical fluctuations, and growth expectations for higher-volatility stocks dip below those of lower-volatility stocks for short periods of time.

Exhibit 4: Difference in expected earnings growth: high volatility–low volatility



Sources: Compustat, WorldScope and FactSet.

Estimate dispersion and volatility

In addition to earnings growth, we examined the level of consensus among analysts as well as the degree to which forecasts varied over time. This analysis shows there is much less earnings consensus for higher-volatility stocks than for lower-volatility stocks. In the United States, higher-volatility stocks had 10% more dispersion in analyst forecasts than lower-volatility stocks, while the non-US higher-volatility stocks registered 30% more dispersion. Furthermore, we find that higher-volatility stocks had about 50% more volatility in earnings forecasting, a measure of the variation in forecasts over time.[5]

Our conclusion is that although higher-volatility stocks had higher growth expectations, the consensus for those expectations was not only weaker but also more variable.

Valuation

Valuation is invariably a key factor in investment decisions. The question in this context is: Are investors willing to pay more for the quality of lower-volatility stocks or for the more speculative growth of higher-volatility stocks?

To shed light on this, we focus on the commonly referenced price-to-earnings multiple (PE). It is important, however, in this kind of valuation analysis, in which price is the numerator, to consider the degree to which price volatility might be distorting data. Especially when comparing the valuations of higher-volatility and lower-volatility stocks, PE may not be that informative because changes in price can have more of an impact than changes in earnings. In view of this, we chose two approaches that would reduce the influence of price volatility on these valuation ratios: 1) valuation premium or discount for higher-volatility over lower-volatility stocks (relative PE) and 2) a longer-term (three-year) average PE.

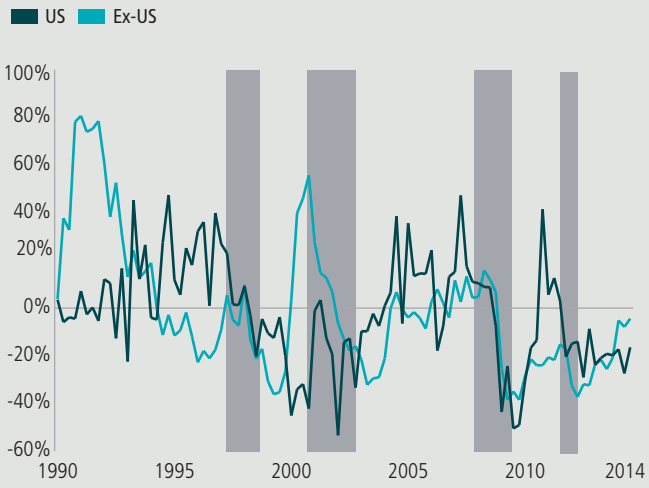
Relative price-to-trailing 12-month earnings

Overall, a comparison of trailing PE depicted in Exhibit 5 shows that over time the relative valuations of the most volatile and the least volatile stocks depend on the stage of the market cycle. In the early stages of the cycle, a valuation premium (higher, more expensive PE) trends upward for high-volatility stocks, peaks around mid-cycle and reverts to a discount (lower, less expensive PE) prior to market declines, eventually crashing to a steep discount as the market bottoms.

For example, in the months prior to the 2008 market selloff associated with the banking crisis, higher-volatility stocks in the US were priced at about a 20% to 40% valuation premium to lower-volatility stocks. As the market fell into a steep downturn, this premium fell to a 40% to 50% discount. The same cyclical trend is observable in the case of non-US stocks, with even more pronounced amplitude prior to 2002–2003.

Based on short-term PE, higher-volatility stocks have not shown consistently more expensive valuations than lower-volatility stocks; at times, higher-volatility stocks are actually priced at a discount relative to lower-volatility stocks. Higher-volatility stocks have approached premium valuation levels toward the end of bull market cycles, but that premium tends to collapse to a discount when the market experiences a sharp correction.

Exhibit 5: High-volatility trailing 12-month PE premium over low-volatility (% difference)



Sources: Compustat, WorldScope and FactSet.
Chart Note: Shaded areas denote crisis periods. See Methodology on page 6 for further details.

Three-year average trailing PE

To minimize the short-term impact of market cycles, we examined a longer-term, "smoother" three-year moving average PE. Based on this metric, higher-volatility stocks in the United States have appeared more consistently expensive than lower-volatility stocks, although the premium has exhibited a wide range. Outside of the United States, higher-volatility stocks had relatively cheaper valuations prior to 1998, but in recent years have commanded an even higher premium than in the United States.

Dividend yield

Higher dividend yield is often associated with stable companies that have consistent cash flows, typical of many profitable companies that have matured beyond the early growth stages. Given that higher-volatility stocks tend to be concentrated in smaller-cap growth, a lower dividend yield is expected, as these companies often choose to reinvest capital in growth opportunities.

The data confirm the higher-yield bias of lower-volatility stocks. In stable trending markets, lower-volatility stocks yielded 50 bps to 100 bps more than their higher-volatility counterparts. However, in the time frame examined from 1989 to 2013, there were also several periods in which lower-volatility stocks had a lower dividend yield. The highest-yielding stocks typically represent about 4% to 6% of the most volatile stocks; this rose to about 10% in the 2008–2009 global financial crisis, when banks, which account for a large number of the higher-dividend-yield payers, became more volatile.

Although lower-volatility stocks tend to have a dividend yield bias, higher-yielding stocks can be exposed to volatility, particularly during financial market crises.

Liquidity exposure

The liquidity in the market for a particular stock can be a very important factor determining the price of the stock. Increased levels of trading activity can put pressure on a stock's price and therefore contribute to shareholder risk. We calculated trading volume as a percentage of common shares outstanding as a measure of liquidity pressure and find that higher-volatility stocks experienced greater trading pressure, at times displaying extreme spikes in trading.

Liquidity pressure is more apparent among higher-volatility stocks.

Short interest

Short selling is a barometer of the market's speculation that prices will fall. For example, an investor may want to delay buying a stock, because the stock price is expected to decline, and agree to a "short sale," which enables him or her to sell the stock now in exchange for buying it at a future unknown price. The speculation, of course, is that the future price will be lower than the current price.

We reviewed interest in short selling to quantify market sentiment regarding the two groups of stocks, examining short interest as a percentage of common shares outstanding.[6] There is evidence that higher-volatility stocks had higher short interest over time, reflecting the fact that investors tend to short higher-volatility stocks to benefit from their price movements.

The level of short interest in higher-volatility stocks confirms a more speculative investor bias.

Compared with lower-volatility stocks, higher-volatility stocks...

- Produced lower and less stable profitability
- Reflected weaker and more variable analyst earnings consensus
- Exhibited premium valuations that are dependent on the market stage
- Delivered lower and more volatile dividend yields
- Revealed more speculative investor behavior

Conclusion

In recent years, investor interest in the low-volatility phenomenon has grown, and along with it a renewed respect for those who drew attention to it in the past, such as Robert Haugen, a financial economist and pioneer in the field of quantitative investing. Although research has shown that the low-volatility phenomenon is largely driven by the tendency for higher-volatility stocks to underperform during down markets, the fundamental rationale for the underperformance of higher-volatility stocks has largely remained unaddressed.

These results demonstrate that the low-volatility phenomenon is largely due to the riskier long-term investment characteristics generally observable in the universe of higher-volatility stocks. From the perspective that greater volatility, more expensive valuations, unstable profitability and weak earnings consensus are often associated with less desirable investment features, the low-volatility "anomaly" is not really an anomaly at all. Rather, the long-term pattern of underperformance of higher-volatility stocks is a realistic expectation that reflects riskier investment characteristics.

Methodology

The global universe used in the analysis shown in Exhibit 1 comprises the 1,000 largest US names, the 600 largest in developed Europe (including the United Kingdom), the 400 largest in Japan, the 200 largest in Asia-Pacific ex Japan and the 200 largest in emerging markets, rebalanced monthly to minimize survivorship bias.

The US universe comprises the largest 1,000 US names, rebalanced monthly to minimize survivorship bias. In similar fashion, the global ex US universe includes the 600 largest names in developed Europe (including the United Kingdom), the 400 largest in Japan, the 200 largest in Asia-Pacific ex Japan and the 200 largest in emerging markets. Stocks in each universe had returns available for a minimum of 24 months.

Stock volatility is calculated as the standard deviation of total returns over the past twenty-four months. The sources are Compustat, WorldScope and FactSet.

The stock clustering into higher-volatility and lower-volatility groups is based on the results of our previous research, which showed that the most volatile stocks tend to underperform over the long run (equal-weighted, based on volatility ranking percentile, volatility calculated as standard deviation of latest 24-month total returns) and be concentrated in about 40% of stocks in the US universe as well as globally.[7]

The shaded areas in the exhibits denote these crisis periods: Asian financial crisis (June 1997 – August 1998), MSCI All Country Asia down 47%; technology bubble (August 2000 – September 2002), MSCI World down 47%; global banking crisis (December 2007 – February 2009), MSCI World down 53%; European sovereign debt crisis (August 2011 – September 2011), MSCI World down 15%.

Endnotes

[1] Baker, Bradley and Wurgler (2011). "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly." *Financial Analysts Journal*, vol. 67, no. 1. (January/February).

[2] MFS white paper: "Quality and Value — The Essence of Long-Term Equity Returns." October 2013.

[3] Return on equity (ROE) is calculated monthly, using the latest 12-month net income as a percentage of the latest reported common equity. The non-US universe data represent local markets only, *e.g.*, exclude ADRs and GDRs. Sources: Factset, Compustat, Worldscope, MFS.

[4] Operating margin (OM) is calculated based on monthly data, using the latest 12-month operating income as a percentage of the latest 12-month reported sales. Sources: Factset, Compustat, Worldscope and MFS. The non-US universe data represent local markets only, *e.g.*, exclude ADRs and GDRs.

[5] Based on standard deviation of mean estimates over rolling three years.

[6] Unfortunately, reliable data sources for short interest in non-US stocks were not easily accessible. Moreover, our data for the United States are limited to the mid-1990s.

[7] MFS white paper: "Low-Volatility Investing in Global Markets." August 2014.

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