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Low-Volatility Investing: Expect the Unexpected

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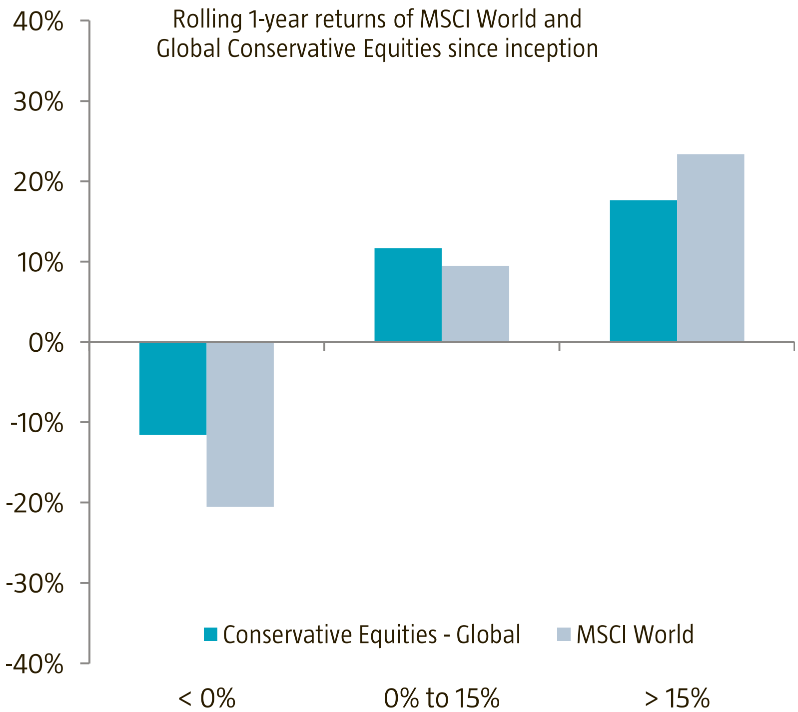
Expect the unexpected

Low-volatility stocks are known to lag in rising markets, but also to lose less in falling markets. On average this is true, but is it always the case, as in a guarantee? Or are there exceptions to this rule? Examining the historical evidence we find that various unlikely scenarios do occur once in a while. Not only on the negative side, but also on the positive side, as low-volatility stocks also frequently outperform in rising markets. We conclude that low-volatility investors should not only focus on averages, but consider a broader range of possible outcomes. In other words: expect the unexpected.

Low-volatility expectations

It is important to have realistic expectations regarding the performance behavior of your investment strategy to avoid future disappointment. An example of well-understood performance behavior of low-volatility stocks is that they tend to outperform in sharply falling markets, as in 2008, but underperform in strongly rising markets, as in 2009.[1] Figure 1 illustrates this typical pattern of low-volatility stocks, using realized returns of the Robeco Institutional Conservative Equity Fund from October 2006 to December 2013.[2]

Figure 1 | Losing less in down markets and lagging in strong up markets



Source: Robeco Quantitative Research, MSCI. The value of your investments may fluctuate. Results obtained in the past are no guarantee for future results.

[1] On a risk-adjusted basis the performance of low-volatility stocks is much more stable.
[2] Fund returns are gross of fees. The fund and reference index are unhedged for currency risk as of June 30, 2012.

But can low-volatility stocks be counted upon to always behave like this, and should one become worried if future performance were to deviate from this apparent norm? For instance, would it be cause for concern if low-volatility stocks were to underperform in a down market, or outperform in an up market? Or if their *ex post* volatility suddenly were to turn out higher than that of the market, instead of lower?

Overconfidence bias

It is well-known from behavioral economics that people tend to be overconfident.[3] One of the manifestations of overconfidence is that people overestimate their ability to predict a certain number. For example, when asked to set a range within which a number will fall with a 90% certainty, most people set the range too narrow, capturing only 40% of the correct answers.

Such overconfidence raises the concern that investors may also underestimate the range of possible outcomes from a low-volatility investment strategy. The objective of this note is to help investors set realistic expectations for the variety in possible outcomes with low-volatility investing. We do not challenge base case expectations, but want to make investors aware of the uncertainty around the average, most likely scenario. We argue that the range and likelihood of possible scenarios are typically underestimated and that investors should increase the volatility around their expectations. For example, the probability that low volatility outperforms during a down market is not 100% or 99% as often implicitly assumed, but closer to 90%. Low-volatility investors tend to profit from the overconfidence of other investors, but should be careful not to fall victim to the same bias themselves.

Learning from history

In this note we examine the historical data and find that low-volatility stocks do not always behave according to general expectations. We discuss several examples of such unusual behavior. In short, our main message is that investors should be prepared for the unexpected. All kinds of unlikely scenarios for low-volatility, which would probably shock many investors if they were to occur today, actually turn out to have happened already at some point in the past – and often more than once as well. We argue that such unusual behavior in the short run should not be an immediate cause for concern, because it does not change the highly appealing long-run performance characteristics of low-volatility strategies: equity-like (or even better) average returns, with less volatility and downside risk. It follows that patience and persistence are needed in order to successfully harvest the low-volatility premium, and that investors should not change course if ideal outcomes do not materialize at some particular point in time. Fortunately, investors can learn from history how to set realistic expectations.

[3] Overconfidence is also one of the explanations for the low-volatility effect; investors often have too optimistic views on their investment skills and underestimate risk. See Blitz, Falkenstein and van Vliet, "Explanations for the Volatility Effect: An Overview Based on the CAPM Assumptions", *Journal of Portfolio Management*, Spring 2014, Vol. 40, No. 3: pp. 61-76.

Low-volatility scenarios

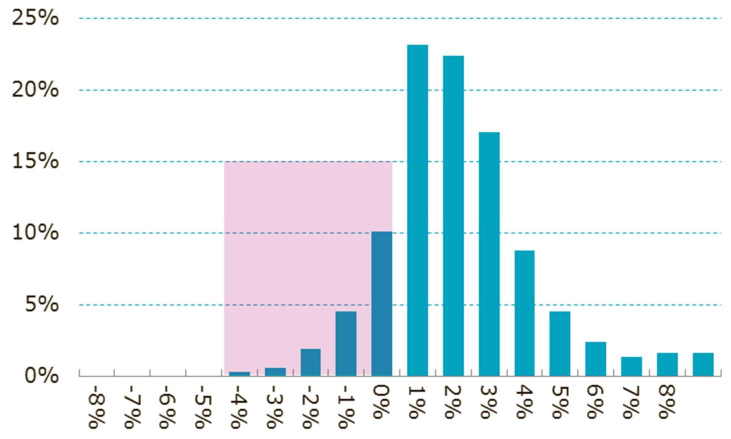
We consider low-volatility series for the US market going all the way back to 1926, because a long history may be needed to identify unlikely scenarios.[4] We consider both a generic low-volatility strategy, based on plain past 3-year volatility, and an enhanced low-volatility strategy, which also takes valuation and momentum factors into account. The latter approach resembles our Conservative Equities strategy, although it is less sophisticated due to data limitations. For instance, forward-looking distress risk measures, which should help to avoid stocks that are more risky than they appear to be, are not included.[5]

In addition to this long-term US sample, we also consider the MSCI World Minimum Volatility index, which offers a publicly available, third-party series of low-volatility returns going back over a quarter of a century, starting in May 1988. This data allows us to objectively examine how frequently, and to which extent, a global low-volatility strategy can exhibit unusual performance behavior. We compare this index with the regular MSCI World index, which reflects the overall market performance.

Underperformance in down markets

It is well-known that if the market goes down, low-volatility stocks tend to go down to a lesser extent. Indeed, this is what you would expect from a strategy that is characterized by a beta well below 1. On average this is clearly true, as illustrated before in Figure 1. But can one count on low-volatility stocks to always offer downside protection? The answer to that question is: no, not necessarily. Figure 2 shows the probability distribution of monthly relative returns for the US low-volatility strategy in market down months. The distribution is skewed to the right, meaning that on average low-volatility stocks outperform during falling markets. However, in 10% of the cases low-volatility stocks underperform by 0-1% and in 7% of the cases by more than 1%.

Figure 2 | Distribution of relative low-volatility returns during down-months



Source: Robeco Quantitative Research. Sample period 1926-2010 US stock market.

[4] All examples are based on total returns, i.e. returns including dividends, gross of transaction costs expressed in US dollars. This data is similar to the data used in some of our earlier notes, such as Van Vliet (2012), "Enhancing a low-volatility strategy is particularly helpful when generic low-volatility is expensive", Robeco client research paper.
[5] See also Huij, Van Vliet, Zhou and de Groot (2012), "How distress risk improves low-volatility strategies: lessons learned since 2006", Robeco client research paper.

Thus, with a 1-month horizon we find a 17% long-term probability of underperformance in a down market for the generic low-volatility strategy. Table 1 shows that this probability goes down over longer investment horizons, shrinking to 11% for 1-year and 10% for 3-year periods. It also shows that the enhanced low-volatility approach does not offer better downside protection in the short run. With a 1-month horizon the probability of underperformance in a down market is even higher, at 21%. At longer horizons the enhanced approach starts to do better though, reducing the probabilities to 9% for 1-year and a mere 2% for 3-year periods. But still, the down market underperformance probabilities are not reduced to zero. Using MSCI index data we find similar results. For instance, if the MSCI World index goes down over a 1-year period, we observe a 14% probability that the MSCI World Minimum Volatility index goes down more instead of less, which is close to the figure in Table 1.

Table 1 | Probability of underperformance during down markets

	1 Month	*3 Months*	*1 Year*	*3 Years*
Low-vol	17%	16%	11%	10%
Low-vol enhanced	21%	14%	9%	2%

Source: Robeco Quantitative Research. Sample period 1926-2010 US stock market.

So what can happen in these unfavorable down market scenarios? Some of these observations relate to periods during which for instance the market goes down 1%, while the low-volatility strategy goes down 1.5%, which is not particularly worrying. The real concern is whether low-volatility can be counted on to give downside protection during a severe market downturn. Although the odds seem to improve in more extreme down markets, we find that exceptions remain. For instance, over the 1-year period ending on January 31, 1991, the market index was down 9.2%, while the MSCI Minimum Volatility index was down 11.2%. A more recent example is the single month February 2009, during which the market dropped by 10.2%, and the minimum-volatility index by about the same amount, 9.8%. Also in our deep history dataset we observe several instances of low-volatility underperforming over 1-year periods in which the market dropped by more than 10%: in the early nineteen forties, in the mid and late nineteen sixties, and in the mid nineteen seventies.

Currencies can have a big impact as well

There are also examples of currency effects having a dramatic influence on low-volatility performance. For instance, it is well known that low-volatility strategies underperformed in the year 2009, during which equities recovered from some of their losses in the year before. In local currency terms, the overall equity market went up 26.5%. The minimum-volatility index gained only 14.5%, but this did not worry US and European low-volatility investors, because they were well aware that low-volatility strategies tend to lag in strongly rising markets. But now consider the same returns from an Australian dollar base currency perspective. As the Australian dollar appreciated by about 25% against other major currencies in 2009, the overall equity market return in that year amounted to only 1.4% in AUD terms, while the return of the minimum-volatility index even turned negative, at -9.2%. If we just compare these two figures, 2009 would appear to have been a very troubling episode for Australian low-volatility investors, but the example illustrates that this is entirely driven by a currency effect. We note that in this particular scenario a currency hedge would have helped.

Higher *ex-post* volatility

Another unusual, but not impossible, scenario is that the volatility of a low-volatility strategy turns out to be higher than overall market volatility, *ex post*. Looking at our deep history dataset, we observe that the generic low-volatility strategy exhibits a higher realized 1-year volatility than the market about 5% of the time, while for the enhanced low-volatility strategy this even happens about 20% of the time. Digging deeper we observe that this higher volatility is typically realized during up markets and rarely during down markets. The frequencies decrease further if the horizon is lengthened to 3-years, especially during down markets. This asymmetric volatility pattern is attractive for investors because downside volatility, which relates to capital preservation, is reduced more than upside volatility, which relates to upside potential.[6]

Table 2 | Probability of higher volatility than the market

	1-year volatility			*3-year volatility*		
	All	Up	Down	All	Up	Down
Low-vol	4.8%	3.4%	1.4%	0.3%	0.3%	0.0%
Low-vol enhanced	21.3%	18.4%	2.9%	8.9%	8.9%	0.0%

Source: Robeco Quantitative Research. Sample period 1926-2010 US monthly returns.

Looking at the rolling 1-year realized volatility of the MSCI World Minimum Volatility index versus the market we observe this phenomenon for the first time at the end of May 2013, and then also in the subsequent months until the end of February 2014. This also refers to a period during which the market went up. Moreover, market volatility was very low to begin with, which may explain why most investors simply shrugged of this event, or did not even notice.

Outperforming in up markets

Low-volatility strategies may not be 100% effective for downside protection, but the good news is that their upside potential is also larger than one might think. History shows that the potential for low-volatility stocks to outperform in rising markets should not be underestimated. On a 1-month basis this probability of outperformance is roughly one third (29%-36%). On a 1-year basis this probability even increases to 39%-52%. The higher probabilities refer to the enhanced low-volatility approach that takes valuation and momentum into account, leading to a further improvement versus the generic approach. This means that historically it is not unusual at all for low-volatility strategies to outperform during rising markets. In fact over 1+ year periods it becomes more like 50-50 instead of 0-100.

Table 3 | Probability of outperformance during up markets

	1 Month	*3 Months*	*1 Year*	*3 Years*
Low-vol	29%	33%	39%	50%
Low-vol enhanced	36%	39%	52%	71%

Source: Robeco Quantitative Research. Sample period 1926-2010 US stock market.

[6] Over this 84-year period the low volatility strategy gives 1% more return than the market and the enhanced low-volatility strategy 3% more return. Please note that we treat the '0.0%' with much caution. It would still be possible that low-volatility stocks have higher volatility, even when the market is down, even if this did not happen in the historical sample.

Consistently with these results we find that although the MSCI Minimum Volatility index also tends to lag during rising markets, it actually outperforms the market in 35% of the 1-year periods during which the market goes up. These episodes are found throughout the 25-year history of the index, but tend to be short-lived. One of the earliest concrete examples is at the end of September 1989, when the MSCI Minimum Volatility index exhibits a 1-year return of 31.6%, versus 25.8% for the market.

Managing expectations

It is well known that low-volatility strategies typically outperform in sharply falling markets, but underperform in sharply rising markets. On average, this pattern is clearly visible in the data. However, our archeological exercise clearly shows that exceptions to this rule are actually not that exceptional. Low-volatility stocks can underperform in falling markets, and also the realized volatility of low-volatility strategies sometimes exceeds that of the market. Currency effects can also lead to distortions, although a currency hedge might mitigate this problem. On the other hand, we also observe that outperformance of low-volatility stocks in strongly rising markets is not as unlikely as one might think, but actually a quite frequently occurring event.

Live performance

Robeco Conservative Equities is our enhanced low-volatility approach. The real-life results since 2006 show that the likelihood of underperformance in down markets is about 10%. This is in line with long-term results and also with the MSCI Minimum Volatility index over this period. Again in line with the long-term analysis, 1-year volatility was reduced roughly 80% of the time, and the 20% of cases with higher *ex post* volatility all occurred during up markets. For EUR investors the currency hedged version of the Conservative Equity strategy had a higher frequency of volatility reduction. Finally, the probability of outperforming in a rising market over a one-year period was over 50%, leading to improved up-capture. This is also in line with long-term results and a positive result for our clients.

Broaden your view

In short, our research shows that low-volatility investors should not only focus on averages, but consider a broad range of possible outcomes and prepare for the unexpected. Low-volatility investors tend to profit from the overconfidence of other investors, but should not fall victim to the same bias themselves. A broad view will help to strengthen the long-term commitment needed to successfully profit from the low-volatility anomaly.

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