

## Low-volatility investing: a long-term perspective

For professional investors only

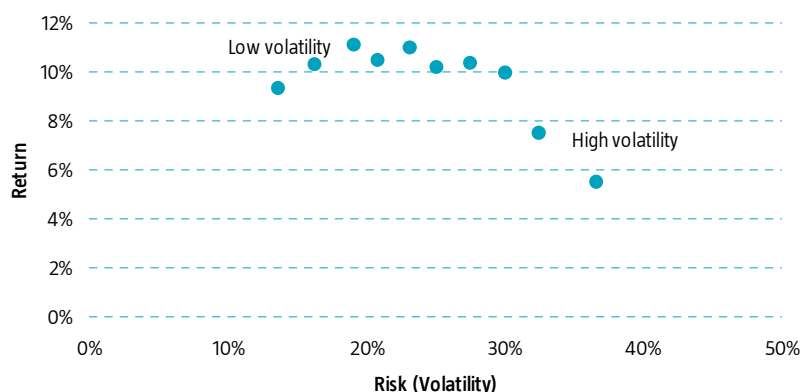


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### Introduction

Over the long-run, risk and return within equity markets are not related. Selecting stocks with a higher risk, does not automatically lead to a higher return. This empirical finding contradicts investment theory, which states that higher risk should give a higher expected return. The figure below shows the average compounded return of portfolios sorted on historical volatility and beta for the 80-year period from 1931-2009.<sup>1</sup> It shows that high-risk stocks are especially unattractive, based both on the return, which is lower, and on risk, which is higher. On the other hand, low-volatility portfolios are especially attractive because they increase the return per unit of risk. The return/risk ratio over the period is 0.68 for the lowest volatility portfolio and steadily decreases to 0.15 for the highest-volatility portfolio.

**Risk-return relation 1931-2009**



Based on these empirical results one should avoid the most volatile stocks. For investors with an absolute return focus, for example, investors aiming to maximize the Sharpe ratio, the stocks with the lowest volatility should be selected. Still, it is

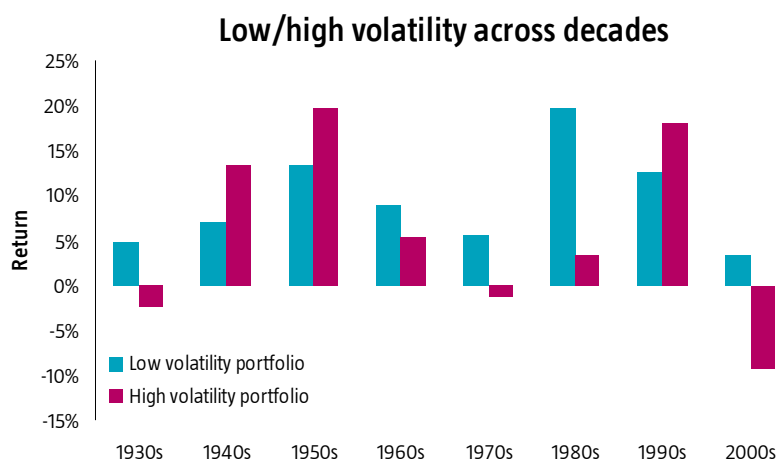
<sup>1</sup> We create value-weighted decile portfolios for all US stocks. We use 60-months of data to estimate beta and volatility and the decile portfolios are an equal-weighted combination of beta and volatility. We refer to the low-risk portfolios as low-volatility portfolios. We use US data because it is only for this market that such long-term, reliable and clean data are available. Results outside the US have similar or even stronger results (e.g. see Blitz and van Vliet, Journal of Portfolio Management, 2007).

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interesting to investigate how stable these results are over time. Eighty years is a very long time period and much longer than the investment horizon of most investors. If we zoom-in on the eight different decades comprising the period from 1931-2009, has the relation between risk and return always been negative?

### Never a lost decade

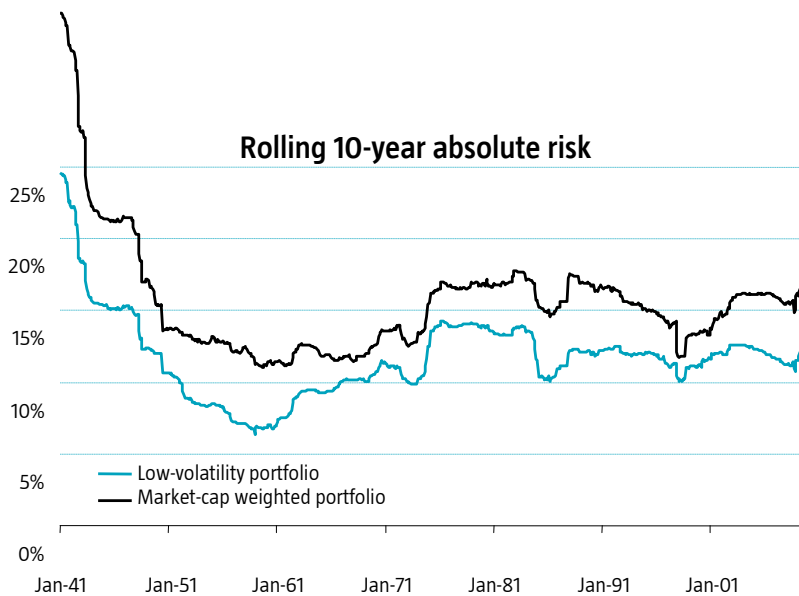
The figure below shows the performance of the low/high volatility decile portfolios for the past eight decades. The low-volatility portfolio had a positive return in each decade. The return varied between 3.4% (2000s) and 19.7% (1980s). By contrast, the high-volatility portfolio has a negative return in three decades (1930s, 1970s, and 2000s). The return of the high-volatility portfolio varied between -9.3% (2000s) and 19.6% (1950s). Over the long run, the low-volatility portfolio outperformed the high-volatility portfolio. This was mainly due to avoiding large losses. Still, over several decades high-volatile stocks can also outperform low-volatile stocks. This happened during the 1940s, 1950s and 1990s, when risk and return were positively related. This means that even over a suspended ten-year period, low-volatility stocks can underperform high-volatility stocks. Underperformance in a strong equity market, however, is not very painful from an absolute return perspective. It is worse to have underperformance in a falling market, which is never the case for low-volatility portfolios. Given the current interest in low-volatility investing, it is important to be aware of the time-varying risk-return relation. Still, the return per unit of risk of low-volatility stocks is superior in each decade, even during the decades (1940s, 1950s and 1990s) when high-volatility stocks outperformed.



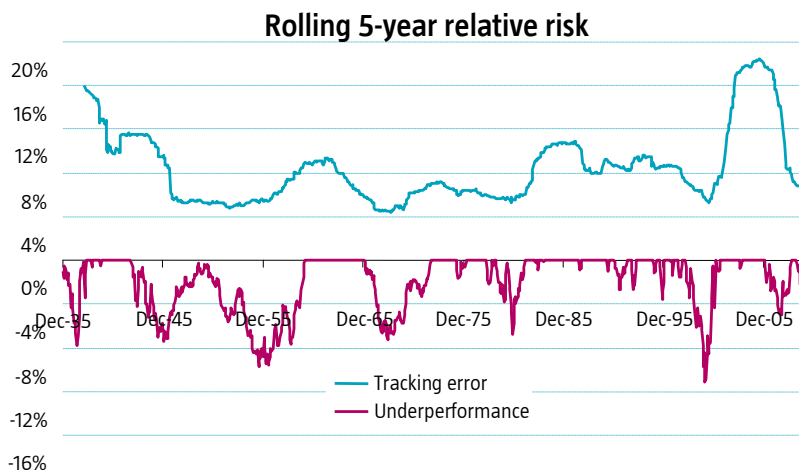
### Persistent risk reduction, but no free lunch

The figure below shows the rolling ten-year standard deviation of both the market portfolio and the low-volatility portfolio. During each ten-year period, we observe that the absolute risk of the low-volatility portfolio is lower than that of the market-capitalization weighted index. The volatility of the market varies between 36% and 12%, compared to 25% and 6% for the low-volatility portfolio. On average, the risk-reduction of the low-volatility portfolio is about 30%, but this varies over time.

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The price investors have to pay to capture this persistent volatility effect is relative risk. One could measure this by calculating the tracking error. From this perspective, low-volatility portfolios are very risky. The average tracking error is about 9% and varies between 4% and 20%. Thus investors who compare themselves with market-capitalization weighted indices are faced with very large return differences. The graph below shows that over five-year periods, the annualized return difference can be as large as -10%, which could be a severe career risk for an active fund manager. No one is happy to see 10% annualized underperformance over a five-year period (-50% in total) and many defensive fund managers lost their jobs in the late 1990s...



## Ways to reduce relative risk

Because of the severe relative risk that comes with low-volatility investing, we have also investigated horizon effects. We know that over the long-term, low-volatility investing gives access to the equity premium, but with lower downside risk. Thus although the specific investment path is different, the final investment outcome is similar. Therefore we have also calculated

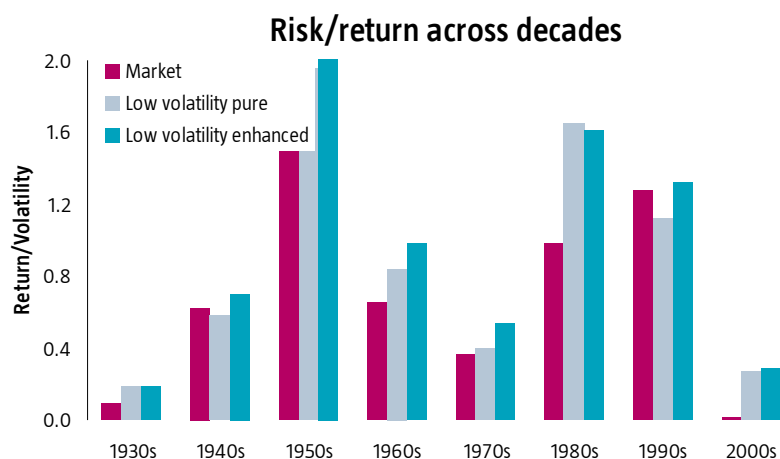
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the standard deviation of the return differences over longer-term periods. We find that the tracking error goes from 9% down to 7% and 4% over a 10-year and 20-year return difference perspective. We find that an increasing investment horizon reduces the relative risk of low-volatility investing. This reduction in tracking error is caused by mean-reversion in equity returns and reflects the fact that, over the long-term, returns are similar. If we would further increase the horizon the tracking error would be reduced further.

A way to reduce relative risk in the short term is to add well-known return factors to the low-volatility strategy. Here, we add value and momentum factors to the low-volatility portfolio. A wealth of academic research exists on these two effects.<sup>2</sup> We add 15% value (dividend yield) and 15% momentum (12-1 month price momentum) to the low-volatility portfolio. Thus we create an enhanced portfolio which consists of 70% low-volatility and 30% return factors. The table below shows the results, again for the 1931-2009 period.

	Low-volatility pure	Market portfolio	Low-volatility enhanced
Return (annual geom.)	9.3%	9.9%	10.9%
Volatility (std dev)	13.7%	18.7%	15.0%
Return/Volatility	0.68	0.53	0.73
Tracking error	9.4%	-	7.1%

The enhanced portfolio is characterized by a lower tracking error and higher return. The relative risk is reduced from 9.4% to 7.1%. Again we observe that the relative risk goes further down when the horizon is lengthened. A final advantage of the enhanced portfolio is that the return/volatility ratio improves from 0.68 to 0.73. The table below shows that the enhanced portfolio also has an improved risk/return profile across the decades. Especially during the 1940s-1970s period, the return factors help to further improve the low-volatility portfolio.



<sup>2</sup> We obtain data from the data library from Kenneth French. [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data\\_library.html](http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html)

## Conclusion

We find that the volatility effect existed during the past 80 years in the US stock market. Risk and return are not positively related, contrary to classic investment theory. In each decade, low-volatility stocks had a positive absolute return, with lower risk than the market-capitalization weighted index. Still, in some decades, low-volatility stocks could show underperformance. The main risk of low-volatility investing is tracking error, which could lead to severe underperformance. A focus on long-term performance evaluation and the inclusion of return factors helps to mitigate this relative risk.

Robeco offers different low-volatility solutions for innovative clients who want to have equity exposure with lower downside risk. Our existing clients have expressed a belief in the persistence of the volatility effect and have adopted the Robeco investment philosophy to capture this effect. The Robeco Conservative Equity products have a track record of more than four years (since September 2006) and have performed very well, with one-third lower risk. Proprietary Robeco research also shows that the volatility effect holds in emerging markets.

Potential clients should have an absolute return perspective and ignore short-term relative performance as much as possible, which is necessary to capture this interesting effect.

## More low-volatility information

Robeco has more information on low-volatility investing. See the link below for our latest research. This website is updated when new publicly available research papers are written. Proprietary research is not available here, but is available to clients upon request.

[www.robeco.com/lowvolatility](http://www.robeco.com/lowvolatility)

Publicly available Robeco papers on this topic

- Low-risk stocks suitable for long-term investors, Jan 2011
- Ten things you should know about minimum-volatility investing, Oct 2010
- Improving coverage ratios with less risk, Oct 2010
- The volatility effect: lower risk without lower return, Oct 2007

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- Combining Low-Volatility and Fundamental Investing, Jan 2011

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