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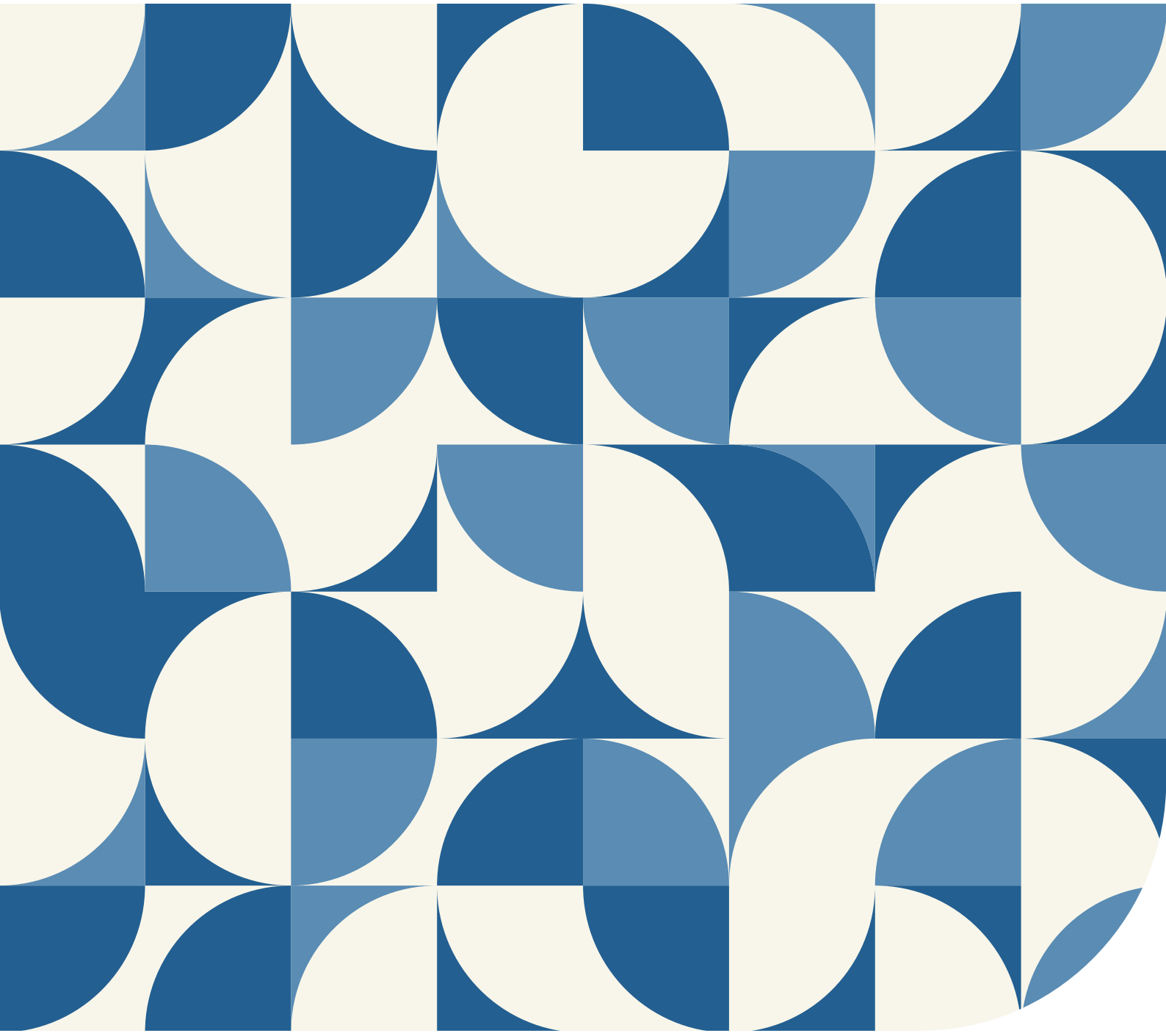

How low volatility boosts compounded returns – case study emerging markets

September 2024

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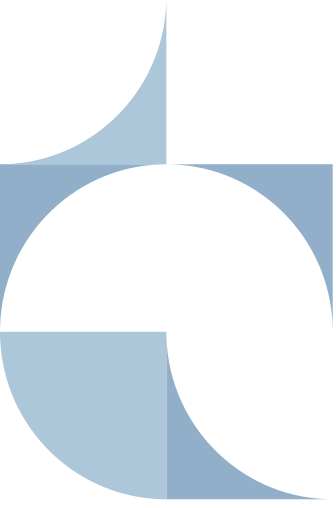
Introduction

The performance of low volatility investing is driven by two effects. The first is the low volatility anomaly, which is the outperformance of low volatility stocks relative to their high volatility counterparts on a risk-adjusted basis. The second effect is that, all things being equal, the lower the volatility of an investment, the greater the compounding of portfolio returns.

While there is ample evidence that the low-volatility anomaly is widespread across markets, there has been less research on regional differences for the compounding effect. To fill this gap, we examine the performance of low volatility strategies globally, distinguishing between the low volatility anomaly and the compounding effect. We find that using a low volatility approach in emerging markets can meaningfully reduce the risk of the market portfolio making the compounding effect exceptionally powerful.



The low volatility anomaly

The low volatility anomaly was discovered in the early 1970s (see Haugen and Heins 1975) and is arguably one of the most enduring anomalies in finance. The anomaly refers to the outperformance of low volatility stocks on a risk-adjusted basis. In other words, to harness the low volatility anomaly, one needs to make sure that the risk of the portfolio of low volatility securities falls in line with that of the portfolio of high risk stocks (see Frazzini and Pedersen 2014).

Several explanations have been put forward for this effect, ranging from limits to arbitrage (see Black 1972 and Miller 1977), delegated agency models (see Baker, Bradley and Wurgler 2011), as well as behavioural explanations for why people would overpay for speculative investments (see Kahneman and Tversky 1979 and 1983).

To demonstrate the presence of this anomaly, we use all constituents of the MSCI Emerging Markets, MSCI Europe and MSCI North America from March 1996 to January 2024. Our low volatility portfolios consist of the 50% of stocks with the lowest estimated market betas each month. Regional holdings are then calculated as the product of the inverse of these lowest estimated market betas and the square root of each security's market capitalisation, to mitigate concerns about investability (Novy-Marx and Velikov 2018). For the same reason, we select the MSCI benchmark portfolio for each region as the higher volatility portfolio. We rebalance the low volatility portfolios monthly, assuming a conservative one-way transaction cost of 75bp in emerging markets, 50bp in Europe and 25bp in North America. Performance statistics are presented in Exhibit 1.

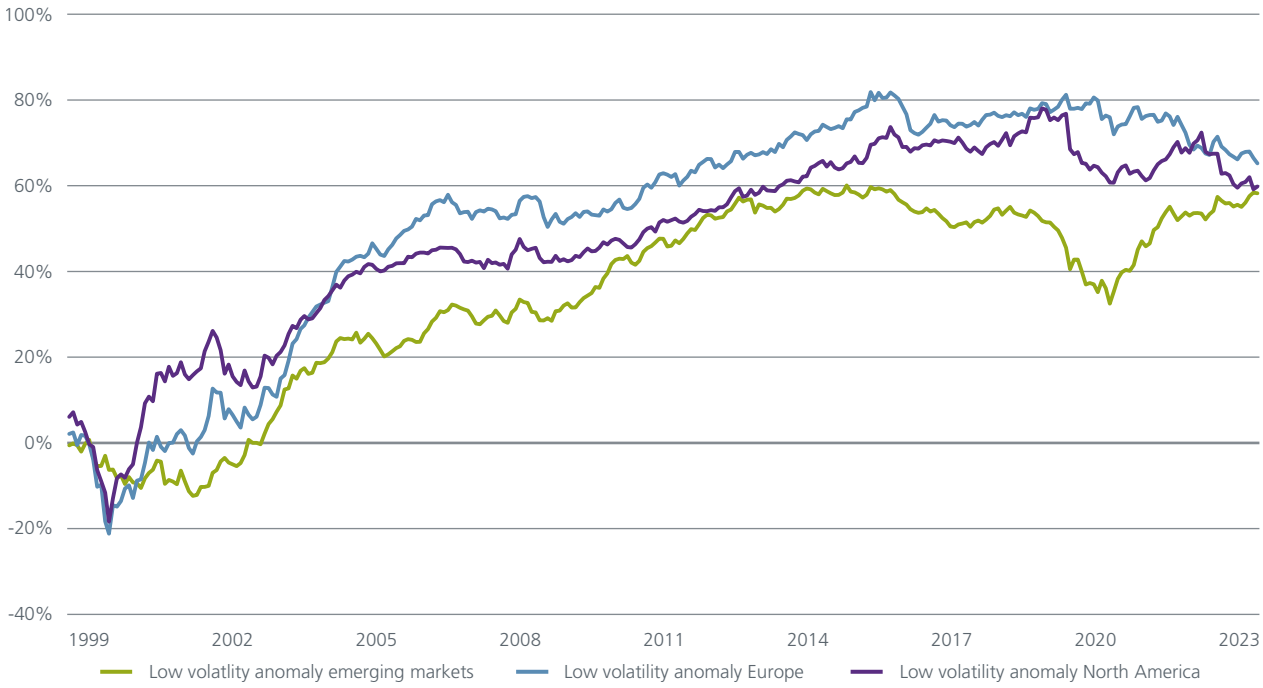
Next, each month we calculate the beta of the return above the risk-free rate, of the low volatility portfolio relative to the market portfolio, using the previous 36 months of data. Finally, to capture the anomaly premium, each month we go 100% long the low volatility portfolio, beta short the market portfolio and we borrow the balance, i.e. 1-beta, at the risk-free rate. Exhibit 2 shows the cumulative monthly returns of a strategy that aims to harvest the low volatility anomaly in each market. We also report summary statistics for their performance in Exhibit 3.

Exhibit 1: Performance statistics for the low volatility and market portfolios
Period: March 1996 to January 2024

	Emerging markets		Europe		North America	
	Low volatility	**Market**	**Low volatility**	**Market**	**Low volatility**	**Market**
Annual arithmetic return	7.91%	8.15%	8.51%	7.39%	10.83%	10.75%
Standard deviation	16.86%	22.17%	15.11%	18.46%	13.55%	16.86%
Ann. one-way turnover	44%	—	39%	—	32%	—
Maximum drawdown	–53.22%	–58.97%	–52.00%	–59.24%	–45.92%	–52.07%

Source: Bloomberg, Quoniam calculations

Exhibit 2: Harvesting the low volatility anomaly
Period: March 1999 to January 2024



Source: Bloomberg, Quoniam calculations

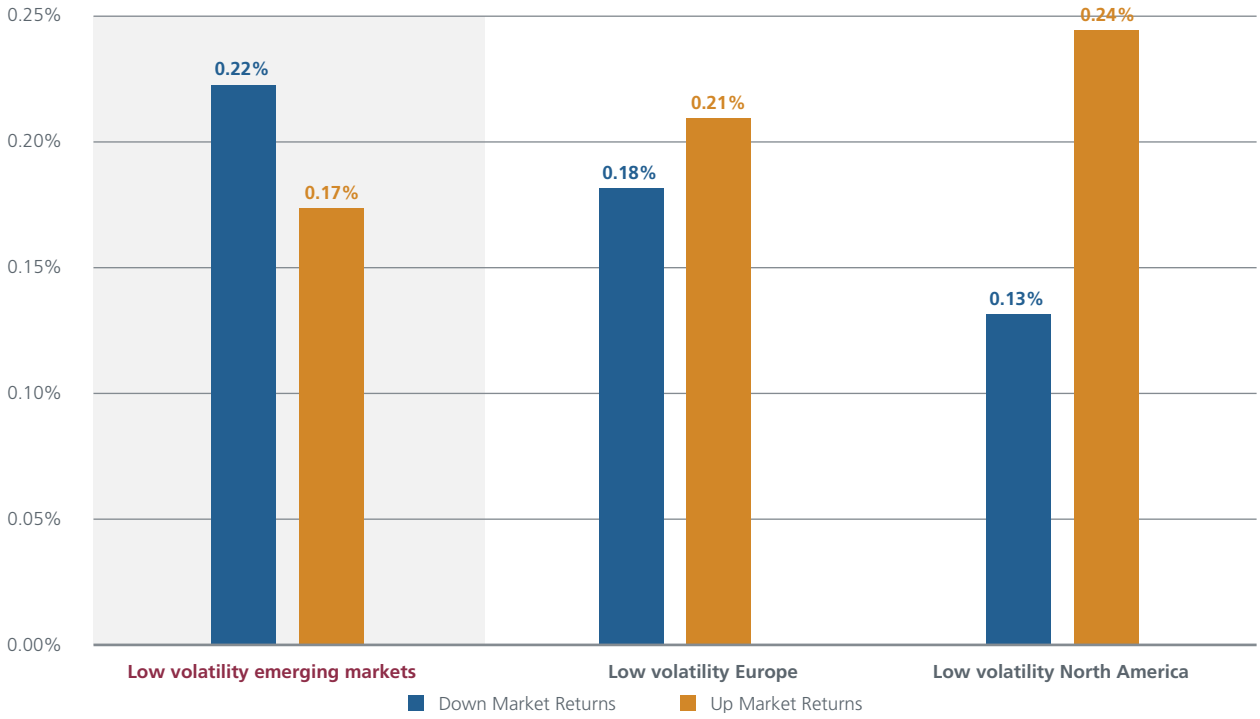
Exhibit 3: Performance statistics for the low volatility anomaly
Period: March 1999 to January 2024

	Emerging markets	Europe	North America
Ann. arithmetic return	2.34%	2.62%	2.40%
Standard deviation	4.76%	6.13%	6.06%
t-Statistic	2.45	2.13	1.98

Source: Bloomberg, Quoniam calculations

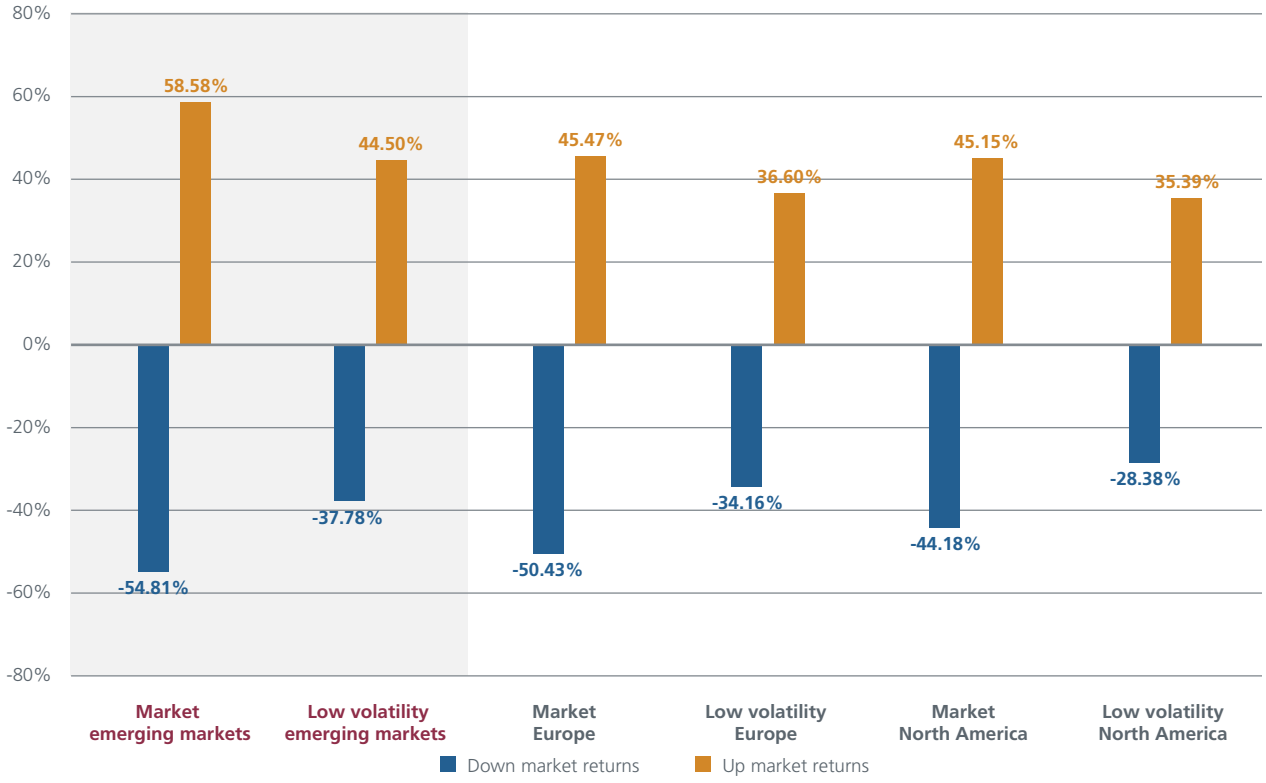
The annualised anomaly return is large in each region, ranging from 2.34% in emerging markets and 2.62% in Europe. Perhaps surprisingly, Exhibit 4 (Panel A) shows little evidence that up and down markets are related to the magnitude of the average monthly returns of the low volatility anomaly. This is not to say that these defensive portfolios do not help in difficult times when market returns are negative. On the contrary, in Exhibit 4 (Panel B), not only does the annualised average monthly return of the low volatility portfolio outperform in falling markets thanks to its lower market beta, but the low volatility anomaly premiums, which we have found to be largely independent of market movements, further improve upon its defensiveness. Conversely, in rising markets, these premiums help to mitigate the underperformance of the low volatility portfolio.

Exhibit 4:Low-volatility strategy in up and down markets
Panel A: Average monthly low volatility anomaly returns across market regimes
Period: March 1999 to January 2024



Source: Bloomberg, Quoniam calculations

Exhibit 4: Low-volatility strategy in up and down markets
Panel B: Annualised low volatility portfolio returns across market regimes
Period: March 1996 to January 2024



Source: Bloomberg, Quoniam calculations

The compounding returns and the base effect

Returns are often calculated using the arithmetic mean, or the simple average, which doesn't take into account changing bases. For example, if an investment gains 20% one year and loses 20% the next, an arithmetic average of 0% suggests no loss. But let's take the basis effect into account: 100 euros rises by 20% to 120 euros in the first period, then falls by 20% to 96 euros in the second period. This means that in addition to the low-volatility anomaly, the performance of low-volatility investments is also magnified in this purely mechanical way. The lower the volatility of an investment, the higher the compounding returns, all else being equal, due to the base effect.

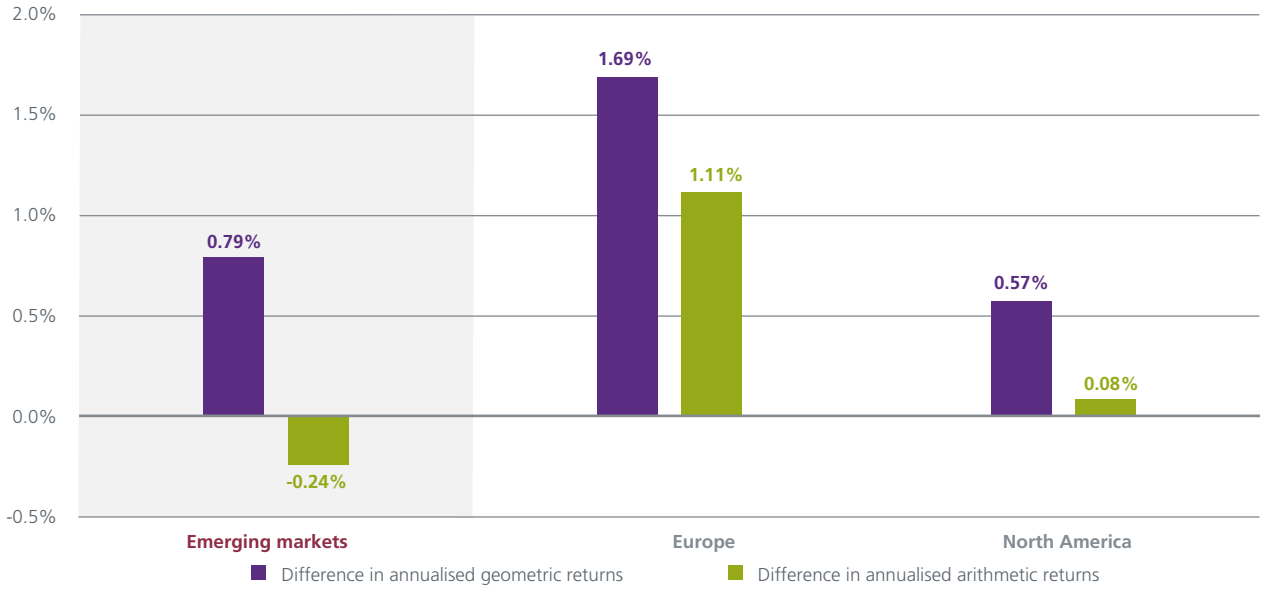
The geometric mean captures compounded returns and therefore better reflects the true performance of an investment by considering the effect of volatility on compounding over time. Perhaps the most popular formula among investment practitioners for the impact of volatility in explaining the difference between geometric and arithmetic returns is given by:

$$r_{geometric} \cong r_{arithmetic} - \frac{\sigma^2}{2} \qquad [1]$$

Emerging markets should be a prime candidate to benefit from this effect given the large difference in risk between securities in this universe. If the emerging markets low volatility portfolio can achieve a much lower risk level than that of the market portfolio, this difference on a geometric return basis could more than offset the potential outperformance of the market portfolio on an arithmetic return basis. In fact, a comparison of the differences in arithmetic and geometric returns between the market and low volatility portfolios in each region illustrates this point remarkably well. The differences in annualised returns between the low volatility portfolios and their respective market portfolios are largely unremarkable.

However, as showcased in Exhibit 5, when returns are compounded to reflect investor experience, the performance of the low volatility portfolios becomes meaningfully stronger than that of the market portfolios in every region. The performance improvement is particularly pronounced in emerging markets, but is not surprising given the evidence in Exhibit 1 that the risk reduction between the low volatility portfolio and the market is approximately equal to 5% in emerging markets and only 3% in Europe and North America.

Exhibit 5: Difference in annualised geometric and arithmetic returns between low volatility and market portfolios
Period: March 1996 to January 2024



Source: Bloomberg, Quoniam calculations

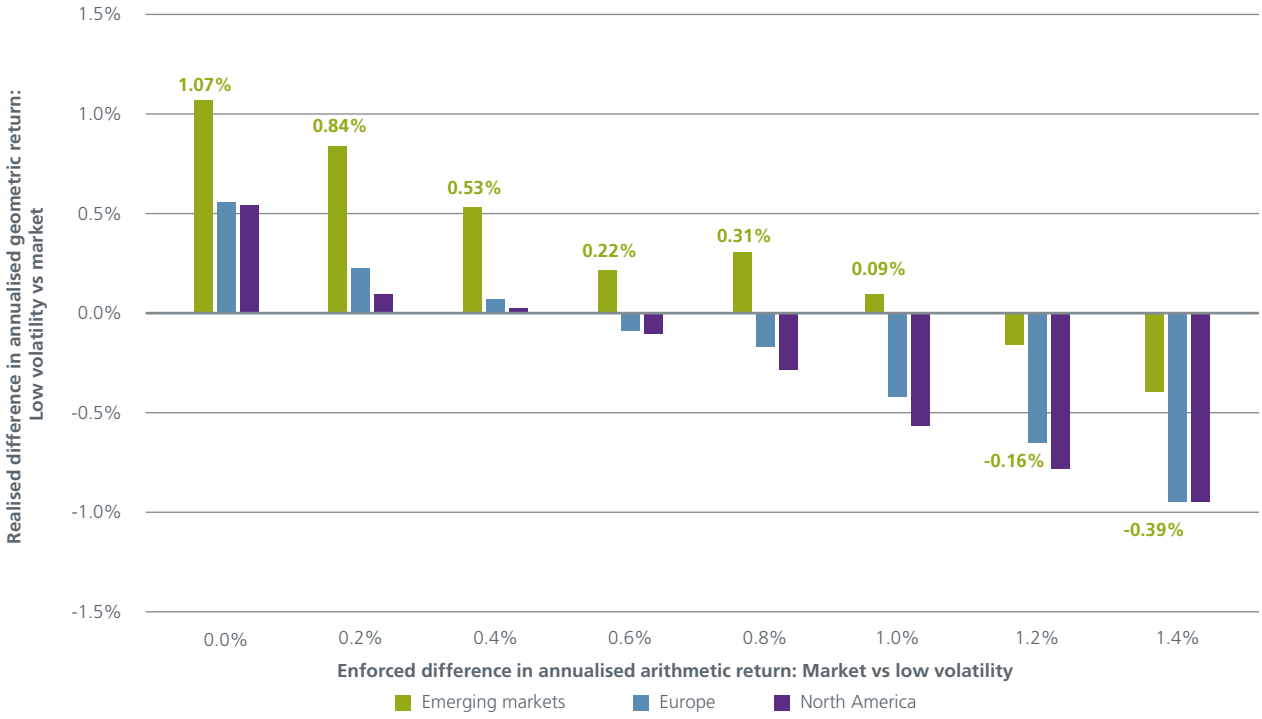
To gain further insight into this important phenomenon, we perform a bootstrapping experiment with the following steps:

- In each region, we sample with replacement 60 monthly returns from the time series of low volatility and market returns together. This method preserves their contemporaneous correlation. Different assumptions are made for the level of outperformance of the market portfolio on an arithmetic return basis. The annualised outperformance is varied from 0% to 1.4% in increments of 20 basis points.
- For each difference in annualised arithmetic returns, we repeat the sampling exercise 3,000 times. For each one of these 3,000 samples, we calculate the difference between the low volatility portfolio's annualised geometric return and the market's geometric return. This process produces a distribution of the differences in the compounded returns of the low volatility portfolio and the market portfolio for each level of outperformance in the arithmetic return of the market portfolio.

The results are summarised in Exhibit 6. For each assumed level of outperformance in arithmetic return by the market portfolio, we report the median value of the resampled distribution of differences between the geometric returns of the low volatility portfolio and market portfolio.

In short, our findings are largely in line with what would be expected from the equation [1] (geometric returns). The strength of the compounding effect in emerging markets is such that we only see a meaningful underperformance of the low volatility portfolio on a geometric return basis when we assume that the market portfolio has an arithmetic annualised return that is 1.2% higher than that of the low volatility portfolio.

Exhibit 6: Bootstrap experiment to quantify the impact of a higher arithmetic return for the market portfolio versus the low volatility portfolio



Source: Bloomberg, Quoniam calculations

Conclusion

Having illustrated the pervasiveness of the low volatility anomaly in emerging markets, Europe and North America, we focus our analysis on illustrating how the reduction in volatility helps to improve the compounded performance of low volatility investing. We show that the reduction in volatility that can be achieved in emerging markets gives the low volatility portfolio a considerable advantage against the market portfolio. Even assuming a significant outperformance of the market portfolio on an arithmetic return basis, we find that the low volatility portfolio still has a reasonable chance of outperforming on a geometric return basis, which is ultimately what matters to investors. Moreover, the opportunity to reduce risk is such that one could consider adding a source of active bets to enhance returns without negating the benefits of low volatility investing.

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