Absa Wits Risk-Controlled SA Low Volatility Index

Risk-focused index solutions

The investor’s dilemma

Investment carries risk. Considering the generational trauma of the 1929 stock market crash and the more recent Global Financial Crisis of 2008, this is demonstrably clear. Prior to both crises, as the scars of previous financial turmoil faded, equity markets boomed with growing complacency. The Global Financial Crisis of 2008 resulted in a market rout not experienced since the 1929 crash and the ensuing recession was the worst since the Great Depression.[1] Yet, investors who swore off equities in the aftermath of 1929 and 2008 would have missed out on big multi-year market rallies.

This presents a dilemma to investors: the necessity of maintaining an equity exposure, while avoiding substantial downside risk in times of market turmoil. Given the difficulty of timing the market, many investors have found that strategies that are naturally defensive provide insurance against large market corrections. It is natural to assume that these defensive, lower-risk strategies would come with lower returns and long-term underperformance. However, global evidence has shown this not to be the case. Lower-risk strategies in most developed markets around the world have outperformed much riskier strategies and the market benchmark. This outperformance is not limited to the tumultuous period of 2008 and 2009, but has been consistent throughout the last decade, including in South Africa. The Low Volatility premium therefore allows investors to benefit from less risk without sacrificing long-term returns.

The two most popular solutions gaining increased global attention are the Low Volatility and low-beta strategies. These defensive strategies enable investors to maintain full equity exposure, while providing an opportunity to capture the Low Volatility premium and avoid significant downside risk.[2]

The low-risk anomaly

In the finance world, risk is commonly proxied by two variables, namely, standard deviation (‘volatility’) and beta (‘market risk’ [i.e. degree of exposure or sensitivity to the overall market]). The implication of the positive risk and return relationship is that investors are compensated with higher returns when they bear a greater level of risk. Yet, empirical research has yielded surprising results. The intuitive relationship between risk and return is in fact inverse.[3] The implication of such a finding is that investors are not compensated for bearing risk, but are, in fact, rewarded for investing in low-risk assets.

The Absa Wits Risk-Controlled SA Low Volatility Index (the ‘Low Volatility Index’) applies extensive empirical research and implements a set of rules that enables the Low Volatility premium to be captured. This is done by selecting shares based on an optimal combination of beta (market risk) and standard deviation (volatility). The Low Volatility Index enables investors to pursue long-term cumulative growth via a **defensive** portfolio that minimises drawdown risk. Independent tests by academics at Wits University conducted over the March 2004 to January 2018 sample period demonstrate (in Figures 1 and 2 below) that the Low Volatility Index substantially outpaced the FTSE-JSE All Share Total Return Index (ALSI), with markedly lower risk.

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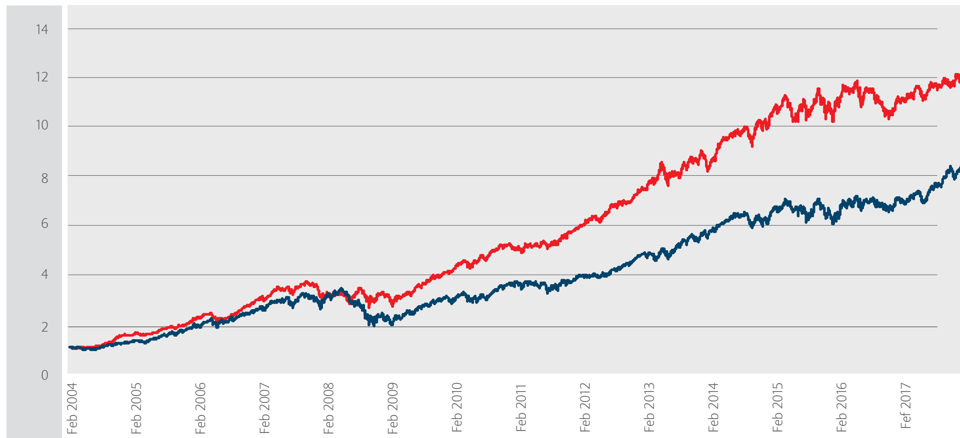
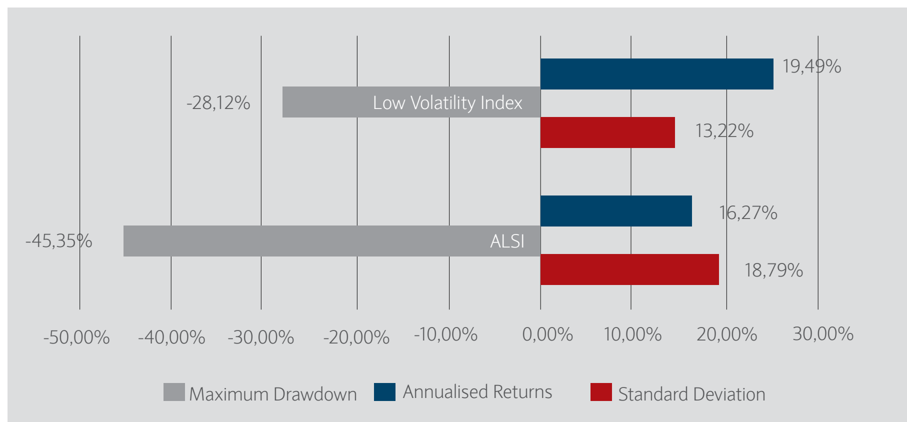


Figure 1: Low Volatility Index cumulative returns vs ALSI



Source: Absa, Bloomberg

Figure 2: Low Volatility Index annualised return, standard deviation and drawdown vs ALSI

Several innovations were applied in the study of the Low Volatility premium in South Africa. Firstly, the Wits University Findata® database was used, which is the only known survivorship bias-free database available in SA. Where stocks have delisted or undergone corporate actions, they have been reintroduced historically to accurately reflect the market at each time. The independent academic tests on Low Volatility were also conducted to minimise the impact of hindsight bias and data mining.

Index construction methodology

Screening

The Low Volatility Index uses the top 60 most liquid shares by value on the JSE as the starting selection universe. In addition, a 5% zero trade-day filter is applied over the previous year, which avoids considering shares that appear to behave like Low Volatility due to gaps in trading days.

Selection

Of the shares that pass the liquidity screen, 20 shares are chosen based on a combined (equally weighted) score of each share's standard deviation and beta with a lookback period of one year.

Weighting

Instead of then equally weighting the selected stocks, the Low Volatility Index constituents are weighted according to their contribution to risk. That is, each share weight is set to contribute equally to the overall portfolio risk, which prevents disproportionate risk contributions. The risk-contribution weighting method improves diversification and mitigates sector concentration. This trait is particularly beneficial in times of high market drawdowns. The suite of Absa Wits indices, including the above Low Volatility Index, are, at time of publication, the only indices in South Africa to apply the risk-parity weighting scheme.

Rebalancing

The Low Volatility Index is rebalanced in February, May, August and November each year.

Risk estimation and liquidity – why are they important?

A key component of risk estimation is the mitigation of estimation error. Estimation error in measuring risk often results in picking shares that appear to be low risk, but are in fact high risk. For example, a large component of estimation error is liquidity. Liquidity is a key component as it ensures that there are adequate and meaningful data points over a historical window period. Consider the following example where the asset in question is the J203 ALSI over the example sample 2003 to 2016 period. Table 1 shows the risk metrics of the ALSI with a market beta of 1, as is to be expected, and an annualised volatility of 19,36%. Imagine now creating an identical time series of returns, yet every third return is zero. The result is a time-series of returns that resembles the market, but trades infrequently and is therefore artificially less liquid.

	ALSI	ALSI (with trading gaps)
Beta	1,00	0,64
Standard deviation	19,36%	15,50%
Standard error	0,000	0,00835

Source: Absa, Bloomberg

Table 1: Liquidity and estimation error in the presence of non-trading days

Table 1 clearly indicates the effect on non-trading or illiquidity on risk estimates. The two series are identical, but with one crucial difference. The second ALSI index has every third return blanked, which produces a beta of 0,64 compared to 1. This gives the false impression that the second ALSI series is significantly less volatile based on beta and standard deviation. The final row of Table 1 displays the estimation error (standard error) and describes the possible range of betas. Therefore, by filtering out illiquid shares, one removes the risk of selecting high-risk shares that present themselves as low risk due to estimation error.

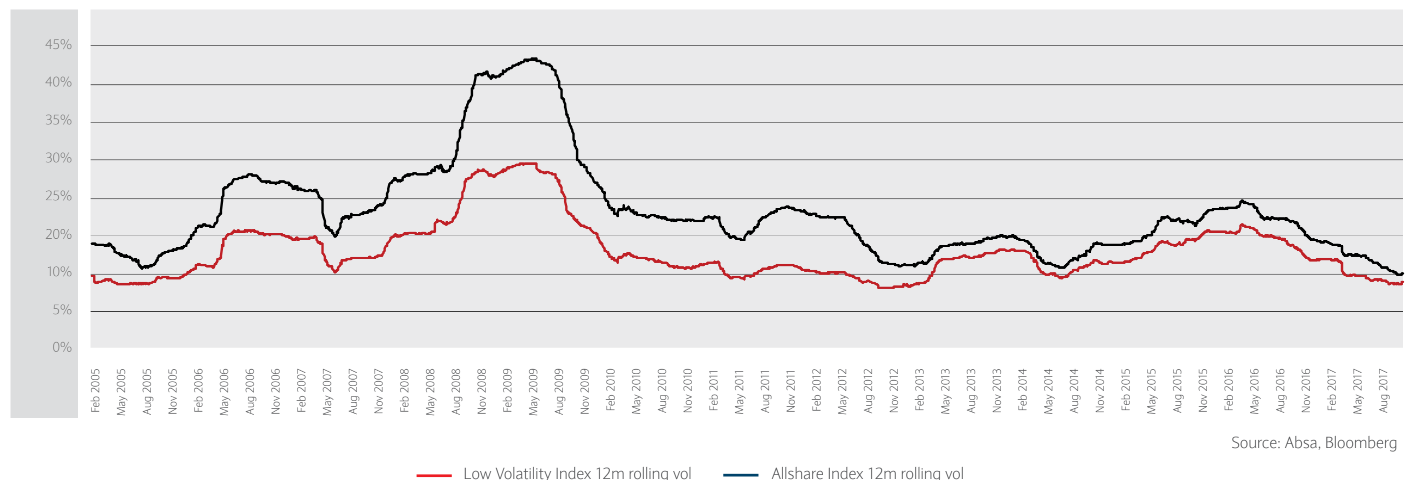
Long-term outperformance

The Low Volatility Index makes use of both daily beta and daily standard deviation estimates of share returns. Combining an equal contribution of beta and standard deviation incorporates two important dimensions of risk into the same index, namely systematic and total risk. In comparison to the ALSI, the Low Volatility Index has outperformed over the period February 2004 to January 2018 by almost 3,5% per year.

	Low Volatility Index	ALSI
Annualised returns	19,49%	16,27%
Standard deviation	13,22%	18,79%
Maximum drawdown	-28,12%	-45,35%
Sharpe ratio	1,47	0,87

Source: Absa, Bloomberg

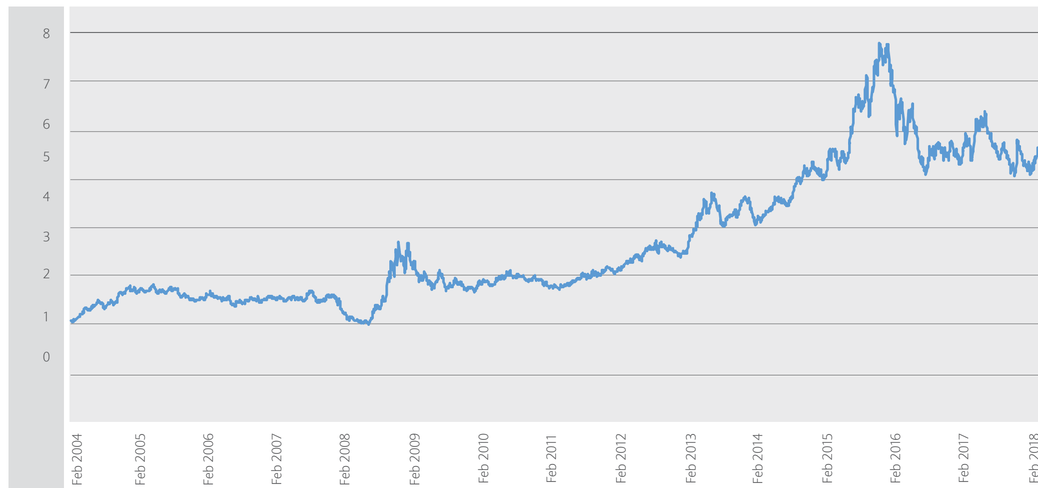
Table 2: Low Volatility Index annualised geometric returns vs ALSI



Source: Absa, Bloomberg

Figure 3: Realised volatility comparison, Low Volatility Index vs ALSI

Figure 4 plots the excess return performance of a notional portfolio with a long position in a Low Volatility portfolio and a short position in high-volatility shares. Over the 2004 to 2018 period, the premium attributable to Low Volatility shares generates an annual positive excess return of 11,43%. The premium is consistently positive, with notable outperformance occurring during times of market stress, particularly the Global Financial Crisis and the Taper Tantrum of May 2013. The periods of underperformance occurred in 2006, late 2007 and early 2016. The underperformance in the first quarter of 2016 is attributable to the relief rally in January and February of that year. High-volatility shares experienced a significant rebound post the lows reached in the aftermath of finance minister Nhlanhla Nene's dismissal in December 2015. Despite these episodes of underperformance, the Low Volatility premium is substantial over the long term and is not period-specific. The result of Low Volatility stocks outperforming high-volatility stocks confirms global evidence that the Low Volatility premium is also consistently reliable and large in the South African equity markets.



Source: Absa Bloomberg

Figure 4: Excess return series, top quintile vs bottom quintile Low Volatility shares

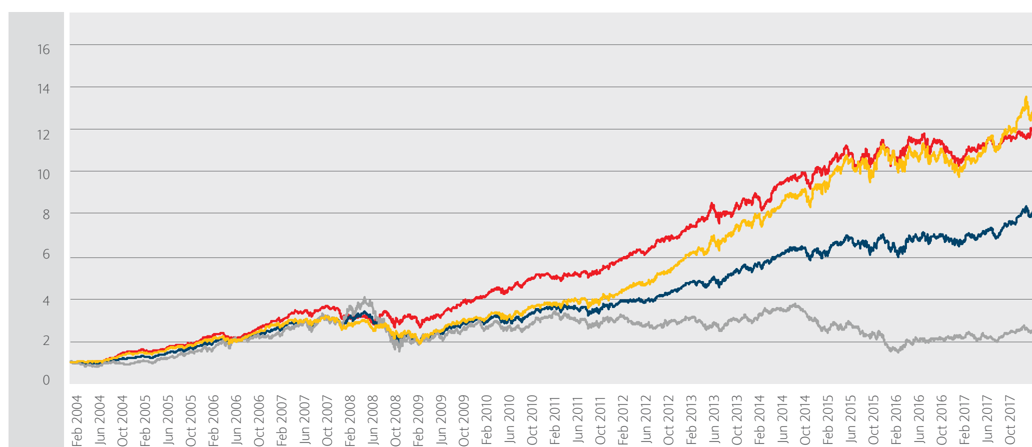
Comparative performance

As can be seen in Table 3, the Low Volatility Index displays strong performance relative to the ALSI. Table 3 and Figure 5 reveal that the Low Volatility Index also outperforms the RESI and until very recently the FINDI too. This was done with much less sector concentration and standard deviation ensuring a better overall risk reward profile as shown by the much higher Sharpe ratio of the Low Volitility Index versus FINDI. The cumulative performance of all four indices are shown in Figure 5.

	FINDI	RESI	ALSI	Low Volatility Index
Annualised returns	20,11%	7,11%	16,27%	19,49%
Standard deviation	18,06%	29,50%	18,79%	13,22%
Beta	0,85	1,37	1,00	0,55
Alpha	6,23%	-15,14%	0,00%	10,50%
Sharpe ratio	1,11	0,24	0,87	1,47
Maximum drawdown	-41,46%	-63,88%	-45,35%	-28,12%

Source: Absa, Bloomberg

Table 3: Low Volatility Index annualised geometric returns vs FINDI, RESI and ALSI



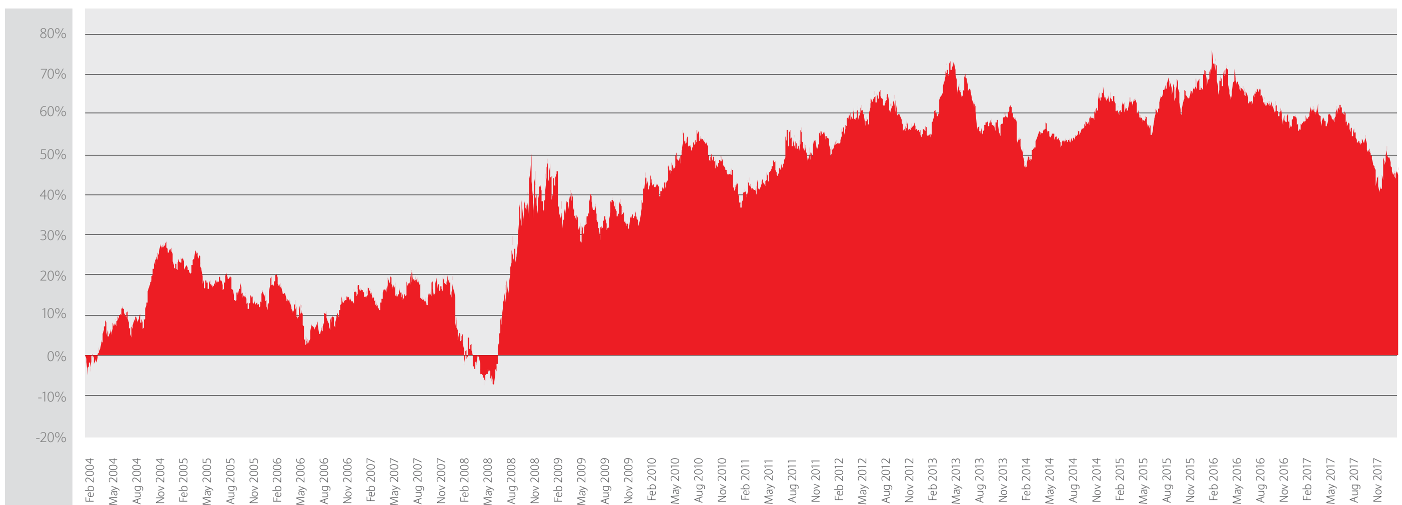
Source: Absa, Bloomberg

Figure 5: Low Volatility Index cumulative returns vs FINDI, RESI and ALSI

Absa Wits Risk-Controlled SA Low Volatility Index

The most common return comparison to make with the Low Volatility Index is that of the market. The Index is compared to the ALSI by dividing the cumulative and rolling returns of the Low Volatility Index by the same returns as the ALSI (an upward sloping line is where the Low Votility Index is outpacing the ALSI and vice versa). The relative performance is plotted in Figures 6 to 8. Any points above zero indicate that the Low Volatility Index outpaced the return of the ALSI, whereas points below zero indicate that the ALSI was the better performer.

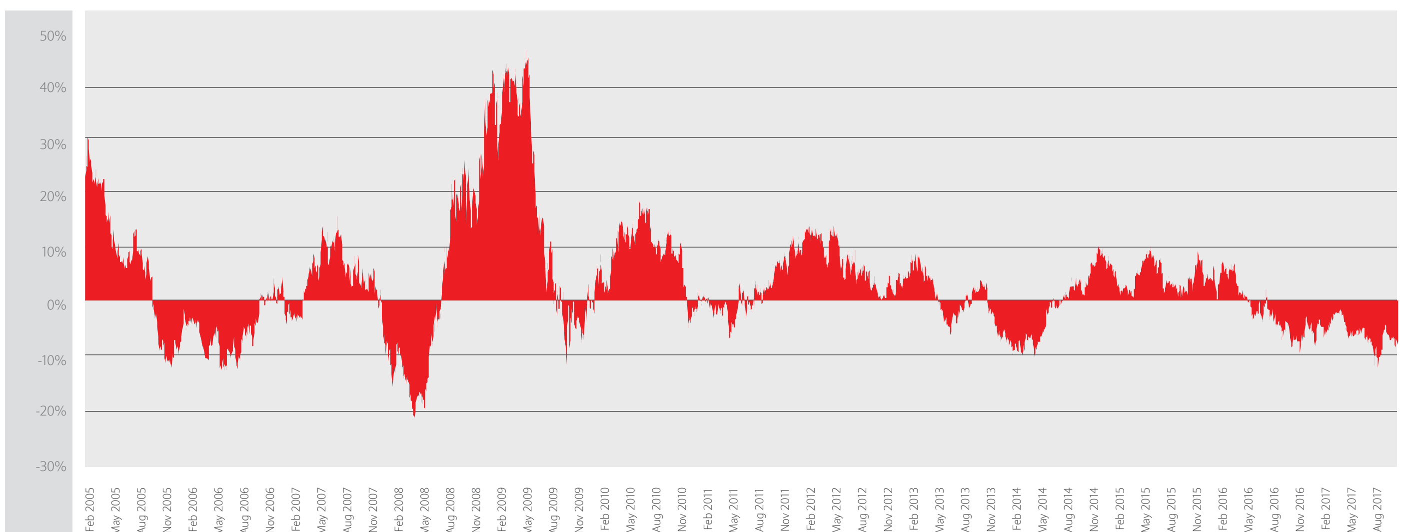
Figure 6 illustrates the superior cumulative performance of the Low Volatility Index over the ALSI. An investor would have outpaced the market by around 47% had they invested in the Low Volatility Index in 2004 and stuck with it. The Low Volatility Index only underperformed in 2004 and in the run-up to the Global Financial Crisis in 2007 to 2008. Importantly, however, the Low Volatility Index substantially outperformed the ALSI in the teeth of the crisis, which can be seen by the sharp upswing in relative performance, beginning in July 2008. The Index continued to outperform with the recovery in equity prices in 2009.



Source: Absa, Bloomberg

Figure 6: Low Volatility Index cumulative returns relative to ALSI

Examining the one-year and three-year rolling relative returns of the Low Volatility Index reaffirms its strong performance. Figure 7 shows that the Low Volatility Index outperforms the market more frequently over a one-year rolling period than it underperforms. The three-year rolling returns plotted in Figure 8 illustrate that the Index underperformed the ALSI only twice, which occurred during the same 2007 to 2008 period prior to the Global Financial Crisis and then again in late 2017. These results show us that holding the Low Volatility Index over periods of at least three years produces the most reliable results relative to the ALSI.



Source: Absa, Bloomberg

Figure 7: Low Volatility Index vs ALSI one-year rolling returns

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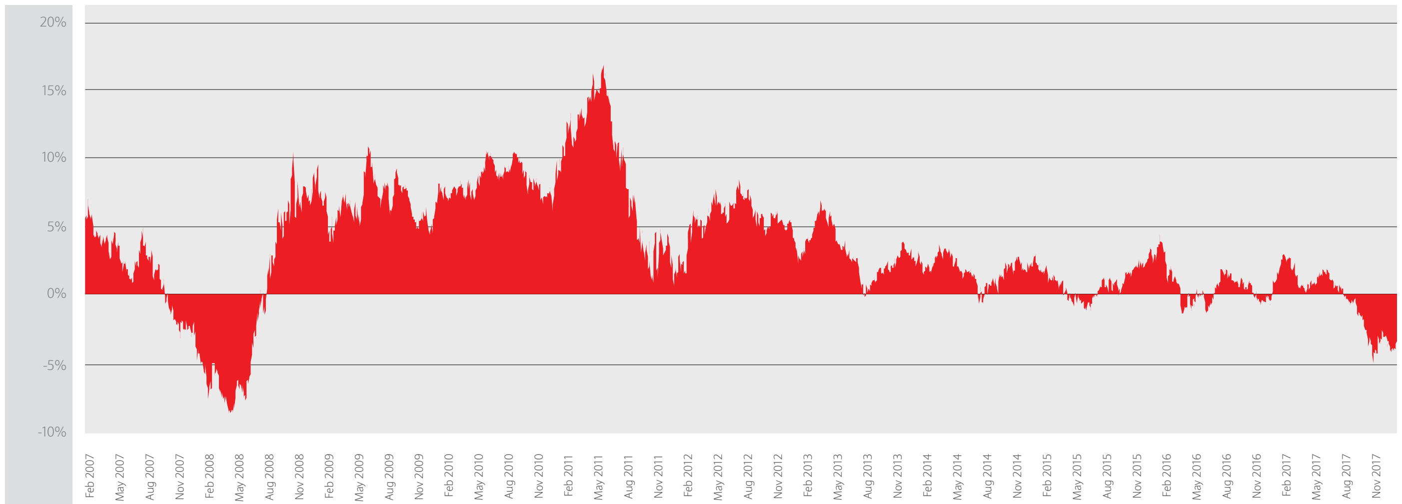


Source: Absa, Bloomberg

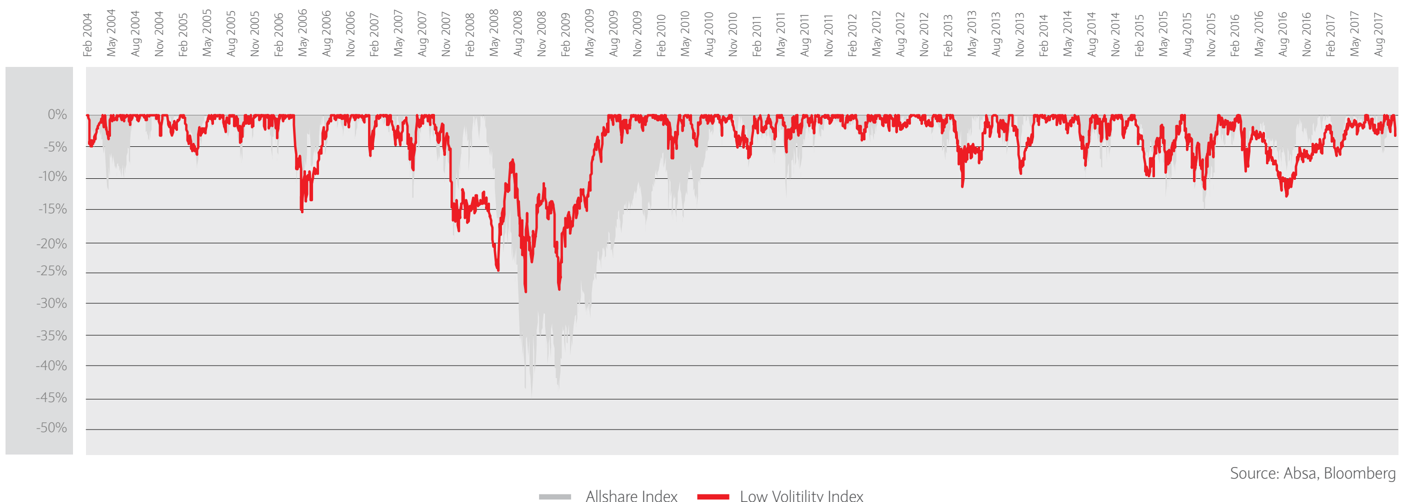
Figure 8: Low Volatility Index vs ALSI three-year rolling returns

Risk control

The Low Volatility Index is designed to select shares that are characterised by low risk. While this has demonstrated strong performance in the past, on both a risk-adjusted and absolute return basis, it is important to be aware that rules-based portfolio construction can potentially lead to selecting shares that are exposed to similar risks. Careful analysis of historical portfolio composition reveals periods where certain sectors, such as property, are over-represented in the portfolio. To account for this, the Low Volatility Index employs an equal risk-contribution weighting scheme in order to maximise diversification of the Index.

The equal risk-contribution weighting method is a dynamic process that considers changing market conditions and is optimised over a rolling lookback window. The weights of constituent shares in the Low Volatility Index are determined by their contribution to the total risk of the portfolio, which is a function of the current correlation structure and the individual volatilities of the stocks in the Low Volatility Index. As a result, shares with either or both low volatilities and low correlations are upweighted, enabling the Low Volatility Index to capture more of the Low Volatility anomaly. By upweighting stocks that exhibit low correlations to other stocks, we select shares with returns that are unrelated to other stocks, thereby always maximising overall diversification. This is the first time that the equal risk-contribution weighting methodology has been applied to a Low Volatility index in South Africa.

This attribute is evident in Figures 9 and 10. The Low Volatility Index experienced significantly less severe drawdowns than the ALSI during the 2008 financial crisis. In the run-up to the financial crisis (after October 2007) the Low Volatility Index tracked the ALSI downwards. During the worst of the crisis, the ALSI collapsed and the Low Volatility Index did not fall. The Low Volatility Index also recovered at a substantially faster rate than the market and, by September 2009, had recovered all of its losses, whereas the ALSI remained approximately 20% below its peak prior to the crisis.



Source: Absa, Bloomberg

Allshare Index   Low Volitility Index

Figure 9: Low Volatility Index maximum drawdown vs ALSI 2004-2018

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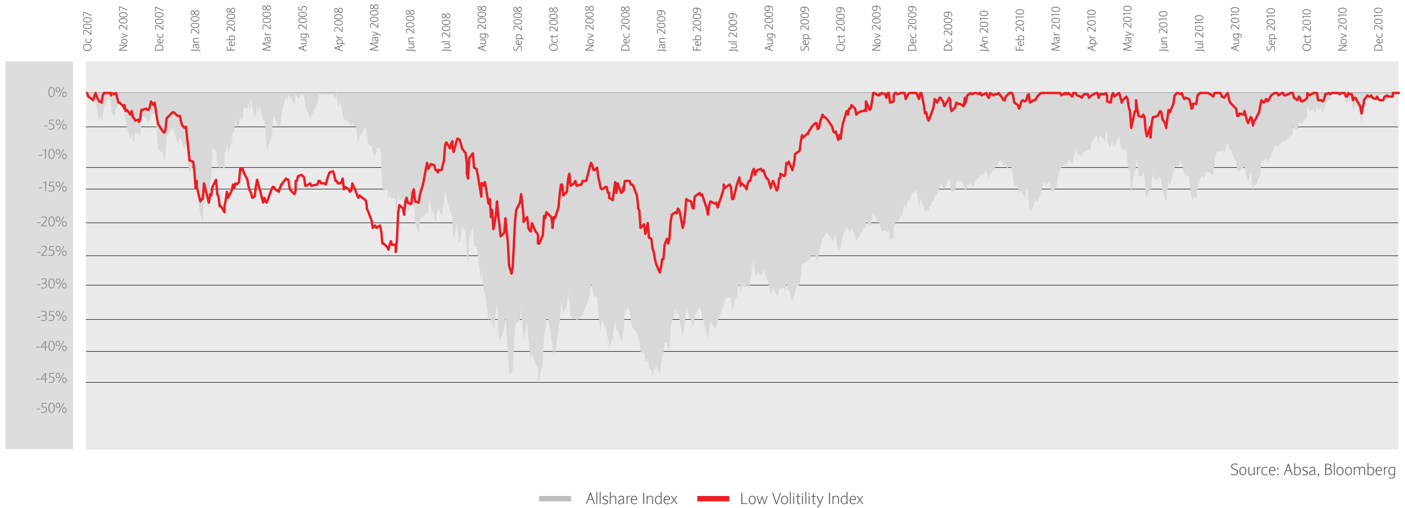

Figure 10: Low Volatility Index maximum drawdown vs ALSI 2007-2010

Conclusion

Low Volatility strategies have been shown to earn a substantial long-term premium, with lower overall risk. With greater attention paid to low-risk strategies in the wake of the Global Financial Crisis, varied articulations of low-risk strategies will likely emerge. However, the essential tenet of Low Volatility strategies will endure, presenting a strategic long-term opportunity for investors. The Absa Wits Risk-Controlled SA Low Volatility Index has been developed using exclusive data, with research methods that apply the latest global index innovations in South Africa. This provides investors with the independently tested opportunity to capture the Low Volatility premium via a transparent and robust rules-based methodology with built-in downside mitigation.

References

[1]Claessens and Kose (2012)
[2]Clarke, da Silva and Thorley (2006); Frazzini and Pedersen (2014)
[3]Black, Jensen and Scholes (1972); Haugen and Heins (1975); van Rensburg and Robertson (2003); Blitz and van Vliet (2007)

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