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The theory of low-volatility investing



The 'low-risk anomaly' has been around for over 40 years. Empirical evidence shows that low-volatility investment portfolios can produce higher returns than riskier portfolios (in particular when adjusted for risk) while providing some level of downside mitigation¹. This anomaly represents a departure from traditional financial theory – where taking on risk is generally expected to yield greater returns.

Recently there has been a significant body of academic research on this topic. At BNP Paribas Investment Partners, our own ground-breaking research shows that not all approaches are equal. So while the low-risk anomaly presents an important opportunity for investors, they need to be discerning when considering their options.

The Smart Beta market – a history of good intentions and unintended consequences

Low-volatility investing is just one of the strategies that come under the umbrella of so-called 'smart beta'. The concept of smart beta has been around since the early 1970s, when academics challenged the conventional approach of using a market capitalisation weighted portfolio of stocks, leading to 'smarter' approaches to fund management. There is a wide range of names for smart beta, including advanced beta, alternative beta, systematic beta, strategic beta, exotic beta and factor beta. The range of potential approaches is very broad and has been the basis of many years of research at BNP Paribas Investment Partners. These include:

- risk-based strategies such as risk parity or minimum variance based on risk views to manage risk and increase diversification
- fundamental indexing, which builds portfolios using criteria such as companies' cash-flows, profits, dividends or sales, which has been shown to derive excess returns from exposures to value (cheap) stocks and smaller capitalisation stocks
- factor investing, which builds portfolios intentionally exposed to value stocks, positive trending stocks, the most profitable stocks or the lowest volatility stocks

Smart beta portfolios and indices were invented to boost returns relative to conventional market capitalisation weighted exchange-traded funds (ETF) and index funds by capitalising on potential opportunities for excess return. Smart beta presents a growing alternative to these traditional approaches, as it offers the potential for higher risk-adjusted returns over the long run for just a slightly higher fee than conventional ETFs and index funds.

¹ The Low-Risk Anomaly Everywhere: Evidence from Equity Sectors. Raul Leote De Carvalho, Majdoline Zakaria, Lu Xiao, Pierre Moulin BNP Paribas Investment Partners November 19, 2014



Since the financial crisis, the development of innovative smart beta strategies has accelerated. Demand from investors is growing, given the search for new sources of returns in the environment of very low interest rates and volatile markets. Furthermore, stung by the repeated pricking of asset-price bubbles, investors are looking for unconventional approaches that do not heavily weight overpriced securities.

With the recent proliferation of smart beta research and products on the market, it is increasingly difficult to differentiate between the various investment strategies. In our view, many strategies and approaches are not achieving their stated investment objectives. Despite increasingly complex methods, many of them have been delivering unintended effects – or factor exposures – and therefore less than desirable outcomes.

The research from our own financial engineering team has found that simpler investment methodologies can remove these unwanted exposures. In addition, with our robust process and investing framework, we can aim to manage risk in a more appropriate way. One of our recent discoveries is that the opportunity presented by the low-volatility anomaly is more widespread than previously thought: reaching across equity sectors and also in asset classes such as fixed income, the anomaly can be found and exploited in almost all markets.²

According to Morningstar³ the size of the smart beta market as at June 2014 was \$396 billion across 673 products in ETFs alone. The US holds around 91%⁴ of assets under management. Meanwhile, in Europe, the market has grown to just over \$26 billion in less than 10 years⁵.

Smart Beta: the first generation

The low-volatility anomaly has been a prominent pillar in smart beta investing. Traditional investment theory of the 50s and 60s says that investors have to accept a higher level of risk for a higher level of return. But it is known since the early 70s the financial markets have not always reflected this theory. Instead, research has shown that stocks with the lowest level of volatility may deliver higher risk-adjusted returns than the most volatile stocks, over the long run. And our latest research demonstrated that this is also the case within equity sectors¹.

First-generation smart beta products in this area came up short with, for example, biases towards less cyclical sectors and unintended consequences such as negative exposures to interest rate changes. Additionally, biases towards value or small-cap stocks may have unintended consequences when not intentionally added and controlled. Finally, clients' investment restrictions often led to riskier stocks having to be included in such funds.

Smart Beta: the second generation

More recent research has led to changes to low-volatility and factor-based approaches. Our own research, for example, found that investors can potentially take advantage of the low-volatility anomaly across a wider range of markets – over regions, assets and market sectors. This can reduce the correlation of excess returns and improve the portfolio diversification.

In our research published in 2012, we found that a number of complex smart beta strategies led to broadly similar portfolios of cheap, small-cap stocks with low-volatility. And we devised simpler processes for creating risk-based strategies while retaining the intended exposures of the strategy.⁶

In 2014, our latest research into the low-volatility anomaly shows that it can be observed across a wider range of asset classes, including most fixed-income markets. As with equities, low-risk bond portfolios brought returns above the benchmark level across a range of markets and currencies. Overall, we found that as the portfolio's risk reduced, its Sharpe ratio increased, meaning that risk-adjusted returns were improving.⁷

Also in 2014, our team investigated inter-temporal risk parity strategies (also known as volatility targeting strategies), an approach that evaluates the level of cash and risky assets held and rebalances the portfolio to keep risk levels constant over time. We found that using inter-temporal strategies benefited risk-adjusted returns in emerging-market equities and

2 R.L. de Carvalho, X. Lu and P. Moulin, 'Demystifying Equity Risk Based Strategies: A Simple Alpha plus Beta Description', The Journal of Portfolio Management, Vol. 36, No. 3 (2012)

3 Hortense Bioy et al, A Global Guide to Strategic-Beta Exchange-Traded Products, Morningstar, 2014, p1

4 Hortense Bioy et al, A Global Guide to Strategic-Beta Exchange-Traded Products, Morningstar, 2014, p8

5 Hortense Bioy et al, A Global Guide to Strategic-Beta Exchange-Traded Products, Morningstar, 2014, p23

6 R.L. de Carvalho, X. Lu and P. Moulin, 'Demystifying Equity Risk Based Strategies: A Simple Alpha plus Beta Description', The Journal of Portfolio Management, Vol. 36, No. 3 (2012)

7 R.L. de Carvalho, M. Zakaria, X. Lu and P. Moulin, 'Low-risk anomaly everywhere: Evidence from equity sectors', in 'Risk Based and Factor Investing' Elsevier, (forthcoming 2015) Management, Vol. 36, No. 3 (2012)

high-yield bonds in particular, while developed-market equities and commodities returns were also lifted. When the inter-temporal process was applied to factor investing – such as value and momentum factors – we showed that risk-adjusted returns also increased; in this case, though, it was found to be more important for foreign exchange and equity factors than for government bonds.⁸

Latest Thinking: The Low-Risk Anomaly Everywhere

Our most recent paper, *The Low-Risk Anomaly Everywhere: Evidence from Equity Sectors*¹, builds further on our experience so far in the field of smart beta research.

Most recent research into the low-volatility anomaly has looked at stock returns across countries and regions. Evidence across industry sectors has been weaker, however.

We believe our latest research is the first to provide evidence of the low-volatility anomaly in each of the 10 market sectors using MSCI's GICS (or Global Industry Classification Standard) sector definitions. Furthermore, our analysis found the anomaly to be stronger in stock returns within each sector than it is across all sectors. We believe this irregularity is partly due to active managers, as their performance is measured against market-cap-weighted benchmarks. Some research suggests this is because active managers prefer riskier stocks. However we think the explanation goes deeper: sector specialisation by fund managers leads to stock selection at a sector level. In addition, the anomaly (within sectors) is exaggerated by limits imposed on how far a fund manager can deviate from the sector weighting in a particular benchmark. So the low-volatility anomaly is found within all sectors. This particularly holds true for developed markets.

A sector-neutral approach boosts risk-adjusted returns

Our research indicates that favouring low-volatility stocks in each sector while neutralising exposure to sector risk (sector neutrality) could lead to a 14%⁹ increase in risk-adjusted returns when compared with a non-sector-neutral approach. Our strategy then removes previously observed trends for allocation in non-sector-neutral approaches, dampening the pre-existing biases away from financials, utilities and consumer staples, and towards IT and consumer discretionary.

The benefits of the sector-neutral approach are achieved by spreading risk through additional diversification. There is a low correlation between the returns from the low-risk stocks in one sector and those in another. Our approach therefore favours investing in low-risk stocks within *each* sector.

We also found there was a low correlation of returns in these portfolios compared with other similar portfolios invested in value stocks, small-cap stocks or momentum stocks. This implies that there are potential diversification benefits to be had from holding a range of strategies. Other important conclusions from our latest research:

- a low-volatility investment approach can lead to improved liquidity compared with momentum, value and small-cap strategies
- in addition, we can aim to reduce the level of stock turnover in a portfolio without reducing risk-adjusted returns
- lower-risk stocks show a low probability of becoming high-volatility stocks in the near future; they are generally persistent in their low-volatility
- low-volatility investing tends to avoid stocks likely to deliver poor performance



8 R.L. de Carvalho, X. Lu and P. Moulin, 'Inter-temporal risk parity: a constant volatility framework for factor investing', *Journal of Investment Strategies*, Vol. 4, No. 1 (2014) and R. Perchet, R. Leote de Carvalho, T. Heckel and P. Moulin 'Predicting the success of volatility targeting strategies: Application to equities and other asset classes.' *Journal of Alternative Investments* (forthcoming 2015).

9 R.L. de Carvalho, M. Zakaria, X. Lu and P. Moulin, 'Low-risk anomaly everywhere: Evidence from equity sectors', BNP Paribas Investment Partners, 2014, p22



Summary

We have been managing low-volatility equities portfolios for many years, employing the low-volatility anomaly returns for clients and we aim to drive better risk-adjusted performance over the long term compared with traditional market-cap-weighted portfolios.

Our extensive research shows that the low-risk anomaly can be found in all sectors and we believe low-volatility investing can significantly improve the Sharpe ratio of equity investments, while providing some level of downside mitigation in bear markets.

Through our ongoing research we have continued to evolve our approach, moving from managing minimum variance type strategies into more efficient approaches. In particular, we invest in all sectors to improve diversification and to avoid the bias towards defensive stocks. Our research aims to continually break new ground in the search for further product and strategy innovation.

Our Research Team

In our financial engineering research team, we cross traditional lines of research, process, innovation and solutions to deliver flexible strategies that meet our clients' requirements. Based in Paris, our global team of quant specialists runs several low-volatility strategies.

We focus on stock screening to uncover the low-volatility stock universe. We then build portfolios using optimisation approaches. Together, our systematic review process, portfolio maintenance and validation checks ensure consistency, liquidity and compliance with our low-risk criteria.

Our research agenda allows for constant refinements and improvements to the low-volatility approaches. This means we are constantly seeking to improve our risk management, for example, by reducing market impact and sensitivity to unwanted factors.

The aim of our portfolios, which are selected from the MSCI World Index or MSCI Emerging Markets Index, is to improve the Sharpe ratio compared with conventional market-capitalisation indices. Our approach also aims to reduce volatility by between 20% and 35%, depending on the strategy we use. We aim to achieve this without any style bias resulting from portfolio construction.

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