AMSA

The drivers of low volatility anomaly
Literature review

Equities

Asset Division – December 2021

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AMSA

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Introduction

This section covers the low volatility anomaly and summarizes the main findings of existing literature regarding the potential drivers of the issue. The low volatility anomaly describes the empirical finding that low volatility stocks outperform high volatility stocks over the long horizon (Baker, Bradley & Wurgler, 2011). This discovery contradicts fundamental theories in finance and the notion that a higher risk should be compensated with a higher expected return (Baker, Bradley & Wurgler, 2011). This anomaly has a significant influence on investment management as well as on the development of finance as a science and, therefore, is important to be considered and analyzed.

Literature review

A lot of studies were conducted with the aim to test the presence of the low volatility anomaly in different financial markets as well as to determine its possible drivers. In the US, the issue was found when the performance of the S&P 500 Low Volatility Index (which consists of 100 least volatile stocks of the S&P 500, based on the standard deviation of the trailing 252 daily returns) was compared with the performance of the S&P 500 Index (Lazzara & Chan, 2019). The Low Volatility Index consistently overperformed the S&P 500

over the years (Lazzara & Chan, 2019). The graph below represents this outperformance over the period of December 1990 to December 2018. It can be seen that starting from about the middle of 2001, the S&P 500 Low Volatility Index was consistently generating greater returns than the S&P 500 index, gradually increasing the degree of overperformance.
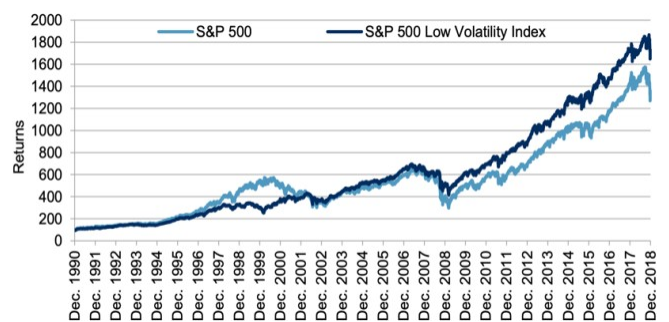
Source: Lazzara & Chain, 2019

Lazzara & Chan (2019) in their research suggest several possible explanations for the pattern. First such explanation is leverage aversion. Specifically, when investors like to hold a portfolio with a risk greater than the risk that market offers, financial theory suggests holding the market index in combination with the exposure to leverage in order to get a greater overall risk. However, the authors argue that leverage may be not accessible due to transaction costs or regulatory restrictions. Therefore, investors are more likely to invest in assets with a greater risk, such that the average risk of their portfolio of assets

matches their target level. This creates excessive demand for high-risk assets and, consequently, increases their prices and lowers expected returns. Secondly, the authors suggest a behavioural explanation for the anomaly, which implies that investors may be willing to demand highly volatile stocks due to the possibility of an enormous return, even if this possibility is low. As so, such investors raise the prices of high volatility stocks and, as a result, drive their expected returns down.

In addition, Lazzara & Chan (2019) also find that the low volatility anomaly is present in other markets and, therefore, compare the impacts of markets' specific environments on the anomaly. The study concludes that low volatility portfolios tend to outperform in weak markets and underperform in strong markets. The authors also state that weak markets are associated with relatively high volatility and dispersion.

Some other studies also focused on investigating the low volatility anomaly outside the US market. For instance, Dutt & Humphery-Jenner (2013) in their paper support the low volatility anomaly in both emerging and developed economies. Regarding the drivers of the issue, the authors find that the low volatility anomaly can be partly explained by low volatility stocks having greater operating performance, which holds for both emerging and developed economies. The intuitions under this result are the following. Firstly, if high operating performance is unexpected, then its unexpected appearance results in positive returns, and this phenomenon is more likely for less volatile stocks since such companies have better access to capital. The second possible explanation is the uncertainty of this high operating performance. Specifically, this implies that if such performance is uncertain, then its actual appearance will result in the revaluation of the stock and increase in its price in accordance with the resulted high operating performance. Thirdly, stronger operating performance generates opportunities for a company to expand. Therefore, if such performance is initially uncertain, the future resulting payoffs, due to the expansion, will not be fully priced until the relevant news. As a result, the high operating performance news will generate positive returns of the stock. Finally, the relation between high operating performance and positive returns can be explained by poor information in markets. Specifically, if an uncertain expectation regarding future positive performance of a company exists, and if this expectation is supported even to a small extent in the future, investors may overreact to this

supportive information and drive the company's price upwards, therefore, increasing the company's returns for existing shareholders. Since high operating performance was found to prevail in low volatility stocks, the described relationships between positive returns and high operating performance are especially relevant for low volatility stocks (Dutt & Humphery-Jenner, 2013). In addition, the study also finds that the operating performance influences the magnitude of the anomaly, having a greater impact within the sample of firms with lower operating performance.

The graph below represents the performance of portfolios sorted on volatility, where Q1 is the lowest volatility portfolio and Q5 is the highest volatility portfolio in the sample of developed economies over the 15 years. Specifically, the graph represents the value of $1 invested in 1995 year (Dutt & Humphery-Jenner, 2013). It can be seen that lower volatility portfolios consistently outperformed higher volatility portfolios. Moreover, the highest volatility portfolio in the sample had the lowest performance in every year, which contradicts financial theories that suggest that a higher risk should be compensated with a greater return.
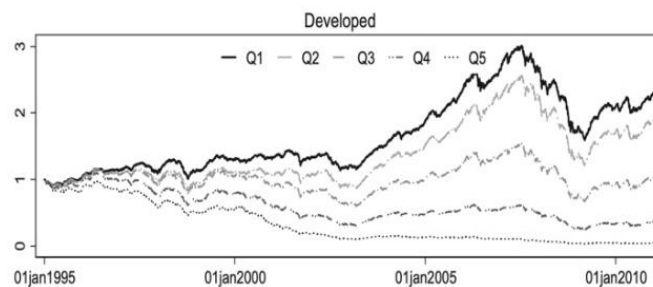
Source: Dutt & Humphery-Jenner, 2013

The following graph shows a similar pattern for sorted on volatility portfolios of emerging economies over the 15 years (Dutt & Humphery-Jenner, 2013). As with developed countries, the portfolios with lower volatility overperformed portfolios with higher volatility over the years.
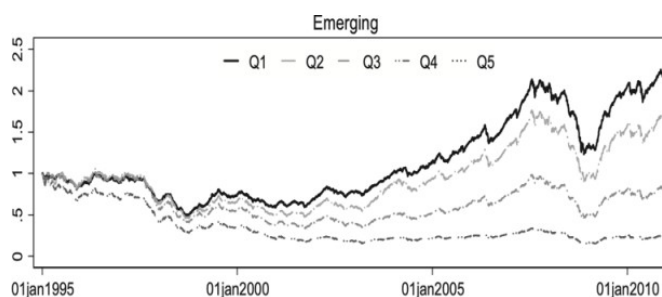
Source: Dutt & Humphery-Jenner, 2013

Driessen, Kuiper, Nazliben & Beilo (2019) in their paper find that part of the outperformance of low volatility stocks can be driven by their exposure to interest rate. Specifically, the authors find that low volatility stocks have greater exposure to interest rate risk, and the excess returns of low volatility portfolios decrease after controlling for the interest rate exposure. This suggests that low volatility stocks'

excess returns can be explained by the premium as a compensation for the interest rate risk.

Jacqmin (2016) in his research on US stocks also supports that exposure to interest rates partly explains the low volatility anomaly. In addition, the author also investigates firm characteristics as potential drivers of the low volatility anomaly. Specifically, dividend yield, operating performance, and investment are considered. Regarding the dividend yield, the idea is that low volatility stocks are associated with more stable and mature firms and, therefore, pay more dividends. In contrast, high volatility stocks are likely to be more unstable growth stocks and, as a result, associated with lower dividend yields. Regarding the investment, since high volatility stocks are more likely to be small capitalization stocks with growth opportunities, they can be linked to active investment strategy, while low volatility stocks are associated with conservative investment strategy (Jacqmin, 2016). As in the paper of Dutt & Humphery-Jenner (2013), the author also suggests that low volatility stocks are likely to have greater operating performance. Jacqmin (2016) supports these intuitions and relations using the 4 Fama-French-Carhart factor model with addition of the operating performance, dividend yield, and investment factors. The study concludes

that drivers of the low volatility anomaly are firm size, momentum, dividend yield and operating profitability, while the investment factor is redundant and highly correlates with the dividend yield factor.

Hartanto (2019) uses US data in his research and also finds that firm size is one of the drivers of the low volatility anomaly. Specifically, he finds that the anomaly exists in firms with small size. However, the issue is not present in big companies. This finding is in line with Jacqmin (2016), and Bali and Cakici (2008), who also find the firm size, in addition to liquidity of stocks, as one of the drivers of the low volatility anomaly.

Beijer (2015) in his paper investigates emerging and developed economies and relies on several arguments that help to explain the low volatility anomaly. The following arguments used in the paper are related to behavioral biases that investors experience. Firstly, the author refers to other studies that found that highly volatile stocks have positively skewed distribution which implies that there is a small probability of a very large return and a high probability of a negative return. The finding of another paper is that investors, therefore, overweight these small probabilities of large returns and invest in such highly volatile stocks. As a result, these stocks

become overpriced and yield negative average returns (Beijer, 2015). Secondly, the author also refers to the representativeness bias that was explained by Tversky and Kahneman (1983). The bias refers to the finding that investors tend to generalize the result that some risky stocks perform well to all such risky stocks. As a result, the demand drives prices up for risky stocks and leads to lower returns for them (Beijer, 2015). Thirdly, overconfidence may also explain the low volatility anomaly. Specifically, investors tend to overestimate their expectations, knowledge or skills, and this phenomenon is more pronounced when it comes to predicting more uncertain events, like returns on more risky stocks (Beijer, 2015). As with previous cases, investors drive up the prices of such stocks making them overpriced and, consequently, lower their returns. The second argument is concerned with agency issues. The idea is that portfolio managers have compensation plans that are dependent on their performance. As a result, they have incentives to invest in more volatile stocks to ensure higher expected returns on their portfolios. This causes excessive demand for risky stocks by portfolio managers which, as a result, leads to overvaluing such stocks and, consequently, results in stocks yielding lower returns (Beijer, 2015). The author also refers to another study that suggests that high volatility stocks outperform low volatility stocks in up markets and, therefore, increase managers incentives to invest in these stocks especially during such times. Thirdly, Beijer (2015) refers to regulatory constraints as a reason for the presence of the low volatility anomaly. If limits for the use of leverage exist, investors have to overweight risky assets in order to get the desired risk exposure, instead of using leverage for this purpose. This suggestion is consistent with the research of Lazzara & Chan (2019). Moreover, Beijer (2015) also explains that these leverage constraints, as well as short selling constraints (constraints to short risky assets that would help to arbitrage away the mispricing) and benchmarking (mutual funds have to choose well-known benchmarks) do not allow portfolio managers to benefit from the low volatility anomaly and arbitrage away the mispricing. Finally, the author also suggests operating performance as a reason for the low volatility anomaly. He bases his suggestion on the Dutt & Humphery-Jenner (2013) work and implements his own analysis with the supportive findings that firstly, low volatility stocks are associated with higher operating performance and, secondly, firms with stronger operating performance overperform firms with lower operating performance. As a result, the paper concludes that operating performance

also partly explains the low volatility anomaly.

Another explanation for the low volatility anomaly related to mispricing is raised in the paper of Barberis & Xiong (2012). The authors consider that investors may derive their utility from realizing gains and losses and construct a model that covers this "realization utility". The implication of this model is that investors prefer high volatility stocks since they offer a possibility for large gains which can be realized right away. In contrast, if a stock declines in value, investors may postpone selling it, and therefore will not realize the loss right away but rather at some date in the future. According to the model, investors with realization utility will be willing to sell the declined stock only in the case of liquidity problems, therefore, such potential loss is viewed as very distant in the future and small, if discounted to present (Barberis & Xiong, 2012).

Li, Sullivan & Garcia-Feijóo (2016) in their study focus on determining whether the low volatility anomaly is caused by mispricing or by certain systematic risk factors. As one of the potential systematic factors, the authors mention consumption-hedging benefits which are offered by highly volatile stocks due to their better performance during recessions. This, however, contradicts with the study of Lazzara & Chan (2019), who found that low volatility portfolios overperform high volatility portfolios in weak markets. Nevertheless, Li, Sullivan & Garcia-Feijóo (2016) suggest that investors may be willing to pay more for high volatility stocks due to these hedging benefits. Using the sample of US stocks and focusing on idiosyncratic volatility, Li, Sullivan & Garcia-Feijóo (2016) find that the anomaly is likely to be related to mispricing rather than to a compensation for a certain pervasive risk. This implies that investors prefer stocks with a higher risk (Li, Sullivan & Garcia-Feijóo, 2016).

Conclusion

This paper focused on summarizing the existing findings regarding the explanations of the low volatility anomaly. The issue was found present not only in US, but also in other emerging and developed markets. The investigation of the issue and its possible drivers has significant consequences for investment decisions. However, it is also important to consider that some studies were not able to find the anomaly in the samples they used in their analysis. Such studies were not included in this paper since they do not facilitate to its purpose of summarizing the found drivers of the issue. However, this implies that investors should firstly ensure that their constructed portfolios exhibit returns that are in line with the low volatility anomaly and only then invest accordingly. From the studies reviewed, the most common explanations for the anomaly are behavioral biases and limits to arbitrage, which may highly depend on regulations and current economic conditions. Also, it is important to consider that past patterns of the portfolio returns may not be entirely representative for future. Overall, taking into account both the observed prevailing drivers of the low volatility anomaly and potential considerations regarding them, could be extremely helpful in investing. Therefore, this summary highly facilitates to the process of investment management.

References

Baker, M., Bradley, B., & Wurgler, J. (2011). Benchmarks as limits to arbitrage: Understanding the low-volatility anomaly. *Financial Analysts Journal*, *67*(1), 40-54.

Barberis, N., & Xiong, W. (2012). Realization utility. *Journal of Financial Economics*, *104*(2), 251-271.

Beijer, D. "The Low Volatility Anomaly: Outperformance of Low Risk Stocks, and the Role of Operating Performance as a Driver." *Thesis / Dissertation ETD*, Tilburg University. Financiering, 2015.

Driessen, J., Kuiper, I., Nazliben, K., & Beilo, R. (2019). Does interest rate exposure explain the low-volatility anomaly?. *Journal of Banking & Finance*, *103*, 51-61.

Dutt, T., & Humphery-Jenner, M. (2013). Stock return volatility, operating performance and stock returns: International evidence on drivers of the 'low volatility'anomaly. *Journal of Banking & Finance, 37*(3), 999-1017.

Hartanto, A. "The Size Effect to Low Volatility Anomaly." *Thesis / Dissertation ETD*, Tilburg University. Finance, 2019.

Hartanto, A. "The Size Effect to Low Volatility Anomaly." *Thesis / Dissertation ETD*, Tilburg University. Finance, 2019.

Jacqmin, R. "An analysis of the low-volatility anomaly." *Thesis / Dissertation ETD, HEC* Liège. Financial engineering, 2016.

Lazzara, C. J., & Chan, F. M. (2019). Is the Low Volatility Anomaly Universal? S&P Dow Jones Indices.

Li, X., Sullivan, R. N., & Garcia-Feijóo, L. (2016). The Low-Volatility Anomaly: Market Evidence on Systematic Risk vs. Mispricing. Financial Analysts Journal, 72(1), 36–47.