The Low-Volatility Anomaly Revisited*

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Abstract

The present study conducts two different strategies in order to exploit the low-volatility anomaly in the U.S., the European and the German equity market. The first strategy uses quadratic optimization to calculate optimal portfolio weights. The second strategy sorts stocks into portfolio quintiles based on past realized volatility. Our main findings show that both low-volatility strategies outperform the respective benchmark market portfolio. While the effect is strongest during bull-market periods, it gets weaker during periods of market downturns. Additional results show that in the U.S. market, the low-volatility anomaly can be explained by trading volume and operating profitability. In the German market, operating profitability and the dividend yield can explain the low-volatility effect while in the European market none of these characteristics play a role in explaining the effect. Overall, our findings provide evidence that the low-volatility anomaly still is a robust phenomenon that is inherent in mature capital markets.

Keywords: Low-volatility anomaly, portfolio optimization, risk-return tradeoff

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I. Introduction

The low-volatility effect describes the long-term average outperformance of low-volatility portfolios relative to the market portfolio along with the relative underperformance of high-volatility portfolios versus low-volatility portfolios on a risk-adjusted basis (see e.g. *Blitz/van Vliet* 2007). The observed phenomenon contradicts rational economic theory that higher risk should be compensated with higher expected returns, and therefore, it has attracted considerable interest of financial practitioners and academics.[1][2]

There are different ways to implement low-volatility strategies. For example, *Denoiseux* (2014) uses Exchange Traded Funds (ETFs) and a minimum-variance approach to create a low-volatility portfolio via simulation. His main finding shows that the ETF-portfolio significantly outperforms the benchmark market portfolio. Another way of constructing the low-volatility portfolio is to minimize the variance of a market index using portfolio optimization of *Markowitz* (1952). For example, *Haugen/Baker* (1991), *Kleeberg* (1993), *Clarke* et al. (2006) and *Wagner/Wolpers* (2008) find evidence that investing in a value-weighted market portfolio is not efficient as an optimized portfolio earns a higher return without adding more risk in terms of volatility. Another less sophisticated but more simple and feasible approach to construct a low-volatility portfolio is to rank stocks according to past volatility and sort them into quantiles, deciles, or halves (see for example *Blitz/van Vliet* 2007, *Baker/Haugen* 2012, *Dutt/Humpherey-Jenner* 2013 and *Blitz* et al. 2019). In contrast to those studies, the present study applies both approaches, minimum-variance optimization and portfolio sorting, in order to test whether the low-volatility anomaly is still

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[1] The early study of *Haugen/Heins* (1975) finds that over the long run, portfolios with lower variance in monthly returns yield higher average returns than high variance portfolios. *Haugen/Baker* (1991) create a minimum-variance portfolio that has a higher expected return relative to the market portfolio. Later on, *Blitz/van Vliet* (2007) find that simple historical volatilities result in even stronger evidence of the low-volatility anomaly, compared to CAPM betas. While most of empirical research on the low-volatility anomaly focuses on the U.S. market (see for example *Haugen/Baker* (1991), *Clarke* et al. (2006) and *Baker* et al. (2011), amongst others), international evidence is provided by *Blitz/van Vliet* (2007). They show that the anomaly is robust in the Global, the European and the Japanese stock market. Results for the German equity market are provided by *Kleeberg* (1993) while *Dutt/Humpherey-Jenner* (2013) provide evidence that the anomaly exists in emerging and developed markets around the world.

[2] The present article clearly focuses on risk measured in terms of volatility. Another strand of literature examines the so-called "beta-anomaly" which describes the related phenomenon that high-beta stocks underperform low-beta stocks on a risk-adjusted basis. The beta-anomaly is subject to empirical investigations (see e.g. *Frazzini/Pederson* (2014) and *Cederburg/O'Doherty* (2016)) and theoretical considerations (see e.g. *Buchner/Wagner* (2015)).