

Executive summary

The low risk anomaly proposes that stocks with lower risk perform on average better than stocks with higher risk and contradicts the underlying assumptions and implications of the modern portfolio theory (MPT) introduced by Markowitz (1952) and Capital Asset Pricing Model (CAPM) developed by Sharpe (1964), Lintner (1965), and Mossin (1966). Black, Jensen, and Scholes (1972) found evidence suggesting that the empirical security market line (SML) of the CAPM is flatter than theoretically assumed. Fama and French (1992) and Carhart (1997) exposed another deficiency of the CAPM by proposing that excess returns of stocks are attributed to additional factors. Further studies found evidence supporting the low risk anomaly on a global basis (Ang, Hodrick, Xing, and Zhang (2009)), across asset classes, and over time (Frazzini and Pedersen (2014)). There are several studies proposing possible explanations for the low risk anomaly such as investors preference for positive skewness (Blitz and van Vliet (2007)), return-chasing behavior by mutual fund managers (Karceski (2002)), benchmarks as limits to arbitrage (Baker, Bradley, and Wurgler (2011)), and leverage constraints (Frazzini and Pedersen (2014)).

An empirical analysis is conducted to examine the appearance of the low risk anomaly on the Swiss Performance Index (SPI) from roughly 1999 to December 2019. Daily price data of the SPI and all stocks constituent the Index, and monthly market capitalization data of all stocks are exported from Thomson Datastream. The empirical analysis is divided into two parts since two risk measures are distinguished, the volatility and CAPM beta. These two parts are differentiated further by varying between the market capitalization and equal weighting method to calculate quantile portfolio returns, and two different periods are used to estimate volatility. At the end of each month, quantile portfolios are formed consisting of stocks listed on the SPI ranked on their historical volatility and beta. It is differentiated between 12 and 36 months of historical returns to calculate volatility, and beta is estimated using trailing 36 months of volatility and trailing 60 months of correlations. Monthly returns are computed for each variation of volatility and beta sorted quantile portfolios following portfolio formation over the observation period, and returns are in Swiss franc (CHF). Cumulative returns are compared by demonstrating the development of 1 Swiss franc in each portfolio over time and following simple return performance measures are used to compare the time series of returns of the portfolios: the arithmetic average, Sharpe ratio, CAPM alpha, alphas after controlling

for the Fama and French (1993) factors SMB and HML, and the Carhart (1997) factor MOM. Monthly alphas are estimated using regression analysis, whereas the independent variables are the market risk premium, SMB, HML, and UMD factor. These factors are retrieved from the Kenneth R. French data library.

When comparing the performance of quantile portfolios by cumulative returns, each variation of quantile portfolios show different results. There seems to be no clear evidence supporting the low risk anomaly in the Swiss stock market regardless of measuring risk by volatility or beta and differentiating between market capitalization and equal weighting method. However, there is evidence indicating a positive relationship between ex ante risk level and ex post return. The results are clearer when using simple return performance measures to compare the performance of quantile portfolios. For each variation of volatility and beta sorted quantile portfolios, higher risk portfolios outperform lower risk portfolios. Ex ante risk level seems to have a positive relationship with ex post return. The relationship is stronger for market capitalization weighted portfolios, while there is a tendency for equal weighted portfolios with a medium risk level to perform better in comparison to low or high risk portfolios. In conclusion, my results are inconsistent with current research on the low risk anomaly (Frazzini and Pedersen (2014), Baker and Haugen (2012), and Ang, Hodrick, Xing, and Zhang (2009)). Moreover, my results contradict the low risk anomaly and seem to be consistent with the MPT of Markowitz (1952) and CAPM introduced by Sharpe (1964), Lintner (1965), and Mossin (1966). The difference of the arithmetic averages between the lowest and highest trailing 36 months of volatility market capitalization portfolio is -9.60%, and the annual alpha spread of the lowest versus highest beta equal weighted portfolio amounts to -1.13%.