Executive summary

Problem statement

Many important academic as well as practical applications in finance require reliable risk-adjusted benchmark returns based on an empirically valid asset pricing model to be implemented in a useful way. The accurate evaluation of corporate management and investment managers is one such important practical application. It relies heavily on the correct estimation of the opportunity cost of capital. Event studies in empirical corporate finance rely on robust asset pricing models to calculate the excess returns over the expected returns. The four factor Carhart (1997) model which incorporates the risk factors market, size, value, and momentum has become the industry standard for the mentioned academic and practical applications in financial markets. While state-of the-art and up-to-date data for these empirical risk factors is publicly available for U.S. security markets, this is not the case for Swiss factor data. To address this gap, I provide a step-by-step description of the factor construction process from scratch.

Method

The thesis derives the four Carhart (1997) risk factors for the Swiss equity market by calculating the returns of factor-mimicking portfolios. The Carhart model attempts to predict average excess equilibrium returns for individual securities over the risk-free return with the following four systematic risk factors:

$$E(\tilde{R}_i) - R_f = \beta_{Market}[RMRF] + \beta_{Size}[SMB] + \beta_{Value}[HML] + \beta_{Momentum}[UMD] + e_t$$

where R_f is the short-term risk-free rate of return. RMRF measures the monthly return spread between the market return and the risk-free return. The small minus big (SMB) factor captures the return spread between small and large firms. The high minus low (HML) factor captures the return spread between firms with high and low book-to-market ratios. Up minus down (UMD) measures the return spread between past winners and past losers. The betas represent the security's factor loadings with respect to the individual risk factors. The thesis generally follows the industry-standard factor portfolio construction approach of Fama and French (1993) and Fama and French (2012) but deviates where sensible due to the special characteristics of the Swiss stock market such as the small number of publicly listed firms. To isolate the performance of the individual factors, the securities are sorted three times into

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equally sized groups based on their size, value, and momentum. The sorting leads to a 2x2x2 split which creates eight subportfolios. Based on the classification each firm is then put into one of following unique sorting combinations: SHU, SHD, SLU, SLD, BHU, BHD, BLU, or BLD. For example, the BLD portfolio consists of firms which are larger than the median size (big), have a lower than the median book-to-market ratio (low), and underperformed the median firm over the last 12 months (down).

In contrast to other empirical research of Swiss multi-factor models such as Ammann and Steiner (2008) as well as Schmidt et al. (2017) this thesis tries to extend the evidence by using data from the Thomson Reuters Datastream (TRD) as well as the Bloomberg database. The dual database approach is unique to studies analyzing Swiss factor premiums. I obtain a survivorship bias free data sample by incorporating data on all Swiss equity securities ever covered in the TRD and Bloomberg database from November 1989 through December 2017. Further, I test if Swiss factors perform similarly as the European and U.S. factors. The Swiss factors are compared to the mentioned foreign factors in local currency as well as on a currency adjusted basis in Swiss francs. The currency adjustments test if currency movements help explain differences between the markets' factor returns.

Results

This thesis provides the four Carhart (1997) factors market, size, value, and momentum for the Swiss stock market over the December 1990 to December 2017 period. In line with other recent research on factor premiums it finds strong evidence in favor of positive and persistent market and momentum premiums with an annualized mean return of 9.40% for the market factor and 6.70% for the momentum factor. The value premium is significantly smaller with an annualized premium of 2.70%. Size performs slightly negative with an annual mean return of −0.03%. Further, it compares the obtained results to other benchmark studies focusing on the Swiss stock market. The study reports Swiss factor data which is similar to the results of Ammann and Steiner (2008) as well as Schmidt et al. (2017).

In line with the results of Fama and French (1998), Griffin (2002), and Fama and French (2017) I find that the international market integration assumption with respect to global factors must be rejected. Furthermore, the thesis provides fruitful avenues for further research on the performance of empirical asset pricing models in the Swiss stock market as well as the effect of different currency regimes on factor correlations across different markets.