5. Empirical Part I – Testing for Predictability

5.1. Hypothesis I

The returns of the Fama-French factor-mimicking Portfolios or of components of these portfolios follow a random walk.

Chapter 5 presents tests of the above-stated hypothesis, which is derived from the research question formulated in the introduction. Besides the motivation outlined along the formulation of the first research question, there are additional factors which favour tests of predictability based on past returns. As shown in the literature review, there is an extensive number of potential forecasting variables and some of them seem to have promising forecasting power. However, each of them has its drawbacks. A major constraint for Swiss companies is data availability. There are almost no such long-time series available, as there are for US data, which makes it difficult to test certain variables since no sufficient sample can be gathered. This is especially true for the company level or for certain market segments. However, with respect to the effects of the real economy on return predictability, a market segment perspective seems important. Another challenge is the data frequency. Some variables such as accounting numbers are updated only one to four times a year. Additionally, historical practices contribute to a low data frequency. For instance, it is common for Swiss companies to pay dividends on an annual basis rather than each quarter. Moreover, some time series of the above-mentioned variables are difficult to handle econometrically. Testing the Random Walk Hypothesis might overcome some of the stated problems.

5.2. Autocorrelation Coefficients and Variance Ratios

There is a difference between the research question stated in the introduction and the hypothesis outlined above. The research question allows for cross-serial correlation,
while the hypothesis focuses on autocorrelation. The reason is the so-called implied cross-autocorrelation, given in equation (9).

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(9) \quad corr(R_{it}, R_{j,t-1}) = corr(R_{it}, R_{jt}) \cdot corr(R_{it}, R_{jt-1})
\]

Boudoukh, Richardson, and Whitelaw (1994) argue that cross-serial correlation \( corr(R_{it}, R_{j,t-1}) \) between two portfolios \( i \) and \( j \) can be determined by a portfolio’s own autocorrelation \( corr(R_{it}, R_{j,t}) \) and the contemporaneous correlation \( corr(R_{it}, R_{jt}) \) between the two portfolios. As the relationship between the contemporaneous correlation and the serial correlation is multiplicative a test of autocorrelation or contemporaneous correlation might be sufficient in order to answer the research question.

As Table 6 of the previous chapter indicates, there is considerable contemporaneous correlation among the portfolios. Thus, with the above formula in mind, a test of contemporaneous correlation does not seem promising. Moreover, it seems implausible to test for no contemporaneous correlation among stock returns as it is well documented in the literature. In contrast, testing whether the portfolios’ returns follow a random walk may be a more appealing approach. Nevertheless, implied cross-autocorrelation might deviate from empirical cross-serial correlations. Therefore, in Chapter 6, with forecasting and investment strategies in view, I provide the empirical values and compare them to the results obtained by (9).

There are several approaches which may be applied in order to test for serial correlation. However, there might be more tests which can be applied to test RW1 than possible tests for RW2 or RW3. In the following, I will focus on one test for RW1 and one test which can be adjusted to test the RW3 model, which is the most general model. Hence, a rejection of RW3 would yield the strongest evidence against the Random Walk Hypothesis. Moreover, RW3 is the one most tested in the more recent literature.