Executive Summary

Problem

The Dividend Growth Model (DGM) is a commonly used instrument, which indicates the intrinsic value of a stock. The intrinsic value thereby is the present value of the sum of all expected future dividends. The growth rate for these future dividends is assumed to be exponential for the "standard" Dividend Growth Model (Gordon Growth Model, $sDGM$) and linear for a "modified" Dividend Growth Model ($mDGM$). Balschun and Schindler (2015) introduced the $mDGM$ to account for some of the criticism towards the in practice often applied $sDGM$. The use of linear growth seems to be more suitable for mature firms, as exponential growth appears unrealistic in most cases. The first section is concerned with introducing the $sDGM$ and $mDGM$ and highlighting their differences. After that, the dividend distribution behavior is discussed first in general, and later on a country-specific level. The main part of this paper serves to analyse if the application of the $sDGM$ respectively the $mDGM$ can be utilized profitably in terms of risk-adjusted excess returns within the German market. The empirical analysis includes an overview of the used historical data, followed by a detailed account of the empirical results. The findings of the main part, then are compared to the results obtained for Switzerland (A. Zgraggen, 2016) as well as Taiwan (S. Zgraggen, 2018).

Method

The German stock market sample consists of the constituents of the Hundert Deutscher Aktien Index (HDAX), which are included at any time between January 2003 and December 2019. The HDAX is a combination of different selection indices, which include large- and mid-sized companies. After a few adjustments, the sample includes 195 companies. For the empirical analysis, six different portfolios are constructed with the data downloaded from Bloomberg. Consisting of three different types (*high-deviation*, *low-deviation* and *long-short*) of portfolios and two different weightings (equally and market value weighted). The deviation measures used to distinguish high from low deviation stocks is the ratio of intrinsic value to the actual stock price. According to their deviation measure, the 10 highest ranked stocks are relatively most undervalued and are included in the *high-deviation* portfolio. The 10 lowest ranked stocks according to their deviation measure are relatively most overvalued and are included in the *low-deviation* portfolio. The *long-short* portfolio is constructed by holding a long position in the *high-deviation* portfolio and a short position in the corresponding *low-deviation* portfolio.

To test, if risk-adjusted excess returns can be generated by the before introduced portfolios, three different benchmark models have been used in the regressions. The first, being the Capital Asset Pricing Model (CAPM) by Sharpe (1964) and Lintner (1965), which controls for the excess return of the market portfolio compared to the risk-free rate. Secondly, the three-factor model of Fama and French (1993) is used, which includes two additional factors that control for the size and market-to-book ratio of a company. The last applied model by Carhart (1997) enhanced the three-factor model by a momentum component. In the regression European risk factors are applied. To test the robustness of the obtained results, various adjustments are implemented. In the last step, the results are compared to those found for Switzerland and Taiwan.

Results

The *high-deviation* portfolios have a higher market capitalization, compared to the *low-deviation* portfolios. This relationship also applies to the median dividend yield, which lies between 3% and 4% for the *high-deviation* portfolios and between 1% and 2% for the *low-deviation* portfolios. The sustainable growth rate takes on median values between 3% and 9% and is again higher for the *high-deviation* portfolios. The median cost of equity, for the *low-deviation* portfolios is 11%, whereas the *high-deviation* portfolios display lower values that range from 8% to 10%. Thus, indicating a higher risk exposure for the *low-deviation* portfolios.

Different regression results yield promising results, especially for the equally weighted *high-deviation* portfolio based on the $mDGM$. Significant annualized alphas of over 12% can be observed, even if round-trip transaction costs of 1% are included in the regression. The portfolios calculated with the $sDGM$ displayed intercepts lower in size that are less or not significant. Furthermore, the applied models show a very low to non-existent explanatory power for the excess returns of *long-short* portfolios, and thus, no significant intercepts can be identified. In addition, the results are subjected to different robustness checks. They are mostly robust for adjustments concerning transaction costs, portfolio composition, country-specific risk factors, and in most cases, the time-dependent sub-samples. Nevertheless, the results are highly dependent on the used variables and the assumptions they are based on, as they can change the outcome significantly.

Evaluation

The German stock market appears to be inefficient in the semi-strong form, as information regarding dividends can be used to outperform the market. However, Fama (1970) states that these supposed anomalies are caused by the used technique or even by chance and will disappear over time. The results show that the DGM seems to be more suitable for developed countries, as for both Germany and Switzerland, significant positive alphas can be observed. In contrast, in Taiwan, only very few significant results are discovered. Therefore, the value added by using the $sDGM$ and $mDGM$ appears to be connected to a country's characteristics.

The generalisability of these results is subject to certain limitations. For instance, European factors are used, even though many researchers advocate using country-specific factors to increase the explanatory power of a model (e.g. Fama and French (1998), Griffin (2002) and Hou, Karolyi, and Kho (2011)). Brückner, Lehmann, Schmidt, and Stehle (2015b) on the other hand, point out that in Germany, the risk factor data sets differ considerably, leading to varying results. Secondly, the data downloaded from Bloomberg could include incorrect data, leading to a distortion of the results. Thirdly, the thesis uses rather simplistic models and different results may be observed by using more complex models (e.g the enhanced dividend model by Irons (2014)). Moreover, the practical relevance may be limited by other factors such as additional fees or taxes, as they reduce the observed excess returns.

There are several aspects of this thesis that could be explored in further research. First, different factor data sets for Germany could be applied to test if the results remain significant and how large the discrepancy between the different outcomes is. Secondly, a prolonged sample

period, which includes the Dotcom Bubble and the recent Corona crisis, would be interesting. This would further insight into how the portfolios based on the $sDGM$ and $mDGM$ perform during times with higher market volatility. Finally, testing the DGM in an additional emerging country may help identify characteristics, which influence the successful application of the DGM in the portfolio management process.