Problem

Since Gordon (Source) proposed the Gordon Growth Model, which will be referred to as the "standard" Dividend Growth Model (sDGM) in this paper, numerous other scholars have proposed additional Dividend Growth Models (DGM) to combat the weaknesses of his formula. There are two flaws in his formula, firstly, an exponential growth pattern into perpetuity is assumed, and secondly, the discount rate must be bigger than the growth rate. Balschun and Schindler (Source) presented the "modified" Dividend Growth Model (mDGM), which elevates the flaws of the sDGM, as the mDGM provides a linear growth pattern as well as the discount rate being able to be smaller than the growth rate.

The introductory part presents an overview of the numerous proposed other DGMs. However, a focus lies on the difference between the sDGM and mDGM. The main objective is to determine if it is possible to generate risk-adjusted excess returns with a systematic usage of the sDGM and mDGM in the stock markets of North America to enhance the portfolio management process.

A few similar, however less extensive, and always somewhat lacking theses' regarding wide-scale empirical evidence have been made. Examples are Sorensen (Source) and Montreal (Source). Also, they solely analysed the sDGM. However, AZ (Source) has examined the sDGM and mDGM for the Swiss stock market. Her thesis implied the potential for long and long-short portfolios based on the mDGM to provide value regarding risk-adjusted excess returns. Furthermore, more empirical research is needed to compare the sDGM and mDGM, as it might be a more optimal and realistic valuation approach. Therefore, this thesis can provide further evidence about the sDGM and mDGM.

Method

As a data sample, the S&P500 represented the North American stock markets best. Furthermore, a period of 20 years from 2003 until 2022 was chosen, which captures a variety of market conditions. All ISINs were exported from Bloomberg for the said period. However, some ISINs were wrong or not compatible with Refinitiv. Therefore they had to be adjusted. In total, 940 stocks were accounted for. Though, under those stocks, there are some with multiple share classes. If the two shares were in the same portfolio, this problem would have been accounted for by investing the capital of the stock into the next best stock according to the DEV measure. Furthermore, if a stock got delisted during the year, it was assumed that its

invested capital would be distributed equally to the other stocks, according to the portfolio weighting method.

A descriptive analysis was conducted, which highlighted some possible issues which later turned out to be relevant. Namely, the growth rates were extremely high compared to the cost of equity (COE). Exempli gratia (e.g.), the average sustainable growth rate is 23%, and the average COE is 11%. This results in many DEV values based on the sDGM being unable to be calculated. Additionally, it results in some relatively high DEV values, which isn't necessarily a problem. It was assumed that the DEV values are correct in their direction (over- and undervaluation) and in the subsequent rankings of the stocks based on the DEV measure.
In total, there are 12 different portfolio types generated by the mixtures of different attributes (strategy, DGM model and weighting). The possible strategies are called "long", meaning you invest in stocks with high DEV values, "short", meaning you invest in stocks with low DEV values, and a "long-short" strategy, which is supposed to be market neutral and uses a combination of the two other strategies. Furthermore, the portfolio types are based on the sDGM or the mDGM and are equally or market weighted. The portfolio was constructed every year on the 31st of December between 2002 and 2021 and rebalanced monthly from January until November between 2003 and 2022.

The standard input parameters to calculate the DEV measure are assumed to be dividends per share (DPS), cost of equity (COE) and the sustainable growth rate (g_{sust}) for the growth.
For measuring excess returns, the excess returns have been regressed onto the factors by Sharpe (Source), 3FM and 4FM. After analysing the excess returns, robustness tests have been made to ensure the validity and consistency of the results.

Key Findings

According to the excess return analysis, the short portfolios and portfolios based on the sDGM provide no significant alpha. However, the long portfolios, respectively the long-short portfolios based on the mDGM, give significant results risk-adjusted returns between 4.74% and 6.57%, respectively 9.51% and 11.25%. As expected, the factor coefficients for the market risk premium are positive for the long portfolios and negative for the short portfolios. However, for the long-short portfolios, the coefficients are negative, implying that the long-short portfolios, in fact, aren't market neutral. The risk-adjusted excess returns are more significant and around 1% higher in EW than in MW portfolios. Afterwards, robustness tests for the input parameters and assumptions were made to verify the consistency and validity of the results.

Again, the portfolios based on the sDGM were insignificant. On the other hand, the EW portfolios based on the mDGM were mainly significant, especially the long portfolios.

Implications and Limitations

The key findings of this thesis support AZ (Sourec) and Balschun (Source). There indeed might be potential in a wide-use application of the mDGM as it seems to overcome the weakness of the sDGM even in practice.

However, there are some limitations with the data sample. For one, the data might be inaccurate and misrepresentative due to false data, respectively, data snooping, even though the robustness test should have restricted this limitation as much as possible.

Additionally, the sustainable growth rate (on average 23%) often exceeds the COE (on average 11%). These DEV values are, therefore, unable to be calculated. In turn, the investment universe for the sDGM shrinks in practice. It often hovers at around 100 of 500 possible stocks, potentially restricting promising investments otherwise. This might present unrealistic DEV values for both DEV values based on the sDGM and mDGM (even if the mDGM has a linear growth pattern). Consequently, the sDGM is less applicable in environments with high growth rates. To adjust for this problem slightly, the sustainable growth rates were adjusted to values between 0% and 30%.

Also, the S&P500 might not be representative of the entire region of North America, and the mDGM presents value in combination with the DEV measure, but that doesn't necessarily imply that they also can value stocks accurately, instead that they can do so on a relative scale. Additionally, shorting stocks isn't always as easy in practice due to regulations and restrictions by the broker, transaction costs (they are near zero for the USA anyways), taxes, and market liquidity weren't considered and might impact the excess returns substantially.

Further research would be interesting for the DEV measure based on the sDGM and mDGM, like Sorensen and Break Relationship (Source). It would be beneficial to have current research regarding whether the DEV measure only works directionally or as a valuation tool. Additionally, it would be interesting to see the practical adoption of the mDGM and if it can uphold its significance in other environments.