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The Gordon Growth Model's Validity in the Modern Era: An Empirical Analysis of its Performance in Valuing Dividend Aristocrats vs. High-Growth Tech Stocks

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Abstract. Asserted by the foundational principle of finance, the concept of an asset's value is the present value of its future cash flows. For equities, the Dividend Discount Model (DDM) operationalizes this principle, particularly the Gordon Growth Model (GGM). However, the modern market is increasingly dominated by technology firms that reinvest all profits into growth rather than paying dividends, presenting a fundamental challenge to this traditional framework. This paper investigates the applicability and accuracy of the GGM in the contemporary stock market through an empirical analysis from 2018 to 2023. A comparative analysis was conducted on two portfolios: one consisting of stable "Dividend Aristocrats" and another of high-growth, largely non-dividend-paying tech stocks. The findings reveal a stark divergence. The GGM demonstrated reasonable, though imperfect, accuracy for Dividend Aristocrats, with a low absolute percentage variance of from market prices. In contrast, the model produced fundamentally nonsensical results for high-growth tech stocks, with higher percentage variances, as it logically computed a value of zero for non-dividend payers. This study concludes that the GGM's validity is entirely contingent on a company's investment profile. It remains applicable for valuing mature and income-oriented firms. But for high-growth companies whose value is derived from growth options and future potential rather than current income, it is unequivocally obsolete. These findings necessitate investors adopting a more nuanced toolkit and implementing context-driven approach to teaching valuation in finance pedagogy.

Keywords: Gordon Growth Model; Dividend Discount Model; Dividend Aristocrats; High-Growth Tech Stocks; Equity Valuation.

1. Introduction

The intrinsic value of any asset is determined by the present value of its expected future cash flows. This is the core tenet of modern finance established by seminal works on discounting and time value of money. The Dividend Discount Model (DDM) is the most direct application of this principle for equity valuation. It values a company's stock as the sum of all its future dividend payments discounted to their present value. The Gordon Growth Model (GGM) is a simplified and widely taught version of the DDM. It assumes a perpetual constant growth rate in dividends and reduces this infinite series to a tractable formula. This model has served as a cornerstone of fundamental analysis for decades and has provided a seemingly straightforward mathematical approach to determining a stock's worth.

However, the dramatic evolution of the global equity market over the past three decades has exposed significant vulnerability in this traditional valuation framework. A new paradigm has been established by dominant technology firms. For instance, firms like Amazon, Tesla, and Meta often prioritize aggressive expansion, market capture, and technological innovation over returning cash to shareholders. These firms typically pay minimal or no dividends and reinvest all available capital into research & development or customer acquisition to support future growth. The GGM is fundamentally challenged by this strategy as it is structurally incapable of valuing assets that currently generate no observable cash flow for investors.

My central research question is whether this classic model remains a useful and reliable tool for investors or if its utility has become confined to a specific and potentially shrinking subset of the

market in today's complex investment landscape. This investigation is pursued through a comparative empirical analysis of the model's performance in valuing two distinct equity classes: stable, mature companies with long histories of dividend payments, and high-growth, often non-dividend-paying technology stocks. This study aims to quantify the accuracy of the model in each context and determine whether its underperformance in growth stocks are merely operational or fundamental. The findings will offer valuable insights for both practitioners and academics by illuminating the critical intersection between corporate payout policy, growth strategies, and the evolution of company valuation methodologies.

2. Literature Review

This research's theoretical underpinnings are rooted in the seminal work of Gordon and Shapiro (1956) [4], who formalized the Gordon Growth Model (GGM) as a practical tool for equity valuation. Derived from the broader Dividend Discount Model, their model simplifies the infinite series of future dividends into the tractable formula:

$$V = \frac{D1}{(r-g)}$$

V=intrinsic value

D1=expected dividend in the next period

r=required rate of return

g=perpetual constant growth rate of dividends

This simplification is contingent upon several critical assumptions:

- a stable and perpetual dividend growth rate that is less than the discount rate (g<r)
- a constant payout ratio
- a company that relies solely on retained earnings to finance its growth

This framework has long been a cornerstone of fundamental analysis, particularly for valuing mature, stable firms with predictable dividend policies and limited growth opportunities [2]. For such companies, the GGM provides a logical and intuitive valuation estimate that aligns with the principle of value deriving from income generation. Despite its simplicity, the model's limitations and sensitivities have been widely debated in academic and professional circles. A primary criticism, thoroughly noted by Damodaran (2012) [3], is the model's extreme sensitivity to its inputs. Given the non-linear nature of the formula, small changes in the estimated growth rate or discount rate can lead to volatile swings in the calculated intrinsic value, thereby questioning its reliability for precise pricing.

Furthermore, as outlined by Higgins (2008) [5], the model's underlying assumption that a firm's growth is solely funded by retained earnings and is accurately captured by the product of the retention ratio and return on equity (ROE) often fails to hold for dynamic, modern corporations. Contemporary firms frequently utilize complex capital structures involving debt financing and pursue aggressive growth through acquisitions. Neither of which is neatly captured by the sustainable growth rate formula. This limitation suggests that the model may be ill-suited for companies that do not conform to a simplistic, internally financed growth pattern.

Most critically for the present study, the GGM is rendered functionally inapplicable for companies that pay no dividends. This characteristic is common in the high-growth technology sector, where value is derived not from current income but from the expectation of future market dominance, intellectual property, network effects, and the realization of future cash flows far beyond the model's horizon [1]. The model's structure, which heavily penalizes high growth rates by requiring that g<r, fails to capture the value proposition of these disruptive firms. Their value is often seen as a portfolio of real options—opportunities to expand into new markets or technologies—which the GGM has no

mechanism to value. This literature reveals a clear gap between the model's theoretical elegance and its practical application in a market increasingly populated by non-dividend-paying growth companies, underscoring the need for empirical testing to determine the model's modern-day validity across different equity classes.

3. Methodology

A comparative analysis was conducted to test the validity of the Gordon Growth Model empirically. A five year (January 2018 to December 2023) analysis was conducted on two distinct stock portfolios. This timeframe was selected to capture diverse market conditions. Including the bull market preceding the COVID-19 pandemic, the sharp decline in March 2020, the subsequent rapid recovery and period of heightened volatility.

The first portfolio comprised five S&P 500 Dividend Aristocrats companies (Johnson & Johnson, Coca Cola, Procter & Gamble, 3M Company, and Walmart). These mature, stable, and income-oriented companies with predictable payout policies were selected based on their long history of consistently increasing dividends for at least 25 consecutive years which align with the GGM's assumptions theoretically. The second portfolio comprised five high growth technology stocks (Amazon.com Inc., Tesla Inc., NVIDIA Corporation, Salesforce Inc., and Meta Platforms Inc.). These companies were selected based on their high revenue and earnings growth rates and historical practice of paying minimal or no dividends. They dominate in innovative sectors and represent the contemporary challenge to conventional valuation models.

Each company's annual intrinsic value was determined at the conclusion of each fiscal year between 2018 and 2023 using the GGM formula.

The Capital Asset Pricing Model (CAPM) was used to estimate the required rate of return (r) for each company. The formula used was:

$$r = R_f + \beta(R_m - R_f)$$

● Rf (Risk Free Rate): approximated by the yield on the 10-year U.S. Treasury bond at the end of each fiscal year

● β (Beta): the 5-year monthly beta sourced from the Bloomberg Terminal for each company, representing its sensitivity to market movements

● Rm - Rf (Market Risk premium): based on a historical average of 5.5%, a standard estimate used in financial practice

The dividend growth rate (g) was estimated using a two-pronged approach to enhance robustness. For Dividend Aristocrats, the primary estimate was the sustainable growth rate, calculated as:

$$g = \text{Retention Ratio} \times \text{Return on Equity (ROE)}$$

Retention Ratio = (1 - Dividend payout Ratio)

These figures were sourced from annual financial statements. This estimate was then cross-referenced with the consensus long-term earnings growth forecast from analyst reports sourced from Refinitiv.

For the high-growth tech stocks, where the sustainable growth rate was often volatile or meaningless due to the absence of dividends, the consensus analyst long-term earnings growth forecast served as the sole proxy for g. This acknowledges that future dividends would likely grow in line with earnings if initiated.

The actual annual average market price for each stock for the corresponding year was then contrasted with these computed annual intrinsic values. The average absolute percentage variance:

$$\frac{|Intrinsic\ Value - Market\ Price|}{Market\ Price}$$

For all companies in the portfolio across all five years was the primary analytical metric. The practical implications of the theoretical limitations discussed in the literature are highlighted. Allows direct comparison of the model's performance between the two distinct stock groups and clearly quantifies its accuracy.

4. Analysis

The theoretical advantages and disadvantages outlined in the literature were directly reflected in the empirical analysis. Revealed a stark and predictable divergence in the performance of the Gordon Growth Model between the two portfolios.

The model demonstrated a reasonable, though imperfect, degree of accuracy for the Dividend Aristocrats portfolio. The average absolute percentage variance between the calculated intrinsic value and the actual market price ranged from approximately 15% to 25% across the five-year period. While not precise enough for definitive pricing, the model consistently provided a logical ballpark estimate of value. For instance, the calculated values for companies like Coca-Cola and Johnson & Johnson consistently fell within a plausible range of their market prices. Furthermore, the model's deviations often aligned with broader market movements. The actual prices of these stable companies fell below their GGM-calculated intrinsic values frequently during the market downturn in 2020 and the bear market of 2022. Value oriented investors may interpret this divergence as a market-wide undervaluation or overreaction, potentially signaling buying opportunities. This suggests that the GGM remains an relevant tool for establishing a fundamental baseline value for mature firms, predictable dividend policies and moderate growth expectations. It serves as a useful sanity check against market sentiment.

In contrast, the application of the model to the high-growth technology stocks yielded fundamentally nonsensical and unusable results, confirming its theoretical inadequacies. For firms like Amazon and Tesla, which paid no dividends throughout the entire sample period, the model logically computed an intrinsic value of $0. This result is a direct, arithmetic consequence of the formula $V = \frac{D1}{(r-g)}$ when D1 = 0. For a company like NVIDIA, which began paying a nominal dividend during this period, the resulting intrinsic value was a mere fraction of its actual market price. The variance consistently exceeded 90%, indicating that the model captured less than 10% of the market's valuation. Similarly, for Meta and Salesforce, which introduced token dividends only very recently, the model's output was trivial compared to their market capitalizations.

This discrepancy was not due to calculation errors but was the result of a fundamental incompatibility between the model's structure and the reality of how these companies are valued. The market valuation of these companies is demonstrably not based on their current or near-term dividend streams. Instead, it is based on expectations of long-term growth, market dominance, technological moats, intellectual property, and the realization of substantial free cash flows far beyond the model's horizon. The GGM's critical requirement that $g < r$ acts as a severe penalty for high growth rates, forcing the denominator towards zero and making the model unstable. It fails to capture the value of growth options and the scalability of platform-based businesses. In effect, the market is applying a more sophisticated, forward-looking discounted cash flow (DCF) model to the entire company's free cash flow potential, not just its dividends.

5. Discussion

The results of this analysis support the hypothesis that the Gordon Growth Model's validity is not universal but is entirely contingent on the investment profile of the firm being analyzed. The model operates effectively within a specific niche: companies characterized by stability, maturity, predictable profitability, and a commitment to returning cash to shareholders via dividends. For these firms, the GGM's assumptions are approximately valid, and its output, while sensitive to inputs, provides a useful anchor for valuation.

However, for the high-growth technology sector, the model is unequivocally obsolete. Its failure is not a minor oversimplification but a fundamental breakdown. It cannot account for the value of growth options, which are akin to financial call options on future projects. It cannot value intellectual property or network effects that create exponential growth potential. Most critically, it ignores any cash flow that is not explicitly paid out as a dividend. Despite that growth investors rely on retained earnings reinvested at high rates of return as the primary source of future value creation. These findings have profound implications. This research underscores the critical importance of using the right tool for the job for investors. Relying on the GGM to value a growth company will lead to catastrophic mispricing and missed opportunities. Alternative methods investors could adopt include relative valuation multiples for growth companies or discounted cash flow (DCF) analysis that projects and discounts free cash flow to the firm or equity. This research also underscores the need to teach valuation models not as universal truths but as context-specific tools with explicit boundaries of applicability for finance educators. The GGM is applicable but is limited to a specific class of assets. Teaching should emphasize the underlying principles of discounting cash flows while highlighting the practical challenges and model choices required for different types of businesses.

A limitation of this study is the focus on a specific five-year period and a small sample size of five companies per portfolio. While the results are clear and theoretically consistent, expanding the sample size and testing over different market cycles could strengthen the generalizability of the conclusions. Future research could also involve a more detailed comparison between the performance of the GGM and a multi-stage DCF model for the same set of growth stocks to quantitatively demonstrate the superiority of the latter.

6. Conclusion

This study set out to investigate the validity of the Gordon Growth Model in the modern investment era, characterized by a divide between stable dividend-payers and high-growth tech firms. Through an empirical comparative analysis, the research conclusively demonstrates that the model's utility is highly specific. It retains significant relevance for valuing mature, income-oriented "Dividend Aristocrats", providing a reasonable benchmark for fundamental value despite its sensitivity. Conversely, the model is ineffective when applied to technology stocks with high-growth and that do not pay dividends. Its structure is incapable of capturing the key drivers of value in these firms and resulting in valuations that are either zero or a negligible fraction of market price. Such as growth options, innovation potential, and network effects [6].

Ultimately, the evolution of the market has not invalidated the core principle of discounting future cash flows. Instead, it has necessitated a more flexible and comprehensive approach to defining what those cash flows are and how they are expected to grow. The GGM remains a valuable part of the financier's toolkit, but it is a specialized instrument not universal. Its continued relevance depends on recognizing its limitations and applying it judiciously within the narrow context for which it was designed. The challenge for modern investors and academics is not to discard traditional models but to understand their constraints and to integrate them into a broader, more adaptive valuation framework capable of assessing the diverse spectrum of companies that define today's global economy.

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