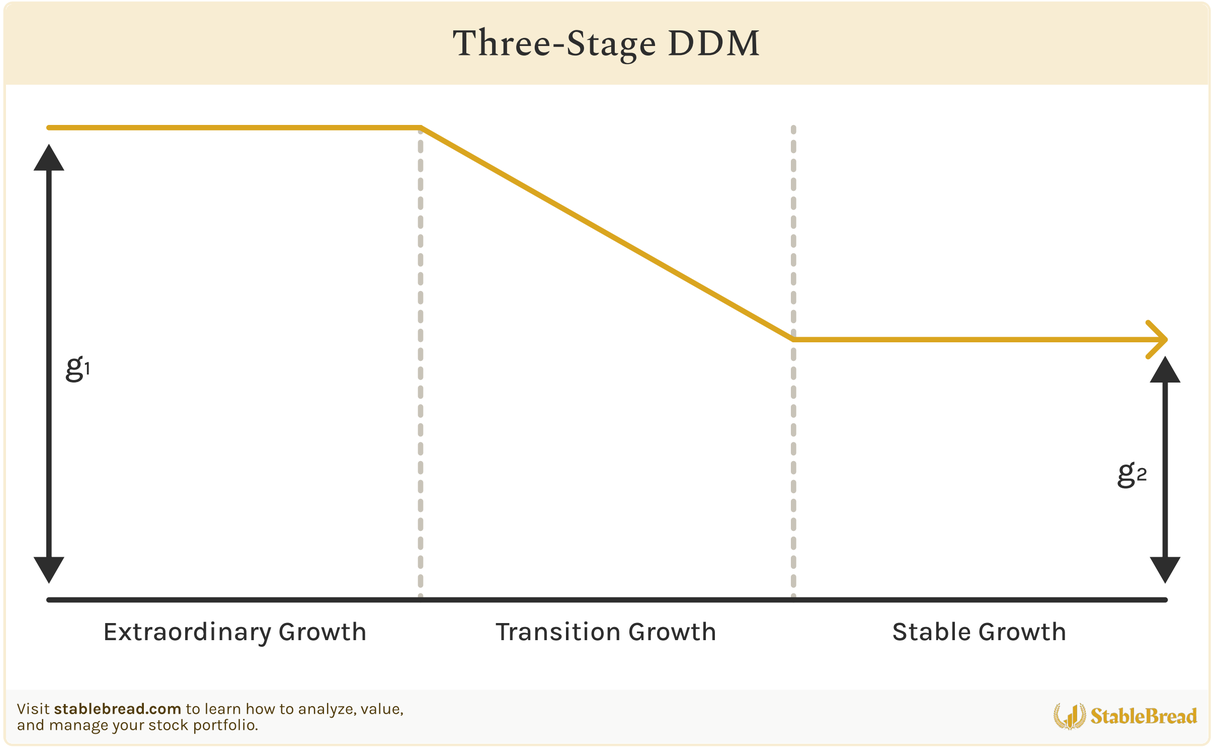
Three-Stage Dividend Discount Model

Three-Stage DDM Explained

Three-Stage Dividend Discount Model (DDM) combines features from the Two-Stage DDM and the H-Model, making it the most intricate DDM.

This model encompasses three distinct growth phases: initial extraordinary growth, a transitional change in growth, and a final phase of stable growth into perpetuity.

Present value is calculated by discounting dividends across all phases: initial extraordinary growth, a transitional phase with changing rates, and the final stable growth phase.



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Three-Stage DDM Formulas

There are two formulas investors can use to calculate the Three-Stage DDM:

Three-Stage DDM Formula #1

The first formula provides a more direct approach and maintains a constant discount rate:

$$\mathrm{PV}_0 = \sum_{t=1}^{t=n} \frac{\mathrm{DPS}_0 \times (1+\mathrm{g}_1)^t}{(1+\mathrm{r_e})^t} + \frac{\mathrm{DPS}_n \times (1+\mathrm{g}_2) + \mathrm{DPS}_n \times \mathrm{H} \times (\mathrm{g}_1 - \mathrm{g}_2)}{(\mathrm{r_e} - \mathrm{g}_2) \times (1+\mathrm{r_e})^n}$$

where:

- PV_0 = present value (at year 0)
- DPS_0 = annual dividends per share (at year 0)
- DPS_n = expected dividend at the end of the extraordinary growth phase
- n = final year of first-stage dividend growth (i.e., when dividend growth rate changes from g_1 to g_2)
- H = one-half the duration of the transitional period
- g_1 = extraordinary dividend growth rate (first stage)
- g_2 = perpetual dividend growth rate (third/final stage)
- r_e = discount rate (cost of equity)

Three-Stage DDM Formula #2

The second formula has variations in earnings, dividend payouts, and discount rates across all three phases:

$$\mathrm{PV}_0 = \sum_{t=1}^{t=n_1} \frac{\mathrm{EPS}_0 \times (1+\mathrm{g}_1)^t \times \mathrm{DPR}_1}{(1+\mathrm{r}_{\mathrm{e},1})^t} + \sum_{t=n_1+1}^{t=n_2} \frac{\mathrm{DPS}_t}{(1+\mathrm{r}_{\mathrm{e},2})^t} + \frac{\mathrm{EPS}_{n_2} \times (1+\mathrm{g}_2) \times \mathrm{DPR}_2}{(\mathrm{r}_{\mathrm{e},3} - \mathrm{g}_2) \times (1+\mathrm{r_e})^n}$$

where:

- EPS_0 = earnings per share (at year 0)
- EPS_{n2} = earnings per share at the end of transition phase
- DPR_1 = dividend payout ratio in extraordinary growth phase
- DPR_2 = dividend payout ratio in stable growth phase
- n_1 = final year of the extraordinary growth phase where the dividend growth rate is g_1
- n_2 = year when the stable growth rate g_2 takes effect after the transition phase
- $r_{e,1}$ = discount rate (cost of equity) in extraordinary growth phase
- $r_{e,2}$ = discount rate (cost of equity) in transition phase
- $r_{e,3}$ = discount rate (cost of equity) in stable growth phase

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Three-Stage DDM Assumptions

- **Initial Extraordinary Growth Phase With Defined Duration**: Begins with high, low, or negative growth due to factors like expansion or restructuring, where defining the duration is crucial for valuation.
- **Linear Transition to Stable Growth**: Assumes a gradual shift in growth and discount rates, with changing dividend payout ratios, reflecting adjusted risk and reinvestment needs as the company matures.
- **Correlation Between Dividend Payout Ratio and Growth Rate**: Suggests variable dividend payout ratios depending on growth phases, with higher ratios in stability and lower during high growth.
- **Risk Profile, Cost of Capital, and Financial Policy Adjustments**: Expects adjustments in risk profile, cost of capital, and financial policies across growth stages, with a decreasing cost of equity moving towards stability.

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Three-Stage DDM Relevant Applications

- **Dividend Alignment and Initial Extraordinary Growth**: Suitable for companies in extraordinary growth phases with dividends closely aligned with free cash flow to equity (FCFE).
- **Gradual Growth Rate Decline and Stable Leverage**: Excels in capturing gradual growth rate reductions in maturing firms, coupled with stable leverage, reflecting consistent financial strategies.
- **Adaptability to Payout and Risk Profile Shifts**: Ideal for fast-growing firms undergoing changes in dividend policies and risk profiles, capturing their transition to sustainable growth.
- **Realistic Business Lifecycle Representation**: Effectively mirrors business cycles, especially for companies initially experiencing high growth due to innovation or market dominance, adapting to their evolving growth dynamics.

Three-Stage DDM Limitations

- **Complexity and Sensitivity in Estimating Inputs**: Requires precise estimations of inputs like payout ratios, growth rates, and betas, with sensitivity to these estimates leading to valuation inaccuracies.
- **Challenges in Defining Growth Phase Durations**: Determining the length of growth phases, particularly the extraordinary growth and transition periods, is challenging and prone to misvaluation due to the difficulty in translating qualitative analyses into exact timeframes.
- **Oversimplification of Growth Transition**: The assumption of a linear transition from high to stable growth may not reflect the complex and sometimes non-linear nature of real-world growth changes.
- **Predicting Future Dividend Growth**: Forecasting dividend growth during the early high growth phase can be difficult, since companies typically reinvest profits instead of distributing significant dividends.

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