Lecture 1

INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

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Chapter Name: Valuation models

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1 Types of valuation models

Absolute valuation model

- **Absolute valuation models** attempt to find the intrinsic or "true" value of an investment based only on fundamentals. Looking at fundamentals simply means you would only focus on such things as dividends, cash flow, and the growth rate for a single company, and not worry about any other companies. Valuation models that fall into this category include the dividend discount model, discounted cash flow model, residual income model, and asset-based model.

Relative valuation model

- **Relative valuation models,** in contrast, operate by comparing the company in question to other similar companies. These methods involve calculating multiples and ratios, such as the price-to-earnings multiple, and comparing them to the multiples of similar companies.

2 Absolute valuation models

An absolute valuation model is a model that specifies an asset 's intrinsic value. Such models are used to produce an estimate of value that can be compared with the asset 's market price

There are different types of absolute valuation models used. They are as follows:

1. Dividend discount model
2. Discounted residual Income method
3. Discounted FCF method

2.1 Discounted cash flow model

Discounted cash flow (DCF) refers to a valuation method that estimates the value of an investment using its expected future cash flows.

They are a fundamental tool in both investment management and investment research.

Four broad steps in applying DCF analysis to equity valuation are:

1. Choosing the class of DCF model — equivalently, selecting a specific definition of cash flow.
2. Forecasting the cash flows.
3. Choosing a discount rate methodology.
4. Estimating the discount rate.

2.2 Dividend discount model

The dividend discount model (DDM) is a quantitative method used for predicting the price of a company's stock based on the theory that its present-day price is worth the sum of all its future dividend payments when discounted back to their present value.

2.2 Dividend discount model

When valuing an asset, before adding up the estimated future cash flows, we must discount each cash flow back to the present: The cash flow ' s value is reduced with respect to how far away it is in time. The two elements of discounted cash flow valuation — estimating the cash flows and discounting the cash flows to account for the time value of money — provide the economic rationale for discounted cash flow valuation.

For some assets, such as government debt, cash flows may be essentially known with certainty — that is, they are default risk free. The appropriate discount rate for such a risk - free cash flow is a risk - free rate of interest.

In contrast to risk - free debt, future cash flows for equity investments are not known with certainty — they are risky. Introducing risk makes applying the present value approach much more challenging.
The most common approach to dealing with risky cash flows involves two adjustments relative to the risk - free case.

- First, discount the expected value of the cash flows, viewing the cash flows as random variables.
- Second, adjust the discount rate to reflect the risk of the cash flows

2.2 Dividend discount model

The following equation expresses the concept that an asset 's value is the present value of its (expected) future cash flows:

$$V_0 = \sum_{t=1}^{n} \frac{CF_t}{(1+r)^t}$$

V_0 = the value of the asset at time t = 0 (today)
n = number of cashflows in the life of asset (n is set equal to ∞ for equities)
CF_t = the cash flow (or the expected cash flow, for risky cash flows) at time t
r = the discount rate or required rate of return

2.2 Dividend discount model

The dividend discount model defines cash flows as dividends. The basic argument for using this definition of cash flow is that an investor who buys and holds a share of stock generally receives cash returns only in the form of dividends.

Generally, the definition of returns as dividends, and the DDM, is most suitable when three conditions are met:

1. The company is dividend - paying (i.e., the analyst has a dividend record to analyze).
2. The board of directors has established a dividend policy that bears an understandable and consistent relationship to the company' s profitability.
3. The investor takes a non control perspective.

2.2 Dividend discount model

The Expression for a Single Holding Period:

If an investor wishes to buy a share of stock and hold it for one year, the value of that share of stock today is the present value of the expected dividend to be received on the stock plus the present value of the expected selling price in one year:

$$V_0 = \frac{D_1}{(1+r)^1} + \frac{P_1}{(1+r)^1} = \frac{D_1 + P_1}{(1+r)^1}$$

Where,
V_0 = the value of a share of stock today, at t = 0
P_1 = the expected price per share at t = 1
D_1 = the expected dividend per share for year 1, assumed to be paid at the end of the year at t = 1
r = the required rate of return on the stock

In this case, the expected cash flows are the dividend in one year (for simplicity, assumed to be received as one payment at the end of the year) and the price of the stock in one year.

2.2 Dividend discount model

The Expression for Multiple Holding Periods:

For an n - period model, the value of a stock is the present value of the expected dividends for the n periods plus the present value of the expected price in n periods (at t = n).

$$V_0 = \frac{D_1}{(1+r)^1} + \ldots\ldots + \frac{D_n}{(1+r)^n} + \frac{P_n}{(1+r)^n}$$

If we use summation notation to represent the present value of the first n expected dividends, the general expression for an n - period holding period or investment horizon can be written as

$$V_0 = \sum_{t=1}^{n} \frac{D_t}{(1+r)^t} + \frac{P_n}{(1+r)^n}$$

2.3 Gordon Growth Model

The Gordon growth model, developed by Gordon and Shapiro (1956) and Gordon (1962), assumes that dividends grow indefinitely at a constant rate.

The simplest pattern that can be assumed in forecasting future dividends is growth at a constant rate. In mathematical terms, this assumption can be stated as:

$$D_t = D_{t-1}(1+g)$$

Where,
g = the expected constant growth rate in dividends
D_t = the expected dividend payable at time t

If $D_0(1+g)^t$ is substituted into Equation for V_0 D_t , it gives the Gordon growth model. If all of the terms are written out, they are

$$V_0 = \frac{D_0(1+g)}{(1+r)} + \frac{D_0(1+g)^2}{(1+r)^2} + \ldots + \frac{D_0(1+g)^n}{(1+r)^n} + \ldots + \cdots = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

2.3 Gordon Growth Model

The Gordon growth model is one of the most widely recognized equations in the field of security analysis. Because the model is based on indefinitely extending future dividends, the model 's required rate of return and growth rate should reflect long - term expectations.

Analysts typically apply DDMs to dividend - paying stocks when dividends bear an understandable and consistent relation to the company ' s profitability. The same qualifications hold for the Gordon growth model.

2.3.1 Strengths & limitations of GGM

Simple to use

Appropriate for valuing dividend-paying companies.

Can be used to judge whether an equity market is fairly valued or not.

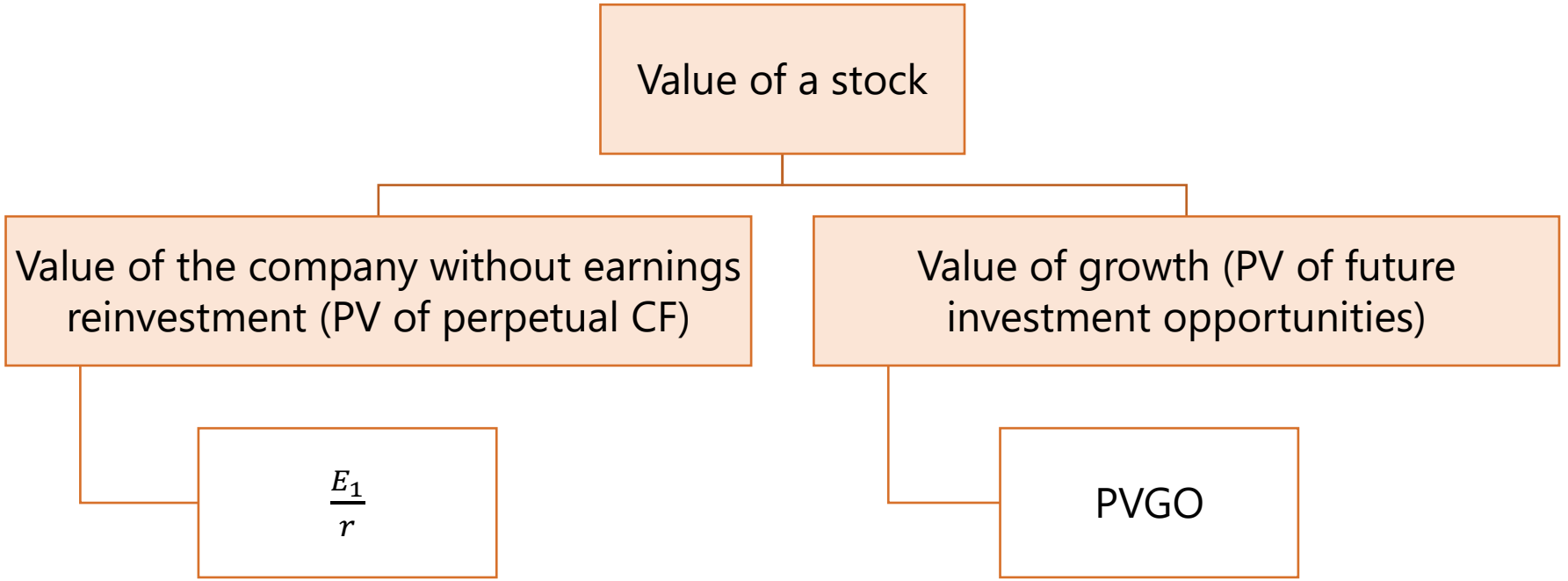
Can be used to estimate the ERP

Output is sensitive to changes in growth rate and required rate of return.

It is characterized by single growth rate, but future growth can consist of multiple stages.

2.4 Present Value of Growth Opportunities

PVGO, also known as the value of growth, sums the expected value today of opportunities to profitably reinvest future earnings.



2.4 Present Value of Growth Opportunities

For any company, the actual value per share is the sum of the no - growth value per share and the present value of growth opportunities (PVGO):

$$V_0 = \frac{E_1}{r} + PVGO$$

What determines PVGO?

- One determinant is the value of a company's options to invest, captured by the word opportunities .
- A second determinant of PVGO is the value of the company's options to time the start, adjust the scale, or even abandon future projects.

2.5 Required return (r)

Under the assumption of efficient prices, the Gordon growth model has been used to estimate a stock ' s required rate of return, or equivalently, the market - price - implied expected return. The Gordon growth model solved for r is:

$$r = \frac{D_0(1+g)}{P_0} + g = \frac{D_1}{P_0} + g$$

The rate r is composed of two parts: the dividend yield (D1 / P0) and the capital gains (or appreciation) yield (g).

2.6 Free cash flow valuation

Free cash flow to the firm is the cash flow available to the company ' s suppliers of capital after all operating expenses (including taxes) have been paid and necessary investments in working capital (e.g., inventory) and fixed capital (e.g., equipment) have been made. FCFF is the cash flow from operations minus capital expenditures.

Capital expenditures — reinvestment in new assets, including working capital — are needed to maintain the company as a going concern, so only that part of cash flow from operations remaining after such reinvestment is " free. "
FCFF is the part of the cash flow generated by the company ' s operations that can be withdrawn by bondholders and stockholders without economically impairing the company.

Conceptually, the value of common equity is the present value of expected future FCFF — the total value of the company — minus the market value of outstanding debt.

Free cash flow to equity is the cash flow available to the company's holders of common equity after all operating expenses, interest, and principal payments have been paid and necessary investments in working and fixed capital have been made.

2.6 Free cash flow valuation

Valuation using a free cash flow concept is popular in current investment practice. Free cash flow (FCFF or FCFE) can be calculated for any company. The record of free cash flows can also be examined even for a non - dividend - paying company. Even for dividend - paying companies, a free cash flow model valuation may be preferred when dividends exceed or fall short of FCFE by significant amounts. FCFE also represents cash flow that can be redeployed outside the company without affecting the company's capital investments. Although a company reports cash flow from operations (CFO) on the statement of cash flows, CFO is not free cash flow. Net income and CFO data can be used, however, in determining a company's free cash flow.

Generally, defining returns as free cash flow and using the FCFE (and FCFF) models are most suitable when

- The company is not dividend - paying.
- The company is dividend - paying but dividends significantly exceed or fall short of free cash flow to equity.
- The company's free cash flows align with the company's profitability within a forecast horizon with which the analyst is comfortable.
- The investor takes a control perspective.

2.6 Free cash flow valuation

The advantage of FCFF and FCFE over other cash flow concepts is that they can be used directly in a DCF framework to value the firm or to value equity. Other cash flow – or earnings - related measures, such as CFO, net income, EBIT, and EBITDA, do not have this property because they either double - count or omit cash flows in some way. Moreover, these measures do not account for the reinvestment of cash flows that the company makes in capital assets and working capital to maintain or maximize the long - run value of the firm.

Using free cash flow in valuation is more challenging than using dividends because in forecasting free cash flow, the analyst must integrate the cash flows from the company's operations with those from its investing and financing activities.

2.6 Free cash flow valuation

The FCFF model is often chosen, however, in two other cases:

1. A levered company with negative FCFE

In this case, working with FCFF to value the company's equity might be easiest. The analyst would discount FCFF to find the present value of operating assets (adding the value of excess cash and marketable securities and of any other significant nonoperating assets 1 to get total firm value) and then subtract the market value of debt to obtain an estimate of the intrinsic value of equity.

2. A levered company with a changing capital structure

First, if historical data are used to forecast free cash flow growth rates, FCFF growth might reflect fundamentals more clearly than does FCFE growth, which reflects fluctuating amounts of net borrowing. Second, in a forward - looking context, the required return on equity might be expected to be more sensitive to changes in financial leverage than changes in the WACC, making the use of a constant discount rate difficult to justify.

2.6.1 FCFF valuation

The FCFF valuation approach estimates the value of the firm as the present value of future FCFF discounted at the weighted average cost of capital:

$$Firm\ value = \sum_{t=1}^{\infty} \frac{FCFF_t}{(1+WACC)^t}$$

Because FCFF is the cash flow available to all suppliers of capital, using WACC to discount FCFF gives the total value of all of the fi rm's capital. The value of equity is the value of the firm minus the market value of its debt:

$$Equity\ value = Firm\ value\ - Market\ value\ of\ debt$$

The method to calculate WACC was discussed earlier but the formula for WACC is listed below:

$$WACC = \frac{MV(Debt)}{MV(Debt)+MV(Equity)} r_d(1-Tax\ rate) + \frac{MV(Equity)}{MV(Debt)+MV(Equity)} r$$

2.6.1 FCFF valuation

MV(Debt) and MV(Equity) are the current market values of debt and equity, not their book or accounting values, and the ratios of MV(Debt) and MV(Equity) to the total market value of debt plus equity define the weights in the WACC formula.

The quantities r_d (1 – Tax rate) and r are, respectively, the after - tax cost of debt and the after - tax cost of equity.

2.6.2 FCFE valuation

The value of equity can also be found by discounting FCFE at the required rate of return on equity, r :

$$Equity\ value = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1+r)^t}$$

2.6.3 Single stage - Free cash flow valuation

The assumption that free cash flows grow at a constant rate leads to a single - stage (stable - growth) FCFF or FCFE model.

FCFF Constant growth model:

Assume that FCFF grows at a constant rate, g , such that FCFF in any period is equal to FCFF in the previous period multiplied by (1 + g):

$$FCFF_t = FCFF_{t-1}(1+g)$$

If FCFF grows at a constant rate,

$$Firm\ value = \frac{FCFF_1}{WACC - g} = \frac{FCFF_0(1+g)}{WACC - g}$$

2.6.3 Single stage - Free cash flow valuation

The assumption that free cash flows grow at a constant rate leads to a single - stage (stable - growth) FCFF or FCFE model.

FCFE Constant growth model:

The constant - growth FCFE valuation model assumes that FCFE grows at constant rate g . FCFE in any period is equal to FCFE in the preceding period multiplied by (1 + g):

$$FCFE_t = FCFE_{t-1}(1+g)$$

The value of equity if FCFE is growing at a constant rate is

$$Equity\ value = \frac{FCFE_1}{r-g} = \frac{FCFE_0(1+g)}{r-g}$$

The growth rate of FCFF and the growth rate of FCFE need not be and frequently are not the same.

2.6.4 FCFF from Net Income

The expression for FCFF as follows:

FCFF = Net income available to common shareholders (NI)
Plus: Net noncash charges (NCC)
Plus: Interest expense × (1 – Tax rate)
Less: Investment in fixed capital (FCInv)
Less: Investment in working capital (WCInv)

This equation can be written more compactly as

FCFF = NI + NCC + Int (1 - Tax rate) - FCInv - WCInv

- NI = Net income available to common shareholders. It represents income after depreciation, amortization, interest expense, income taxes, and the payment of dividends to preferred shareholders (but not payment of dividends to common shareholders.
- NCC = It represent an adjustment for noncash decreases and increases in net income. The most common noncash charge is depreciation expense.

2.6.4 FCFF from Net Income

- Int expense = After - tax interest expense must be added back to net income to arrive at FCFF. This step is required because interest expense net of the related tax savings was deducted in arriving at net income and because interest is a cash flow available to one of the company's capital providers (i.e., the company ' s creditors).
- Investments in fixed capital = This represents the outflows of cash to purchase fixed capital necessary to support the company's current and future operations. Necessary capital expenditures may also include intangible assets, such as trademarks.
- Net increases in working capital = This adjustment represents the net investment in current assets (such as accounts receivable) less current liabilities (such as accounts payable). Analysts can fi nd this information by examining either the company ' s balance sheet or its cash fl ow statement.

2.6 FCFF

- **Using Profit before Tax:** PBT + Non-cash charges + Interest Expenses (1-tax rate) –Fixed Capital Investment – Working Capital Investment
- **Using CFO:** CFO – Fixed Capital Investment
- **Using EBIT:** EBIT (1-Tax rate) + Non-cash charges – Fixed Capital Investment – Working Capital Investment
- **Using Ebitda:** Ebitda (1-Tax rate) + (Depreciation * Tax Rate) – Fixed Capital Investment – Working Capital Investment

2.6.5 FCFE from FCFF

FCFE is cash flow available to equity holders only. To find FCFE, therefore, we must reduce FCFF by the after - tax value of interest paid to debt holders and add net borrowing (which is debt issued less debt repaid over the period for which one is calculating free cash flow):

Free cash flow to equity = Free cash flow to the firm
Less: Interest expense × (1 – Tax rate)
Plus: Net borrowing

This equation can be written more compactly as :

FCFE = FCFF - Int (1 - Tax rate) + Net borrowing

2.6.6 Uses of FCFF

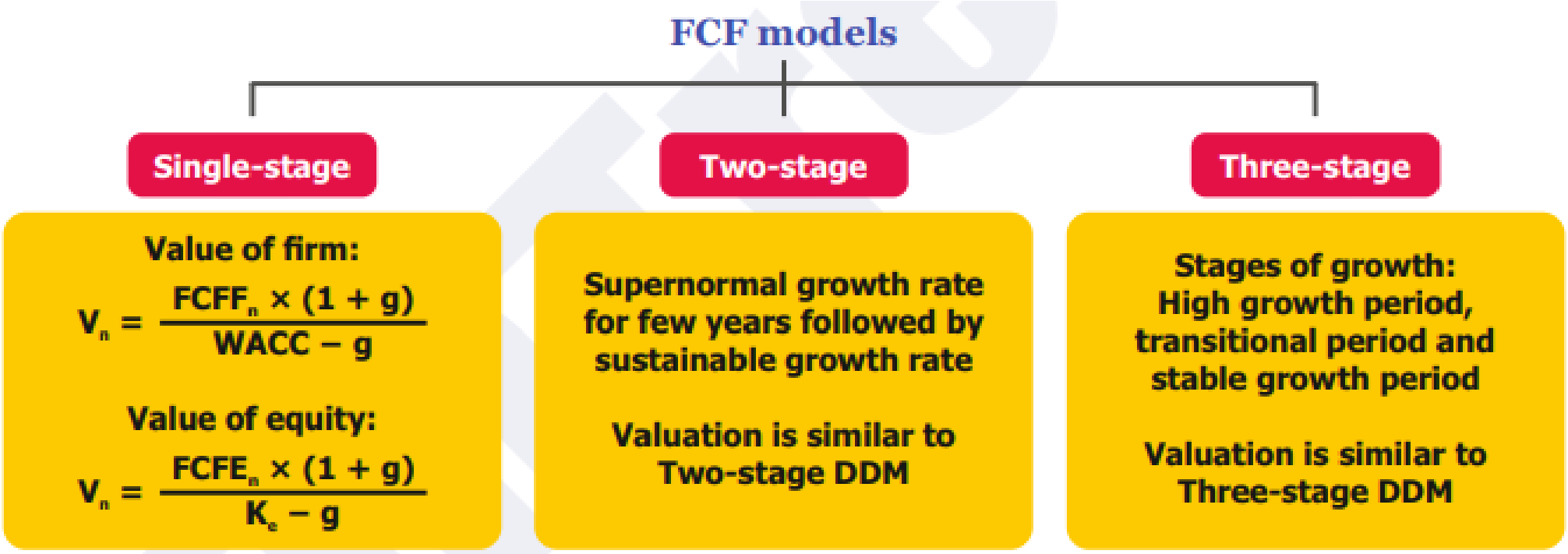
Uses of positive FCFF:

(1) Retain the cash and thus increase the firm's balances of cash and marketable securities;

(2) Use the cash for payments to providers of debt capital (i.e., interest payments and principal payments in excess of new borrowings);

(3) Use the cash for payments to providers of equity capital (i.e., dividend payments and/or share repurchases in excess of new share issuances).

2.6.7 FCF Models



2.6.8 Sensitivity analysis in FCFF and FCFE valuations

Two critical sources in valuation analysis

- Growth rate and duration of growth: Growth in FCFF/FCFE depends on future profitability. Future profitability depends on sales growth and NP margins. Sales growth and NP margins depend on growth phase of the company and the profitability of the industry
- Base year values: Value of firm or value of equity will increase or decrease proportionately with the base-year values used

3 Residual income

Residual income for a given time period is the earnings for that period in excess of the investors ' required return on beginning - of - period investment (common stockholders ' equity).

The residual income model states that a stock's value is book value per share plus the present value of expected future residual earnings. (Book value per share is common stockholders ' equity divided by the number of common shares outstanding.)

The residual income model can be viewed as a restatement of the dividend discount model, using a company - level return concept. The record of residual income can always be calculated, a residual income model can be used for both dividend - paying and non - dividend - paying stocks.

Analysts may choose a residual income approach for companies with negative expected free cash flows within their comfortable forecast horizon. In such cases, a residual income valuation often brings the recognition of value closer to the present as compared with a free cash flow valuation, producing higher value estimates.

3 Residual income

The residual income model has an attractive focus on profitability in relation to opportunity costs.

Generally, the definition of returns as residual income, and the residual income model, is most suitable in either of the following two situations:

1. The company is not paying dividends, in which case the residual income model may be selected as an alternative to a free cash flow model.
2. The company's expected free cash flows are negative within the analyst's comfortable forecast horizon.

3.1 Use of Residual income in valuation

A company that is generating more income than its cost of obtaining capital — that is, one with positive residual income — is creating value. Conversely, a company that is not generating enough income to cover its cost of capital — that is, a company with negative residual income — is destroying value. Thus, all else equal, higher (lower) residual income should be associated with higher (lower) valuations.

Residual income has sometimes been called economic profit because it is an estimate of the profit of the company after deducting the cost of all capital: debt and equity.

In forecasting future residual income, the term abnormal earnings is also used. Under the assumption that in the long term the company is expected to earn its cost of capital (from all sources), any earnings in excess of the cost of capital can be termed abnormal earnings.

The residual income model has also been called the discounted abnormal earnings model and the Edwards - Bell - Ohlson model after the names of researchers in the fi eld

3.2 Residual income model

The residual income model of valuation analyzes the intrinsic value of equity as the sum of two components:

1. The current book value of equity.
2. The present value of expected future residual income.

According to the residual income model, the intrinsic value of common stock can be expressed as follows:

$$V_0 = B_0 + \sum_{t=1}^{\infty} \frac{RI_t}{(1+r)^t} = B_0 + \sum_{t=1}^{\infty} \frac{E_t - rB_{t-1}}{(1+r)^t}$$

Where,

V_0 = value of a share of stock today (t = 0)

B_0 = current per - share book value of equity

B_t = expected per - share book value of equity at any time t

r = required rate of return on equity investment (cost of equity)

E_t= expected EPS for period t

RI_t= expected per - share residual income, equal to $E_t - rB_{t-1}$

3.3 General Residual income model

The residual income model has a clear relationship to other valuation models, such as the dividend discount model. The clean surplus relation states the relationship among earnings, dividends, and book value as follows:

$$B_t = B_{t-1} + E_t - D_t$$
$$D_t = E_t - (B_t - B_{t-1})$$
$$= E_t + B_{t-1} - B_t$$

Substituting $E_t + B_{t-1} - B_t$ for D_t in the expression for V_0 results in:

$$V_0 = \frac{E_1 + B_0 - B_1}{(1+r)^1} + \frac{E_2 + B_1 - B_2}{(1+r)^2} + \frac{E_3 + B_2 - B_3}{(1+r)^3} +$$

This equation can be rewritten as follows:

$$V_0 = B_0 + \frac{E_1 - rB_0}{(1+r)^1} + \frac{E_2 - rB_1}{(1+r)^2} + \frac{E_3 - rB_2}{(1+r)^3} +$$

3.3 General Residual income model

The general expression for the residual income model based on this work can also be stated as:

$$V_0 = B_0 + \sum_{t=1}^{\infty} \frac{(ROE_t - r)B_{t-1}}{(1+r)^t}$$

3.3 General Residual income model

In general, the residual income model makes no assumptions about future earnings and dividend growth. If constant earnings and dividend growth are assumed, a version of the residual income model that usefully illustrates the fundamental drivers of residual income can be derived. The following expression is used for justified price - to - book ratio (P/B) based on forecasted fundamentals, assuming the Gordon (constant growth) DDM and the sustainable growth rate equation, g = b * ROE:

$$\frac{P_0}{B_0} = \frac{ROE - g}{r - g}$$

The justified price is the stock's intrinsic value ($P_0 = V_0$). Therefore, using the previous equation and remembering that residual income is earnings less the cost of equity, or (ROE * B_0) – (r * B_0), a stock's intrinsic value under the residual income model, assuming constant growth, can be expressed as:

$$V_0 = B_0 + \frac{ROE - r}{r - g} B_0$$

3.4 Single stage - Residual income model

The single - stage (constant - growth) residual income model assumes that a company has a constant return on equity and constant earnings growth rate through time. This model was given in:\

$$V_0 = B_0 + \frac{ROE - r}{r - g} B_0$$

Similar to the Gordon growth DDM, the single - stage RI model can be used to assess the market expectations of residual income growth — that is, an implied growth rate — by inputting the current price into the model and solving for g

3.5 Strengths of the Residual income model

The strengths of residual income models include the following:

- Terminal values do not make up a large portion of the total present value, relative to other models.
- RI models use readily available accounting data.
- The models can be readily applied to companies that do not pay dividends or to companies that do not have positive expected near - term free cash flows.
- The models can be used when cash flows are unpredictable.
- The models have an appealing focus on economic profitability.

3.6 Weaknesses of the Residual income model

The potential weaknesses of residual income models include the following:

- The models are based on accounting data that can be subject to manipulation by management.
- Accounting data used as inputs may require significant adjustments.
- The models require that the clean surplus relation holds, or that the analyst makes appropriate adjustments when the clean surplus relation does not hold.
- The residual income model's use of accounting income assumes that the cost of debt capital is reflected appropriately by interest expense.

3.7 Guidelines for using a Residual income model

A residual income model is most appropriate when:

- A company does not pay dividends, or its dividends are not predictable;
- A company's expected free cash flows are negative within the analyst ' s comfortable forecast horizon;
- Great uncertainty exists in forecasting terminal values using an alternative present value approach.

Residual income models are least appropriate when:

- Significant departures from clean surplus accounting exist; or
- Significant determinants of residual income, such as book value and ROE, are not predictable.

4 Relative valuation models

A relative valuation model is a business valuation method that compares a company's value to that of its competitors or industry peers to assess the firm's financial worth.

The three most common types of relative valuations are P/E, E/V, and P/S, where:

1. P/E: Price-to-Earnings
2. EV/Ebitda: Enterprise Value/Ebitda
3. P/S: Price-to-Sales
4. P/BD: Price-to-Book Balue
5. Dividend Yield

4.1 Price to earnings ratio (P/E)

The price-to-earnings ratio (P/E) is one of the most widely used metrics for investors and analysts to determine stock valuation. It shows whether a company's stock price is overvalued or undervalued and can reveal how a stock's valuation compares to its industry group or a benchmark like the S&P 500 index.

Value of P/E can be calculated as:

$$\frac{P_0}{E_1} = \frac{1}{r} + \frac{PVGO}{E_1}$$

Where,
1 / r = Value of P/E for no-growth company
PVGO / E_1= Value that relates to growth opportunities

The distinction between no - growth and growth values is of interest because the value of growth and the value of assets in place generally have different risk characteristics.

4.1 Price to earnings ratio (P/E)

The expression for P/E can be stated in terms of the current (or trailing) P/E (today ' s market price per share divided by trailing 12 months ' earnings per share) or in terms of the leading (or forward) P/E (today ' s market price per share divided by a forecast of the next 12 months ' earnings per share, or sometimes the next fiscal year ' s earnings per share).

Define b as the retention rate, the fraction of earnings reinvested in the company rather than paid out in dividends. The dividend payout ratio is then, by definition,

$$\frac{P_0}{E_0} = \frac{D_0(1+g)/E_0}{r-g} = \frac{(1-b)(1+g)}{r-g}$$

4.2 Price to Sales

The price-to-sales (P/S) ratio is a valuation ratio that compares a company's stock price to its revenues. It is an indicator of the value that financial markets have placed on each dollar of a company's sales or revenues.

It can be calculated either by dividing the company's market capitalization by its total sales over a designated period (usually twelve months) or on a per-share basis by dividing the stock price by sales per share. The P/S ratio is also known as a sales multiple or revenue multiple.

A low ratio may indicate the stock is undervalued, while a ratio that is significantly above the average may suggest overvaluation.

$$\frac{P}{S} = \frac{Market\ Value\ per\ share}{Sales\ per\ share}$$

4.3 EV / EBITDA

EV/EBITDA is a financial ratio that is commonly used to evaluate a company's value and performance. It measures the relationship between a company's enterprise value (EV) and its earnings before interest, taxes, depreciation, and amortization (EBITDA).

Enterprise value is the total value of a company's equity and debt, with cash and cash equivalents. EBITDA, on the other hand, represents a company's operating earnings before accounting for non-operating expenses and non-cash items like depreciation and amortization.

Most common uses of EV/EBITDA:

1. Company valuation
2. Identifying potential investment opportunities
3. Comparing companies within the same industry or sector.

It is also used as a financial metric in mergers and acquisitions, debt refinancing, and initial public offerings (IPOs).

4.4 Price to Book Value (P/B)

A company's price-to-book ratio is the company's current stock price per share divided by its book value per share (BVPS). This shows the market valuation of a company compared to its book value.

Investors use the price-to-book value to gauge whether a stock is valued properly. A P/B ratio of one means that the stock price is trading in line with the book value of the company.

A company with a high P/B ratio could mean the stock price is overvalued, while a company with a lower P/B could be undervalued.

$$\frac{P}{B} = \frac{Market\ price\ per\ share}{Book\ value\ per\ share}$$

4.5 Dividend yield

The dividend yield, expressed as a percentage, is a financial ratio (dividend/price) that shows how much a company pays out in dividends each year relative to its stock price.

A company with a high dividend yield pays a substantial share of its profits in the form of dividends. Dividend yield of a company is always compared with the average of the industry to which the company belongs.

$$Dividend\ yield = \frac{Dividend\ per\ share}{Price\ per\ share}$$

5 Financial determinants of growth rates

We explain the relationship the dividend growth rate (g) equals the earning retention ratio (b) times the return on equity (ROE). and show how it can be combined with a method of analyzing return on equity, called DuPont analysis.

1. Sustainable Growth Rate

Sustainable growth rate is the rate of dividend (and earnings) growth that can be sustained for a given level of return on equity, assuming that the capital structure is constant through time and that additional common stock is not issued.
The reason for studying this concept is that it can help in estimating the stable growth rate in a Gordon growth model valuation, or the mature growth rate in a multistage DDM in which the Gordon growth formula is used to find the terminal value of the stock.

5 Financial determinants of growth rates

The expression to calculate the sustainable growth rate is :

$$g = b \times ROE$$

Where,
g = dividend growth rate
b = earnings retention rate (1 – Dividend payout ratio)
ROE = return on equity

2. Dividend Growth Rate
ROE is the return (net income) generated on the equity invested in the company:

$$ROE = \frac{Net\ income}{Shareholder's\ equity}$$

5 Financial determinants of growth rates

For purposes of analyzing ROE, it can be related to several other financial ratios. For example, ROE can be related to return on assets (ROA) and the extent of financial leverage (equity multiplier):

$$ROE = \frac{Net\ income}{Total\ assets} \times \frac{Total\ assets}{Shareholder's\ equity}$$

A company can increase its ROE either by increasing ROA or by the use of leverage (assuming the company can borrow at a rate lower than it earns on its assets). This model can be expanded further by breaking ROA into two components, profit margin and turnover (efficiency):

$$ROE = \frac{Net\ income}{Sales} \times \frac{Sales}{Total\ assets} \times \frac{Total\ assets}{Shareholder's\ equity}$$

- The first term is the company's profit margin.
- The second term measures total asset turnover, which is the company ' s efficiency.
- The last term is the equity multiplier, which measures the extent of leverage, as noted earlier.

5 Financial determinants of growth rates

The dividend growth rate is equal to the retention rate multiplied by ROE:

$$ROE = \frac{Net\ income\ -Dividends}{Net\ income} \times \frac{Net\ income}{Sales} \times \frac{Sales}{Total\ assets} \times \frac{Total\ assets}{Shareholder's\ equity}$$

This expansion of the sustainable growth expression has been called the PRAT model. Growth is a function of profit margin (P), retention rate (R), asset turnover (A), and financial leverage (T).
The profit margin and asset turnover determine ROA. The other two factors, the retention rate and financial leverage, reflect the company's financial policies.