soleadea

LEVEL 1: EQUITY INVESTMENTS

Reading 38 (6th out of 6): EQUITY SECURITIES: VALUATION

Difficulty: **medium**

Benchmark Study Time: **3.5h**

2022

THIS E-BOOK:

- is a selective summary of the corresponding Reading in your CFA® Program Curriculum,
- provides place for your own notes,
- helps you structure your study and revision time!

How to use this e-book to maximize your knowledge retention:

1. **Print** the e-book in duplex and bind it to keep all important info for this Reading **in one place.**
2. **Read** this e-book, best twice, to grasp the idea of what this Reading is about.
3. **Study** the Reading from your curriculum. **Here add** your notes, examples, formulas, definitions, etc.
4. **Review** the Reading using this e-book, e.g. write your summary of key concepts or revise the formulas at the end of this e-book (if applicable).
5. **Done?** Go to your study plan and change the Reading's status to **green**:
   (it will make your Chance-to-Pass-Score™ grow ☺).
6. **Come back** to this e-book from time to time to **regularly review for knowledge retention!**

NOTE: While studying or reviewing this Reading, you can use the tables at the end of this e-book and mark your study/review sessions to hold yourself accountable.

The most important aspect of securities valuation is the ratio of the intrinsic value (estimated by analysts) to the market value. If the former exceeds the latter, we say that a security is undervalued. If the intrinsic value is lower than the market value, the security is overvalued.

EQUITY VALUATION MODELS

Categories of equity valuation models

Categories of equity valuation models:

- present value models (discounted cash flow models),
- multiplier models, also called market multiple models,
- asset-based valuation models.

PRESENT VALUE MODELS

Present value models (discounted cash flow models) are based on an assumption that the value of an instrument is equal to the present value of the instrument's future benefits or free cash flows that are to be distributed to shareholders.

Types of present value models:

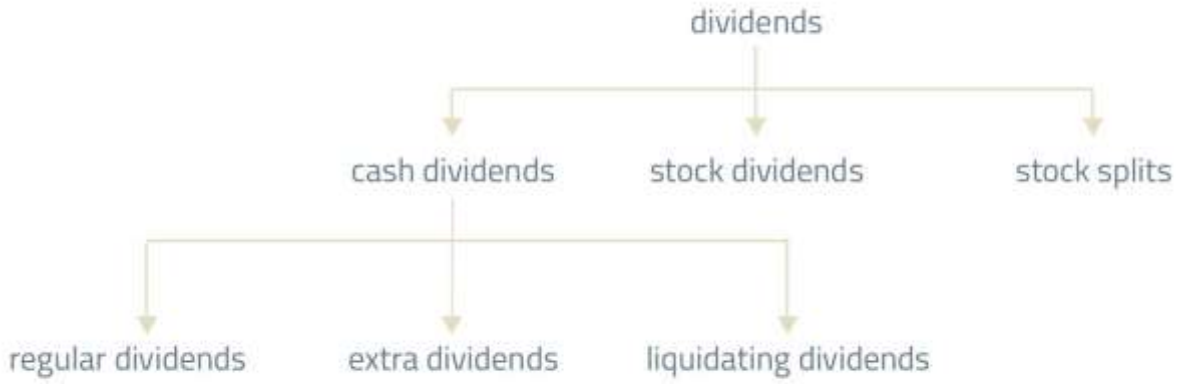
- dividend discount models,
- free-cash-flow-to-equity models.

Types of dividends

A dividend is:

- paid to shareholders proportionally to the number of shares they own.
- declared by a corporation's board of directors.
- discretionary.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.



Frequency of dividend payments:

- quarterly – Canada, the USA,
- semi-annually – Japan, Europe,
- annually – China, Thailand.

Extra dividends

extra dividends = special dividends

Extra dividends are:

- dividends paid by companies which do not pay dividends on a regular schedule, or
- dividends that supplement regular cash dividends with an extra payment when the company's earnings are much higher than expected or when the company has a huge amount of excess cash.

Liquidating dividends

A liquidating dividend is paid to shareholders when the company:

- goes out of business and the assets of the company are distributed to shareholders,
- sells a portion of its business for cash and the proceeds are distributed to shareholders, or
- pays a dividend that exceeds its accumulated retained earnings.

Stock dividends

From the company's point of view, stock dividends do not reduce cash or assets and the equity also remains unchanged. Cash dividends do reduce cash (and assets), as well as retained earnings, which are part of equity. In other words, stock dividends, unlike cash dividends, do not decrease liquidity and solvency ratios. In terms of equity, only one aspect changes when it comes to stock dividends – retained earnings fall, while contributed capital grows.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

However, the decline in retained earnings is completely offset by the growth in contributed capital, so the company's financial structure and the debt-to-equity ratio do not change.

After the stock dividend:

- the investor has more shares,
- the cost per share has declined,
- the total cost of shares has not changed,
- the price-to-earnings has not changed.

Stock splits

A stock split, like a stock dividend, has no economic effect on the company. If a company announces a two-for-one stock split, each shareholder will have twice as many shares after the split and their price will decline by half. What's important, earnings per share will also be twice as low, which means P/E is not going to change. Also, the market value of the company will remain the same after the split. The company will maintain the same dividend payout ratio and dividend yield as before the split.

Investors often view the announcement of a stock split

as a sign of future stock price increases.

The most common splits:

- a two-for-one,
- a three-for-one.

Reverse stock splits

A reverse stock split is:

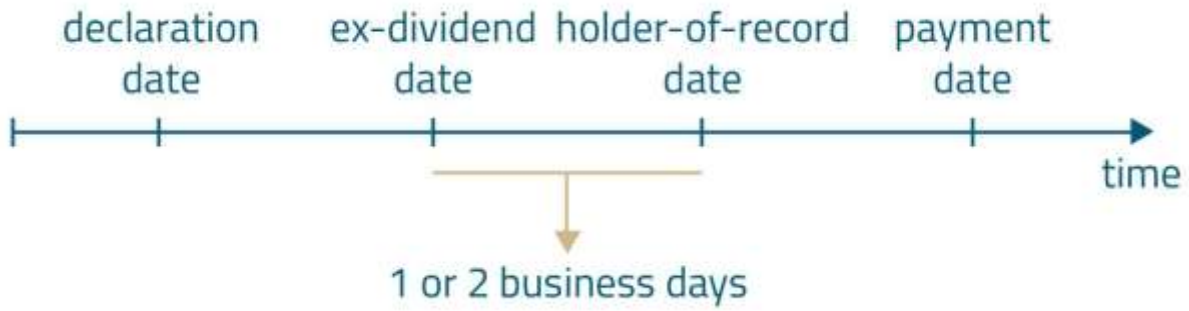
- the opposite of a stock split,
- used when the stock price is very low.

After the reverse stock split:

- the number of shares will decline,
- the price per share will increase,
- the market value of the company will not change,
- the P/E ratio will not change,
- the dividend payout ratio will not change,
- the dividend yield will not change.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Dividend chronology



Declaration date

The declaration date is the day when the company issues a statement declaring a dividend.

Ex-dividend date

The ex-dividend date:

- is the first day when a share trades without the dividend,
- investors who owned the company's shares on the ex-dividend date will receive dividends,
- is 2 business days before the holder-of-record date (except for Hong Kong where it is 1 business day before the holder-of-record date).

Holder-of-record date

The holder-of-record date:

- is usually two business days after the ex-dividend date,
- is set by the company.

Payment date

The payment date:

- on this day, the dividend is paid to shareholders,
- the company states the payment date when the dividend declaration is made.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Share Repurchases

share repurchase = share buyback

Share repurchases are:

- transactions in which companies buy the shares they have previously issued back from their shareholders,
- considered an alternative to paying out dividends.

Share repurchases vs Dividends

Differences between share repurchases and dividends:

- Share repurchases are not obligatory (e.g. a company may decide against continuing repurchase).
- Dividends are always paid out proportionally to the number of shares held. In the case of a share repurchase, the company can only buy shares back from the shareholders willing to sell them.

Reasons for share repurchases

A share repurchase:

- can support share prices if the company's management feels they are undervalued,
- is a flexible way to pay out cash to shareholders,
- increases tax efficiency if the tax rate on cash dividends exceeds the tax rate on capital gains.

Dividend discount models

The dividend discount models are based on a basic assumption that the value of a stock is equal to the present value of future dividends:

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

Where:

- V_0 – value of the stock today,
- D_t – expected dividend in year t,
- r – required rate of return on the stock.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Remember that if there is an investor with a certain investment horizon, the present value of a financial instrument is directly affected by the dividends received before the sale of the shares and, moreover, it is indirectly affected by the dividends paid after the sale because these determine the selling price of the instrument:

$$V_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \cdots + \frac{D_n}{(1+r)^n} + \frac{P_n}{(1+r)^n}$$

Where:

- V_0 – value of the stock today,
- D_n – expected dividend in year n,
- r – required rate of return on the stock,
- P_n – price of the stock at the end of year n.

The Gordon Growth Model (GGM)

In dividend discount models, we deal with the problem of an infinite series of expected dividends, which in reality is difficult to predict. One of the solutions is the Gordon growth model which assumes that dividends grow indefinitely at a constant rate:

$$V_0 = \frac{D_0 \times (1+g)}{r-g} = \frac{D_1}{r-g}$$

Where:

- V_0 – value of the stock today,
- D_0 – value of a dividend today, D_1 – value of a dividend 1 year from now,
- r – required rate of return on the stock,
- g – growth rate of the dividend.

In your exam, pay attention whether you're given a current year dividend (D_0) or a dividend 1 year from now (D_1). The answers to the question will cover both cases, so if you make a mistake here, you're likely to arrive at the wrong answer.

$$g = b \times ROE$$

Where:

- b – earnings retention rate,
- ROE – return on equity.

The Gordon growth model can be used to value companies in the mature growth stage that are insensitive to the business cycle and pay regular dividends.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

The Gordon growth model – assumptions

The assumptions of the Gordon growth model:

- Dividends are useful in the valuation process.
- Dividends are characterized by a constant growth rate.
- The required rate of return does not change.
- The dividend growth rate is lower than the required rate of return.

Multistage dividend discount models

In the case of fast-growing companies, we use multistage dividend discount models, further divided into two-stage and three-stage models. The two-stage DDM, as the name suggests, consists of two periods. In the first period, the dividend grows by the fixed rate of return. In the second period, the dividend also grows at a fixed rate but lower than in the first period:

$$V_0 = \sum_{t=1}^{n} \frac{D_0 \times (1+g_s)^t}{(1+r)^t} + \frac{\frac{D_{n+1}}{r-g_l}}{(1+r)^n}$$

Where:

- V_0 – value of the stock today,
- D_0 – value of a dividend today,
- r – required rate of return on the stock,
- g_s – short-term growth of the dividend,
- g_l – long-term growth of the dividend.

In a three-stage model, there are 3 stages: growth, transition, and maturity. The growth phase is characterized by a high growth rate which is followed by a lower one in the transition stage. In the third stage, there is a sustainable growth rate into perpetuity. This model is more appropriate for companies in their early stages, unlike the two-stage model, which is suitable for valuing more developed companies.

Preference stock

$$V_0 = \frac{D_0}{r}$$

Where:

- V_0 – value of the preference stock today,
- D_0 – value of a preferred dividend today,
- r – required rate of return on the preference stock.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Free-cash-flow-to-equity model

According to the free-cash-flow-to-equity model, the stock value is equal to the sum of present values of future cash flows:

$$V_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1+r)^t}$$

Where:

- V_0 – value of the stock today,
- $FCFE_t$ – expected free cash flow to equity,
- r – required rate of return on the stock.

$$FCFE = CFO - (\text{fixed capital investment}) + (\text{net borrowing})$$

$$CFO = (\text{net income}) + (\text{non-cash charges}) - (\text{investment in working capital})$$

MULTIPLIER MODELS

Multiplier models use either:

- price multiples, such as price-to-earnings or price-to-sales per share, which depend on the share price, or
- EV multiples, like EV/EBITDA and EV/total revenue, which depend on the enterprise value (EV).

To value a company using a multiplier model, we simply **multiply** the value of a given multiplier by a given value from the company's financial statements. For example, if we assume that the price-to-earnings ratio for a given company is 10, and the company's net income from the financial statement is equal to USD 20 million, we will estimate the company value as 10 **times** USD 20 million, that is at USD 200 million.

Price multiples

Price multiples are used to value directly a company's equity. They can be based on passed values (e.g. last year earnings) or expected future results (e.g. next year expected earnings).

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Method based on forecasted fundamentals

For example, the justified forward P/E is given by the following formula:

$$\frac{P_0}{E_1} = \frac{\frac{D_1}{E_1}}{r - g} = \frac{p}{r - g}$$

Where:

- P_0 – price of the stock today,
- E_1 – value of earnings expected 1 year from now,
- D_1 – value of a dividend expected 1 year from now,
- r – required rate of return on the stock,
- g – growth rate of the dividend,
- p – dividend payout ratio.

The formula given above is justified by the fundamentals. We can prove it by deriving it from the Gordon growth model (assumption: price equals intrinsic value):

$$P_0 = \frac{D_1}{r - g}$$

Let's divide both sides of the equation by the value of earnings expected 1 year from now (E_1):

$$\frac{P_0}{E_1} = \frac{\frac{D_1}{r - g}}{E_1} = \frac{\frac{D_1}{E_1}}{r - g}$$

We get the formula for the justified forward P/E.

Method of comparables

This method is based on the law of one price which says that identical assets should be sold for the same price. So, to value a company we should find a company or companies that are well priced and share similar characteristics as the company we intend to value. Then, we compute a multiple like price-to-earnings for this comparable company and multiply it by the earnings of the company that we intend to value. This way, we get the value of our stock and we can compare it with the price of the stock.

Of course, with this method, we can find it difficult to select appropriate comparable companies. Especially nowadays, when many companies are international businesses operating in various fields and different geographical areas. For this reason, selecting comparable companies can be problematic and greatly complicate the analysis.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Enterprise value multiples

Enterprise Value (EV) = market capitalization + market value of preferred stock +

+ market value of debt – cash equivalents and short-term investments

In other words, enterprise value is equal to the capital needed to take over an enterprise.

If the company and comparable companies are characterized by significant differences in the capital structure or, for example, the net income is negative, enterprise value multiples should be used instead of price multiples.

The EV-to-EBITDA ratio is most commonly used by analysts. Of course, an analyst can also use other enterprise value multiples, like EV-to-total revenue or EV-to-operating income.

Note: To calculate the enterprise value correctly, we need to know the market value of the company's debt. If market quotations are not available, it is possible to estimate bond values based on current quotations of bonds with the same maturity and similar characteristics.

ASSET-BASED VALUATION MODELS

In asset-based valuation models, the intrinsic value of a company is the difference between the estimated market value (or fair value) of the company's assets and the company's liabilities and preferred shares.

This method of valuation can be used for companies with **1)** a low level of intangible assets and **2)** a high level of current assets and current liabilities. It is often used for valuing private companies for which it is hard to apply other valuation methods, as well as for valuing financial companies or natural resource companies.

The asset-based valuation usually shouldn't be applied if it is difficult to estimate the value of assets and liabilities. This is the case when a company has substantial amounts of **1)** fixed assets or **2)** intangible assets. Remember that it is often hard to value PP&E and not all intangible assets are shown on the books. Additionally, it may also be difficult to estimate the value of assets and liabilities when there is hyperinflation.

HERE KNOWLEDGE RETENTION HAPPENS | WRITE: notes, examples, formulas, definitions, relations, etc.

Summarizing key concepts:

☐ Categories of equity valuation models: Present value models, Multiplier models, Asset-based valuation models

My summary:

☐ Dividend discount models

My summary:

☐ The Gordon growth model

My summary:

☐ Multistage dividend discount models

My summary:

☐ Valuation of preferred stock

My summary:

☐ Free cash flow to equity valuation model

My summary:

☐ Price multiples vs EV multiples

My summary:

☐ Asset-based valuation models

My summary:

Reviewing formulas:

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

Write down the formula:

$$V_0 = \frac{D_1}{(1+r)^1} + \frac{D_2}{(1+r)^2} + \cdots + \frac{D_n}{(1+r)^n} + \frac{P_n}{(1+r)^n}$$

Write down the formula:

$$V_0 = \frac{D_0 \times (1+g)}{r-g} = \frac{D_1}{r-g}$$

Write down the formula:

$$g = b \times ROE$$

Write down the formula:

$$V_0 = \sum_{t=1}^{n} \frac{D_0 \times (1+g_s)^t}{(1+r)^t} + \frac{\frac{D_{n+1}}{r-g_l}}{(1+r)^n}$$

Write down the formula:

$$V_0 = \frac{D_0}{r}$$

Write down the formula:

$$V_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1+r)^t}$$

Write down the formula:

$$FCFE = CFO - (\text{fixed capital investment}) + (\text{net borrowing})$$

$$CFO = (\text{net income}) + (\text{noncash expenses}) - (\text{investment in working capital})$$

Write down the formula:

$$\frac{P_0}{E_1} = \frac{\frac{D_1}{E_1}}{r-g} = \frac{p}{r-g}$$

Write down the formula:

Keeping myself accountable:

TABLE 1 | STUDY

When you sit down to study, you may want to **try the Pomodoro Technique** to handle your study sessions: study for 25 minutes, then take a 5-minute break. Repeat this 25+5 study-break sequence all throughout your daily study session.

✓ Tick off as you proceed.

POMODORO TIMETABLE: study-break sequences (25' + 5')													
date		date		date		date		date		date		date	
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TABLE 2 | REVIEW

Never ever neglect revision! Though it's not the most popular thing among CFA candidates, regular revision is what makes the difference. If you want to pass your exam, **schedule & do your review sessions.**

REVIEW TIMETABLE: When did I review this Reading?													
date		date		date		date		date		date		date	
date		date		date		date		date		date		date	