

# Technical Appendix

## Valuation framework

# Intrinsic value

**The intrinsic, fair or fundamental value** of a company is the sum of its variable future cash flows  $D$ , discounted to the present at the variable cost of capital  $R$ :

$$V_t = \frac{D_{t+1}}{1+R_t} + \frac{D_{t+2}}{(1+R_t)(1+R_{t+1})} + \dots$$

Every valuation framework is a variation of this, obtained under different simplifying assumptions.

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2117765](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2117765)

# Value-Earnings Ratio

For example, assuming that  $R$  is constant and that  $D$  grows at a constant rate  $G$ , then:

$$V_t = \frac{D_t(1+G)}{1+R} + \frac{D_t(1+G)^2}{(1+R)^2} + \dots = D_t \left[ \frac{1+G}{1+R} + \left( \frac{1+G}{1+R} \right)^2 + \dots \right] = \frac{D_t(1+G)}{R-G} = \frac{D_{t+1}}{R-G}$$

If the company distributes a constant share of its earnings  $E$ , equal to  $D/E$ , while retaining  $H=1-D/E$  and reinvesting it in the business, then:

$$\frac{V_t}{E_{t+1}} = \frac{1-H}{R-G}$$

In this case, the fair value of the company is represented by a **constant Value-Earnings ratio**, equal to its payout ratio over  $R-G$ . In this framework, a company is 'cheap' if its Price-Earnings ratio is below its fair level, and expensive if it is above.

# Growth and profitability

Every other ratio – Price to Cash Flow, Price to Sales, Price to Book Value, Enterprise Value to EBITDA, etc. – is a variation of the PE ratio, obtained under different sets of simplifying assumptions.

However, this framework is **too simplistic**. Different combinations of H, R, G, as well as other parameters linking E to various P&L and balance sheet items, can be used to ‘justify’ any level of valuation.

One step forward is to recognise **the relationship between growth and profitability**.

The company’s book value B is increased by retained earnings:  $B_{t+1} = B_t + E_{t+1} - D_{t+1} = B_t + H \cdot E_{t+1}$ . Therefore, a constant return on equity  $ROE = E_{t+1}/B_t$  requires  $B_{t+1} = (1 + H \cdot ROE)B_t$  and therefore  $G = H \cdot ROE$ : **earnings growth is a linear function of profitability**, with slope H.

The retention ratio H measures the trade-off between growth and dividends. If  $H=1$ , earnings are always entirely retained and reinvested in the business,  $G=ROE$  but  $PE=0$ : the company is worthless to shareholders. If  $H=0$ , earnings are always entirely distributed to shareholders, but the company does not grow:  $G=0$  and  $PE=1/R$ .

# Franchise Value

Therefore, a useful decomposition of the Value-Earnings ratio is:

$$\frac{V_t}{E_{t+1}} = \frac{1}{R} + \frac{ROE - R}{R \cdot ROE} \cdot \frac{G}{R - G} = \frac{1}{R} + FF \cdot GO$$

where FF is the **Franchise Factor**: the PE impact of future investments, earning an ROE above the cost of capital R; and GO are **Growth Opportunities**: the present value of equity increases accruing to the company from future investments.

Hence the VE ratio can be seen as the sum of a base VE, equal to the inverse of the cost of capital, and a premium VE=FF·GO, reflecting profitable Growth Opportunities. Likewise, the company's fair value can be seen as the sum of a **Tangible Value** TV=E/R and a **Franchise Value** FV=FF·GO·E.

<http://www.massimofuggetta.com/2014/04/14/strong-message/>

# Franchise period

A second step forward is to recognise that **the franchise spread  $ROE-R$ , and therefore the Franchise Value and the premium  $PE$ , cannot last forever**. The spread has a finite life, as  $ROE$  decreases and eventually converges to, and possibly past, the cost of capital  $R$ .

Therefore, **it is necessary to distinguish between two periods**: one, from 0 to  $N$ , in which the company uses its franchise – if it has one – and invests at  $ROE > R$ ; and two, from  $N$  onwards, in which the franchise has been exhausted and the company continues to invest at  $ROE = R$ .

In the first period, the company grows at  $G^* = H^* \cdot ROE$  where, unlike in the one-period model,  $G^*$  can be higher than the cost of capital  $R$  and can even approximate  $ROE$  as, in order to pursue its investment opportunities, the company reinvests most or all its earnings in the business. But in the second period, having exhausted its franchise, the company will continue to grow at a lower rate  $G = H \cdot R$ .

# Two-period model

In the two-period framework:

$$V_t = \frac{D_t(1+G^*)}{1+R} + \frac{D_t(1+G^*)^2}{(1+R)^2} + \dots + \frac{D_t(1+G^*)^N}{(1+R)^N} + \frac{D_t(1+G^*)^N}{(1+R)^N} \cdot \frac{1+G}{R-G}$$

The company's fair value can be decomposed into a **N-period value NV** and a terminal or **End value EV**:

$$NV = \frac{D_t(1+G^*)}{1+R} + \dots + \frac{D_t(1+G^*)^N}{(1+R)^N} = \frac{D_{t+1}}{R-G^*} \left[ 1 - \left( \frac{1+G^*}{1+R} \right)^N \right]$$

$$EV = \frac{D_t(1+G^*)^N}{(1+R)^N} \cdot \frac{1+G}{R-G}$$

<http://www.massimofuggetta.com/2014/04/18/moat-question/>

# Advantages vs. the DDR model

The Two-period model is equivalent to a Dividend Discount Rate (DDR) model.

Like the DDR model, it is based on normalised earnings and is closed by the terminal growth rate and the cost of capital.

However, it has **three key advantages**:

- It delivers an absolute valuation gap, rather than a relative DDR spread.
- It focuses on the two key inputs of the Franchise Value:  $G^*$  and  $N$  – the growth rate and the length of the Franchise period.
- It allows for a variable Franchise period.



# The Two-period model in practice

Key inputs	Key questions	Key factors
Normalised EPS	What level of earnings can the company deliver in a 'normal' year?	Normal sector returns, competitive position, Free Cash Flow generation
Franchise period return on equity, ROE	Does the company have a franchise?	Return and valuation history, product differentiation, competitive advantage, pricing power
Franchise period retention ratio, $H^*$	What portion of earnings is reinvested in the business?	Capital allocation strategy, balance sheet strength, corporate governance
Length of the franchise period, $N$	How durable is the franchise?	Sector competitiveness, strategic advantage sustainability, management quality
Cost of capital, $R$	What is the appropriate cost of capital for present discounting of the company's cash flows?	Macroeconomic risk, sector risk, strategic risk, management risk
Long-term growth rate, $G$	What is the company's long-term growth rate?	Long term-macro economy growth rate