Aalto University
School of Business

Financial Statement Analysis (22E00100)

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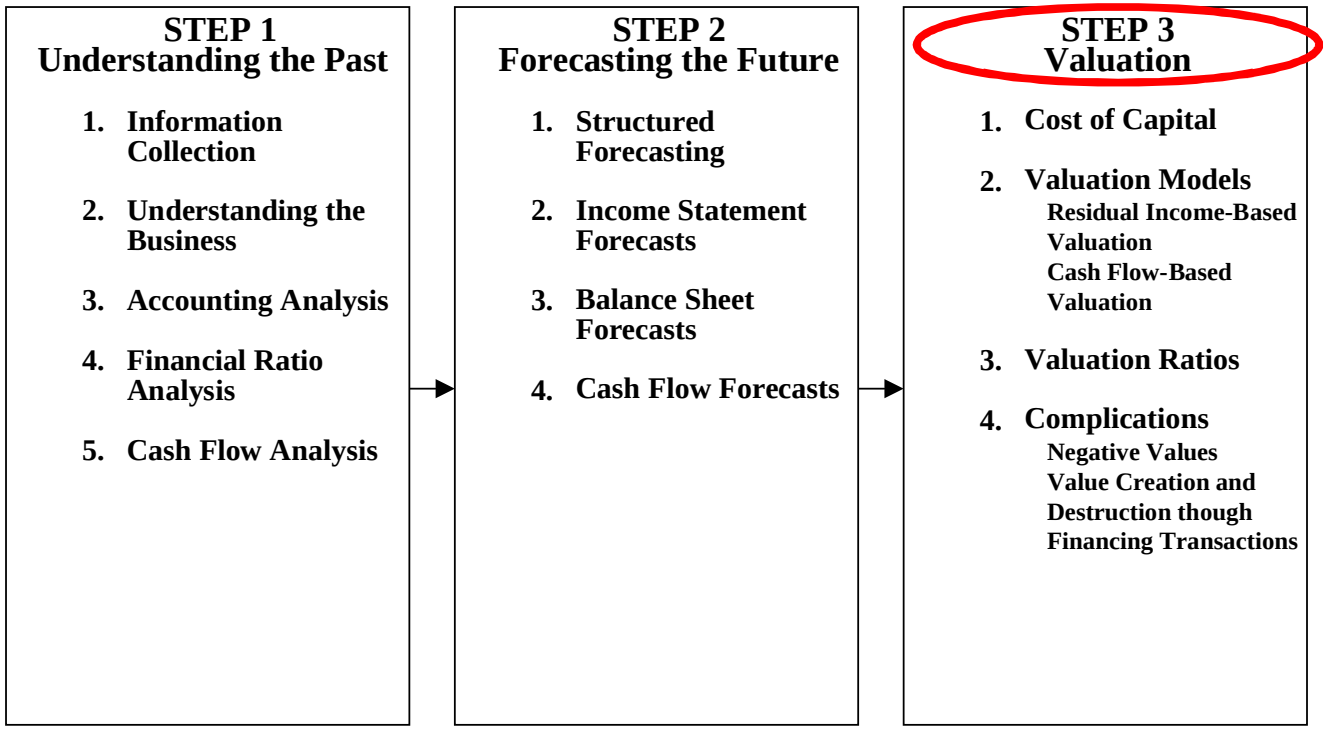
Framework for Business Analysis and Valuation



What is the intrinsic value of a firm?

- The intrinsic (equity) value of a firm is the present value of expected future payoffs to shareholders.
  - Unlike rare art, stocks are presumed to have an intrinsic value.
  - The intrinsic value of a Van Gogh painting is ill defined; basically, its value is what people are willing to pay for it.
  - But when investors think about equity valuation, we have in mind a monetary sum that corresponds to the present value (PV) of expected future payoffs to shareholders.
  - Each share, after all, is simply a fractional ownership claim on an ongoing business enterprise.

What is the intrinsic value of a firm?

- While the value of other assets may carry nonmonetary benefits (such as the consumptive value of the house we live in, or the pleasure derived from owning a painting), the value of stock ownership, by and large, derives from its claim to a firm's future cash flows.
- Alternative equity valuation methods differ in terms of technique, but they all have the same objective – to estimate the PV of these eventual payoffs to shareholders.

What is the intrinsic value of a firm?

1. Valuation involves forecasting
   - The technical differences in alternative valuation models are trivial when compared to the importance of making a better forecast of future payoffs.
2. Value is at best an educated guess
   - Given most companies are going-concerns with indefinite life-spans, the process of estimating their future payoffs will be highly subjective and imprecise
3. Historical accounting numbers are not enough
   - Reported accounting numbers should be useful, in conjunction with other information, in valuing firms.

Market returns vs. accounting earnings

- Financial reporting is concerned with presenting the economic history of an enterprise.
  - This economic history consists of contractually determined amounts arising from past exchanges.
  - Reported earnings cannot, and should not, anticipate profits from future exchanges that have not yet taken place.
- Market returns, on the other hand, are driven primarily by revisions in the market expectation of future profits from future exchanges.

Should GAAP earnings start anticipating future exchange transactions?

- The market has come to rely on accountants as the keepers of economic history.
- Benjamin Graham and his adherents: “Don’t put speculation into the financial statements; tell me what you know – what I can anchor on – but leave the speculation to me, the analyst”.
  - A corporate chronology might not be as exciting as science fiction, but at least we know what we are reading relates to economic events and transactions that really took place.
  - As soon as we start to anticipate future exchanges, we are into a world of speculation, and unfortunately (given dysfunctional managerial incentives and other moral hazard problems), it is often also a world of fiction.

Should GAAP earnings start anticipating future exchange transactions?

- The level of uncertainty associated with future revenue streams is many orders of magnitude larger than the uncertainty associated with the numbers we currently report.
- And as the pace of change quickens in our world, the level of uncertainty about a firm's future also increases. In such a world, a trustworthy historian is much needed.
- Equity valuations are opinions.
  - We can all have opinions about what a firm's value should be, but let us let these opinions be seen as what they are . . . subjective, speculative, quasi-educated guesses about the future.

Fair value accounting / Balance sheet approach

- The guiding philosophy behind this movement is that if we can find an external market for something that the company owns or owes (or a market for near-enough substitutes), we should book that "something" as an asset or a liability. This is a balance-sheet focus.
- The idea is to get the balance sheet to reflect the appropriate value of each asset and liability, or as close as possible.
  - This would presumably apply not only to fairly concrete and tangible assets (such as property, plant & equipment (PP&E)) or liabilities (such as Warranty Reserves), but also such intangibles as Brand Names, Patents, and Goodwill.

Fair value accounting / Balance sheet approach

- The key to more accurate valuation for most firms (particularly growth firms) is not the value of its “assets-in place”, but the “expected future growth opportunities” associated with those assets.
- The value of a firm’s “assets-in-place” is not what serious fundamental investors are really focused on.
- The key to successful investing is being able to better forecast the “expected-abnormal-growth-opportunities” associated with these assets.
- In other words, fundamental investors are interested in the value of the firm’s capacity for “wealth creation” in the future.

Fundamental investors

- What fundamental investors (“we”) need from accountants is information that helps them to make their own forecast of what these growth opportunities are likely to be.
- We need performance measures that help us evaluate the likely future performance of the company’s core operations (the wealth-creating engine) of the firm.
- We want to compute a measure of firm value that could be used to challenge and perhaps discipline the current market price.
- We do not need to have that market valuation parroted back to us in the form of GAAP numbers.

What about the market?

- The stock market also has an opinion about firm value, but it is a volatile and extremely noisy opinion.

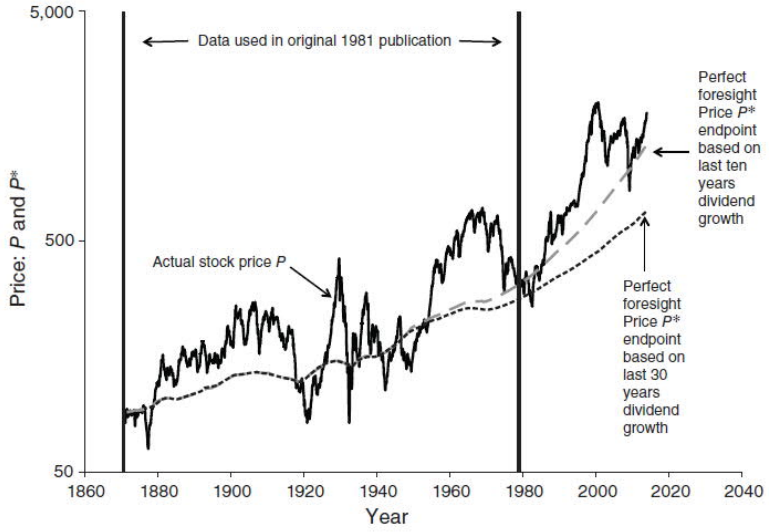


FIGURE 1. REAL STANDARD AND POOR'S COMPOSITE STOCK PRICE INDEX ALONG WITH PRESENT VALUES WITH CONSTANT DISCOUNT RATE OF SUBSEQUENT REAL DIVIDENDS ACCRUING TO THE INDEX 1871–1913. THE TWO PRESENT VALUES DIFFER IN THEIR ASSUMPTION ABOUT DIVIDEND GROWTH AFTER 2013.

https://search.proquest.com/docview/1529182992?accountid=27468

What about the market?

- Stock returns are driven by many forces unrelated to fundamentals
  - Investor sentiment, moods, or emotions, as well as market-wide fund flows, and other things that bear no relation to the PV of future cash flows.
  - Market prices are constantly buffeted by waves of noise trader sentiment, and the effect of these noise traders can only be partially mitigated by rational arbitrageurs, because the smart money is operating under various limitations, including cost and risk constraints.
- So even if our ultimate goal is to measure firm performance on the basis of changes in the PV of a company's future cash flows (which is a bad idea), accounting-based performance measures still cannot be replaced by something as capricious as stock returns.

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013

Eugene F. Fama, Lars Peter Hansen, Robert J. Shiller

Trendspotting in asset markets

There is no way to predict the price of stocks and bonds over the next few days or weeks. But it is quite possible to foresee the broad course of these prices over longer periods, such as the next three to five years. These findings, which might seem both surprising and contradictory, were made and analyzed by this year's Laureates, Eugene Fama, Lars Peter Hansen and Robert Shiller.

The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2013

Eugene F. Fama, Lars Peter Hansen, Robert J. Shiller

- In characterizing this contribution, the committee said their findings “showed that markets were moved by a mix of rational calculus and human behavior.”
- It would be most unfortunate if accountants decided it is better to simply rely on markets to tell us how to measure performance.
- With all of their attendant problems and limitations of GAAP (and we know there are many), investors at least generally know what they are looking at in these statements.
  - The fear is that even this tenuous link to historical reality may sometimes be lost if we dive headlong into certain types of “fair value accounting.”

The usefulness of accounting to valuation

- Why do we need historical-based accounting, even if our main interest is in deriving an estimate of the PV of future cash flows?
- There are at least three important reasons why historical accounting numbers (and the accounting systems that generate them) are crucial to the task of valuing companies.

1) Accounting provides a language for forecasting

- Thanks largely to the "revenue recognition" and "expense matching" principles, GAAP earning is a reasonably objective measure of performance in terms of economic exchanges that took place during a given time period. As a measure of period-specific performance, accrual-based GAAP earnings are better than dividends or cash-flow measures. This is why financial analysts typically express their predictions in terms of earnings, not cash flows or dividends.

The usefulness of accounting to valuation

- A valuation model is helpful because it specifies what is to be forecasted, directs you to the information needed to make the forecast, and shows how to convert a stream of expected payoffs into a value estimate. However, the essential task in valuation is not algebraic manipulation of valuation equations. The essential task in valuation is forecasting, and accrual-based accounting systems help us to make forecasts.

2) Accounting provides an ex post settling-up mechanism

- Since accounting systems provide a structure for expressing what happened in a given time period, they impose discipline on market participants engaged in making forecasts about these time periods.
- Today's earnings forecasts have credibility only because they can be compared to the actual (and audited) numbers reported in the future.
- The more we allow companies to change the rules of the game after the forecast has been issued, the more we risk the integrity of the settling-up mechanism.

The usefulness of accounting to valuation

3) Accounting information is useful in forecasting

- Although the GAAP accounting numbers are related to exchange transactions that have already taken place, they provide a wealth of information for making forecasts about the future.
- Fundamental analysis may be viewed as an art of using the existing information, such as historical financial statements, to make better forecasts.
- Analysts evaluate the quality of reported earnings, for example, with the hope of making better forecasts of future earnings.
- Analysts also study a firm's footnote disclosure to glean information about contingencies, off-balance-sheet assets and liabilities, line-of-business information, and so on.

Summary

- Equity valuation is the task of forecasting the PV of the stream of expected payoffs to shareholders.
- In making this forecast, we specify a valuation model, and we predict its parameters with the aid of fundamental analysis.
- Historical GAAP financial statements are important for valuation, because they provide a language for forecasting and an ex post settling-up mechanism.
- Summary measures from historical financial statements, such as reported earnings or book value, are not sufficient statistics for the stream of expected payoffs.

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Cost of Capital

Cost of Equity Capital (r_e)

- r_e = risk free rate + risk premium
- risk free rate = 10-year U.S. T-Note yield (or country's equivalent)
- risk premium = ?????
  - 'CAPM' says β x equity premium
  - β represents sensitivity of security to market-wide risk
  - equity premium represents risk premium for market-wide risk
    - ✓ U.S. realized historical average = 7%
    - ✓ worldwide realized historical average = 4%
    - ✓ implied historical average = 3%
    - ✓ theoretical = 1%

Cost of Equity Capital (r_e)

- You ask: ”*Does not the CAPM give us a cost-of-capital? That’s what they teach in business school!*”
- Let’s be frank: After fifty years of research, with Nobel Prizes won, we do not know how to measure the cost-of-capital.
  - The CAPM and like models require inputs of covariances, betas, and expected market risk premiums, all of them expectations (in the mind of beholder) rather than concrete observables.
  - These features are then deemed to vary randomly; correlations change, betas change, the market risk premium changes, all unpredictably, to overwhelm the investor trying to find an anchor.

Cost of Equity Capital (r_e)

- **One's price of risk is a very personal thing, it depends on one's tolerance for risk, so objective measurement of a risk premium is misdirected.**
- Studies report a large variation in people's estimate of the risk premium.
    - http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1473225
    - http://www.jstor.org/stable/10.1086/209653
    - https://doi.org/10.1093/qje/qjw034
  - Your disposition to risk may be quite different from mine.
  - You will take personal responsibility for taking risk, rather than delegating the task to a machine model that pretends to deliver your required return.

Weighted Average Cost of Capital (r_w)

- The weighted average cost of capital (WACC) is the rate that a company is expected to pay on average to all its security holders to finance its assets.

Weighted Average Cost of Capital (r_w)

Calculation [edit]

In general, the WACC can be calculated with the following formula:[3]

$$\mathrm{WACC} = \frac{\sum_{i=1}^{N} r_i \cdot MV_i}{\sum_{i=1}^{N} MV_i}$$

where N is the number of sources of capital (securities, types of liabilities); r_i is the required rate of return for security i; and MV_i is the market value of all outstanding securities i.

In the case where the company is financed with only equity and debt, the average cost of capital is computed as follows:

$$\mathrm{WACC} = \frac{D}{D+E} K_d + \frac{E}{D+E} K_e$$

where D is the total debt, E is the total shareholder's equity, Ke is the cost of equity, and Kd is the cost of debt. The market values of debt and equity should be used when computing the weights in the WACC formula.[4]

Modigliani–Miller theorem

Proposition I [edit]

$V_U = V_L$

where

V_U *is the value of an unlevered firm* = price of buying a firm composed only of equity, and V_L *is the value of a levered firm* = price of buying a firm that is composed of some mix of debt and equity. Another word for levered is *geared*, which has the same meaning.[3]

To see why this should be true, suppose an investor is considering buying one of the two firms U or L. Instead of purchasing the shares of the levered firm L, he could purchase the shares of firm U and borrow the same amount of money B that firm L does. The eventual returns to either of these investments would be the same. Therefore the price of L must be the same as the price of U minus the money borrowed B, which is the value of L's debt.

Modigliani–Miller theorem

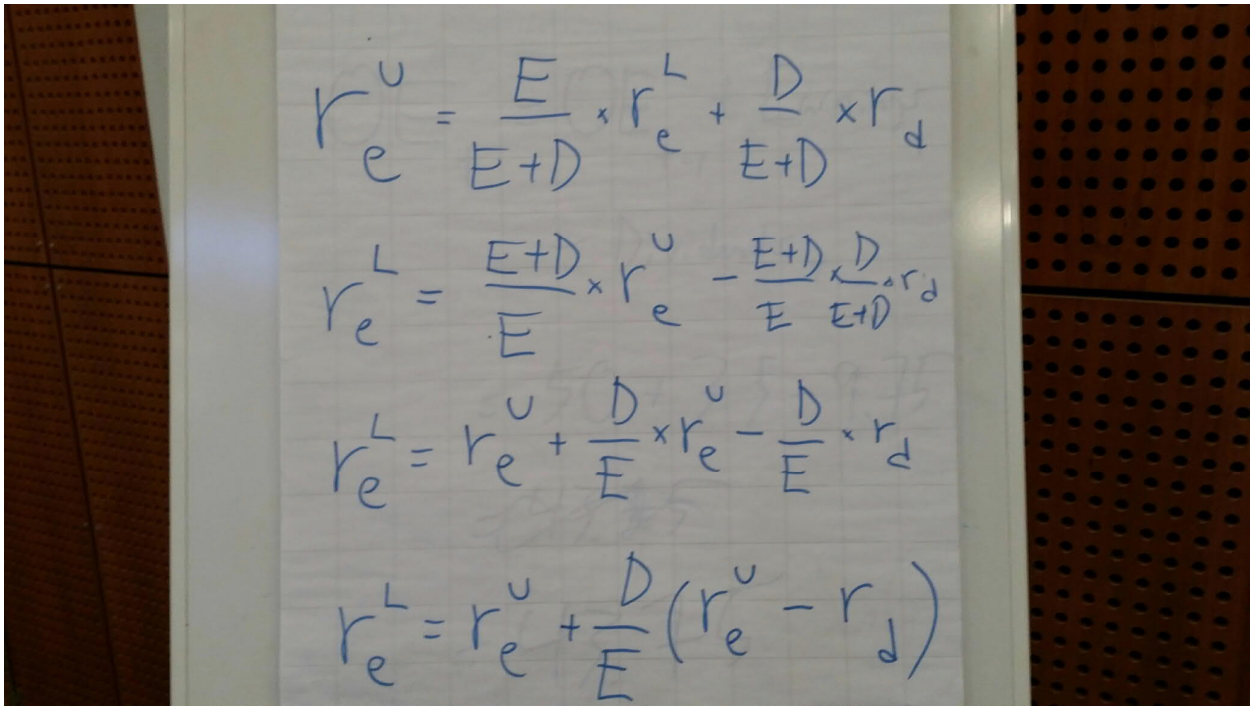
Proposition II [edit]

$$r_E(\text{Levered}) = r_E(\text{Unlevered}) + \frac{D}{E}(r_E(\text{Unlevered}) - r_D)$$

here

- r_E *is the required rate of return on equity, or cost of equity.*
- r_D *is the required rate of return on borrowings, or cost of debt.*
- $\frac{D}{E}$ *is the debt-to-equity ratio.*

Modigliani–Miller theorem
Recall the WACC formula



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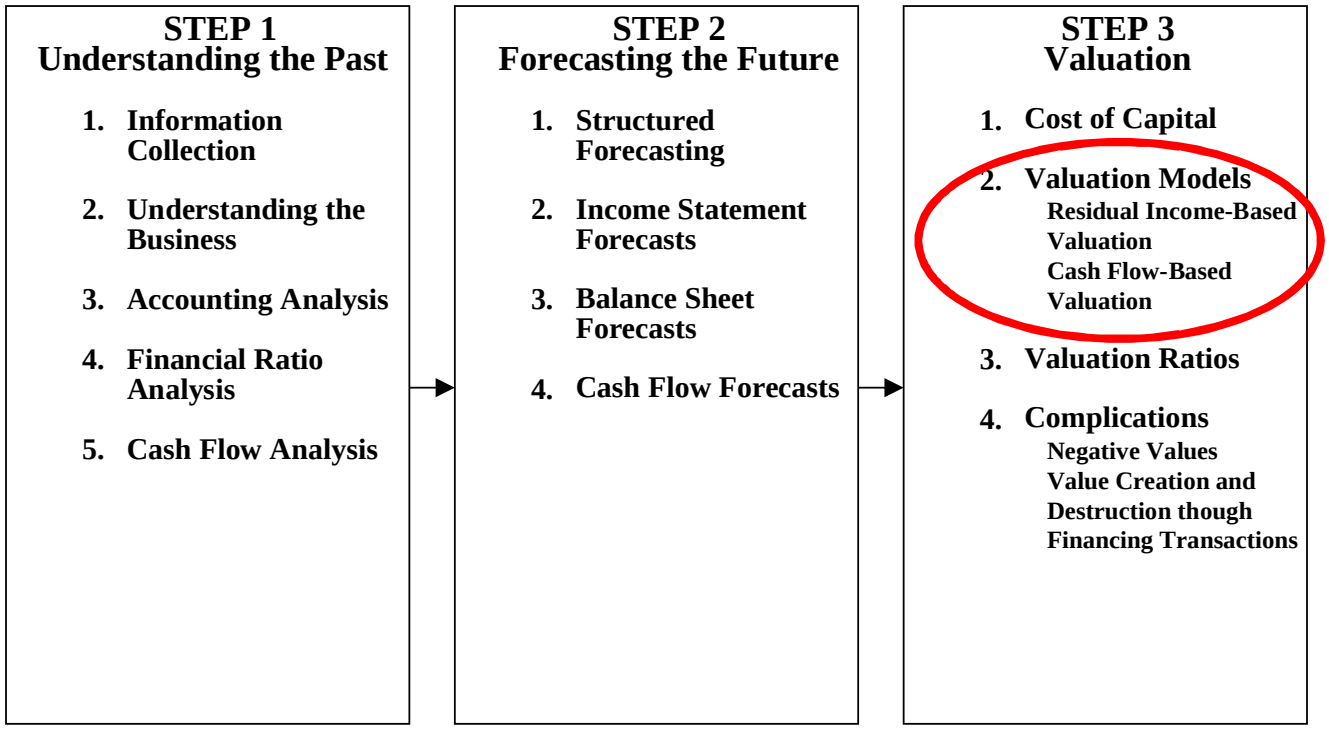
Valuation Models

Framework for Business Analysis and Valuation



Alternative Approaches to Valuation

- Discounted Dividends
- Discounted Free Cash Flow
- Discounted Residual Income
- Earnings Multiples and Related Heuristics

Dividend Discounting Model

$$P_0 = \sum_{t=1}^{\infty} \frac{Div_t}{(1 + r_e)^t}$$

where

P_0 = equity value at the end of period 0

Div_t = net cash distributions to equity at the end of period t

r_e = cost of equity capital

Problems With Discounting Dividends

- Most growth companies pay no dividends, and may plan not to pay dividends for many years
- Most companies reinvest a large proportion of their earnings rather than paying them out as dividends
- Dividends measure wealth distribution rather than wealth creation

Traditional Discounted Free Cash Flow Model (to All Investors)

$$P_0 = \sum_{t=1}^{\infty} \frac{FCF_t}{(1 + r_W)^t} - Debt_0$$

where

P_0 = equity value at the end of period 0

FCF_t = free cash flows to debt and equity holders during period t

r_W = weighted average cost of capital

$Debt_0$ = value of debt at the end of period 0

Discounting Free Cash Flows to Equity

$$P_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1 + r_e)^t}$$

where

P_0 = equity value at the end of period 0

$FCFE_t$ = free cash flows to equity holders during period t

r_e = cost of equity capital

Problems With Discounting Free Cash Flows

- Cash flows are difficult to forecast because they depend on the timing of events that do not have a big impact on value (e.g., timing of equipment/inventory purchases).
- For growth companies, cash flows may be negative for many years to come.
- Cash flows provide a noisy and untimely measure of firm performance.
- Unfortunately, the cash flows reported in the statement of cash flows do not correspond exactly with the inputs to the DCF model.

Discounted Residual Income Model

$$P_0 = CE_0 + \sum_{t=1}^{\infty} \frac{NI_t - r_e * CE_{t-1}}{(1 + r_e)^t}$$

where

P_0 = equity value at the end of period 0

NI_t = net income for period t

r_e = cost of equity capital

CE_t = book value of common equity at the end of period t

The Discounted Residual Income Valuation Model

- We can rewrite the dividend discounting formula as:

  $Value_0 = Equity_0 + RI_1/(1+r) + RI_2/(1+r)^2 \ldots$

  where Equity = book value of equity; and

  RI = residual income

  r = discount rate

- RI = Income - (r x Equity)
- RI = ((Income/Equity) - r) x Equity
- RI = (ROE- r) x Equity

Normal earnings

Return on Equity

The Key Drivers of Value

- ROE
  - Create value by generating long-run ROE that exceeds r
  - Business strategy and competitive environment
  - Accounting distortions affect short-run ROE

- Growth in Equity
  - Magnifies value created by ROE
  - If ROE>r, then growth creates value
  - If ROE<r, then growth destroys value

Discounted Residual Income Model Focuses on Key Value Drivers

$$\frac{P_0}{CE_0} = 1 + \sum_{t=1}^{\infty} \frac{\left(\frac{NI_t}{CE_{t-1}} - r_e\right) * \frac{CE_{t-1}}{CE_0}}{(1 + r_e)^t}$$

This expression indicates that value is created by:

1. Generating a long-run ROE that exceeds the cost of capital (focus on profit margin and asset turnover)
2. Growing the size of the investment base on which the ROE is generated (focus on sales growth)

The “residual-income model” (RIM)

Alternative notation

The most common form of the RIM in the academic literature expresses a firm’s value in terms of its current book value and future expected abnormal accounting rates-of-returns:

$$P_t^* = B_t + \sum_{i=1}^{\infty} \frac{E_t[\mathrm{NI}_{t+i} - (r_e{}^* B_{t+i-1})]}{(1+r_e)^i}, \qquad (1)$$

$$= B_t + \sum_{i=1}^{\infty} \frac{E_t[(\mathrm{ROE}_{t+i} - r_e)^* B_{t+i-1}]}{(1+r_e)^i},$$

where B_t is the book value at time t; $E_t[\cdot]$ is the expectation based on information available at time t; NI_{t+i} is the net income for period $t+i$; r_e is the cost of equity capital; and ROE_{t+i} is the after-tax return on book equity for period $t+i$.[13] In this formula, the residual income (RI) for period t is defined in terms of period t earnings, minus a normal rate-of-return on the beginning capital base. Notionally: $\mathrm{RI}_t = \mathrm{NI}_t - (r * B_{r-1})$.

The “residual-income model” (RIM)

- An attractive aspect of the RIM is that it allows us to express Firm Value (i.e., the PV of a firm’s future cash flows) in terms of variables that appear in financial statements.
- In fact, with a sharp pencil and some high school algebra, it is easy to show that Equation (1) is simply a mathematical re-expression of the dividend discount model, with the addition of the “Clean Surplus Relation” (CSR).
- Setting aside the details on the right-hand side of Equation (1) for a moment, notice that this equation has decomposed the firm value into two components:

$$\text{Firm Value}_t = \text{‘Capital}_t\text{’} + \text{‘PVRI}_t\text{’}, \qquad (2)$$

where the book value at period t is “Capital$_t$,” or the initial Invested Capital base, and the rest of the right-hand side is the “Present Value of Future Residual Income,” or “PVRI$_t$.”

Two Stage Discounted Residual Income Model

$$P_0 = CE_0 + \sum_{t=1}^{T} \frac{NI_t - r_e * CE_{t-1}}{(1+r_e)^t} + \frac{NI_{T+1} - r_e * CE_T}{(r_e - g)(1+r_e)^T}$$

where

P_0 = equity value at the end of period 0

NI_t = net income for period t

r_e = cost of equity capital

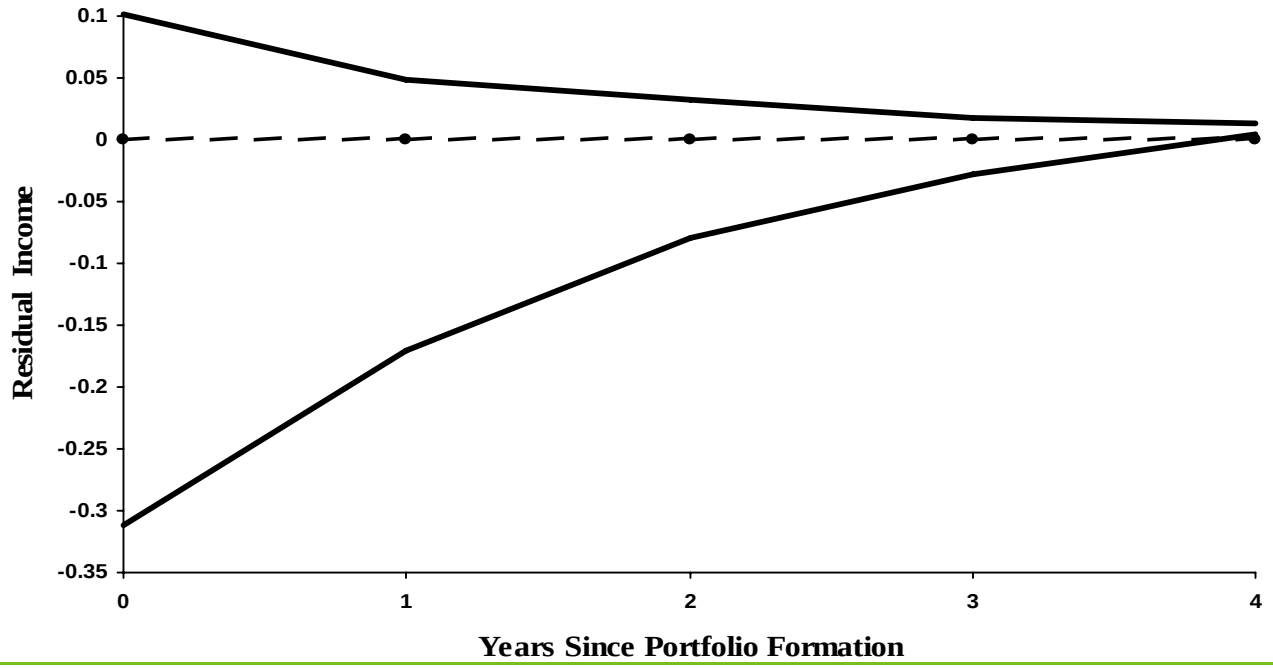
CE_t = book value of equity at the end of period t

g = constant terminal growth rate in residual income beyond period T+1

Advantages of Discounting Residual Income

- Unlike dividends and cash flows, earnings provide a reasonably reliable and timely measure of firm performance
- Accounting analysis and ratio analysis provides a framework for evaluating earnings performance
- Most practicing investors seem to use earnings to evaluate equities

Subsequent Performance for Firms With Extreme Residual Income



Discounting Residual Income to All Investors (Debt and Equity)

$$P_0 = NOA_0 + \sum_{t=1}^{\infty} \frac{NOI_t - r_W * NOA_{t-1}}{(1 + r_W)^t} - Debt_0$$

where

P_0 = equity value at the end of period 0

NOI_t = net operating income (after taxes)

r_W = weighted average cost of capital

NOA_t = net operating assets at the end of period t

$Debt_0$ = value of debt at the end of period 0

Microsoft Corporation

Microsoft is said to have value in its network externalities, the dominance of Win-dows, its brand, and its product R&D. None of these assets are on its balance sheet. After publishing its annual report for fiscal year ending June 2008, Microsoft traded at $25 per share or $228,775 million. With a book value of $36,286 million, the market saw a considerable value, $192,489 million, missing from the balance sheet (the price-to-book ratio is 6.3). The book value of $36,286 million was made up of a mere $12,624 million of net operating assets (enterprise book value) and $23,662 million of cash and near-cash investments (and no financing debt). The income statement for 2008 reported interest income on the cash and near-cash assets of $846 million (after an allocation of tax) and after-tax operating income from the business of $16,835 million, for a total net income of $17,681 million.

Required

Let's give Microsoft a required return, *r,* of 9 percent. Apply a residual income to all investors with no-growth valuation.

Microsoft Corporation

Equity value = Enterprise value + Value of Cash

$$= \text{Net operating assets}_{2008} + \frac{Residual\ operating\ income_{2009}}{r} + Cash_{2008}$$

$$Equity\ value = 12{,}624 + \frac{16{,}835 - (0.09 \times 12{,}624)}{0.09} + 23{,}662$$

$$= 210{,}718, or\ \$23.03\ per\ share.$$

- Note that the valuation forecast 2009 enterprise income as being the same as that reported for 2008.
- Although considerable value is missing in the balance sheet, the accounting that includes earnings explains almost all the value that the market sees in its $25 price!

Dell Inc.

Dell, the computer manufacturer, is said to have valuable organizational capital. Trading at $20 per share or an equity market capitalization of $41,200 million at the time, the market attributed considerable value to Dell over the book value of $3,735 million (a price-to-book of 11). The missing balance sheet value could readily be attributed to the enterprising way Dell organizes its business. The low operating asset values mean that shareholders need invest less to get value. The big feature of the balance sheet is the negative net operating assets—$5,076 million in 2008.

The consensus analyst operating income forecast for 2009 is $1,433 million. Dell's required return is 10%, and the long-term abnormal operating income growth rate (beyond 2010) is assumed to be 3%. Assume also that no dividends, additional stock issuances or repurchases are made. Apply residual operating income valuation model. What would the company's shares then be worth (price per share or equity market capitalization)?

Solution

$$A = L + OE$$
$$op.A + fin.A = op.L + fin.L + OE$$
$$op.A - op.L = fin.L - fin.A + OE$$
$$NOA = NFO + OE$$
$$NFO = -5{,}076 - 3{,}735$$
$$NFO = -8{,}811$$

$$Value = NOA_{2008} + \frac{NOPAT_{2009} - r \times NOA_{2008}}{(r-g)} - NFO$$
$$= -5{,}076 + \frac{1{,}433 - 10\% \times (-5{,}076)}{(10\% - 3\%)} - (-8{,}811) = 31{,}458$$

Calculus Example

You invest 100 Euros (at time 0) and expect to receive 115 Euro in cash in one year. You required return on the investment is 9 percent.

A. Calculate the value of the investment at time 0 using the DCF model.

B. Calculate the value of the investment at time 0 using the abnormal earnings model (Hint: assume that the initial investment is expensed during the year).

C. Suppose that you invest 80 Euros to another project that is also expected to give 115 Euros and you require the same 9 percent return as for the investment in A). Calculate the value of this investment.

D. Discuss the reason for the results you got.

Solution

A. Value of investment = Present value of cash expected cash flow = $\frac{115}{1.09} = \mathbf{105.50}$

B. Book value of investment = 100

- Earnings, Year 1 = 115 - 100 = 15 (100 represents the expensing of the investment)
- Abnormal earnings: $AE_1 = 15 - (0.09 \times 100) = 6$
- Value of investment = 100 + PV of expected AE = $100 + \frac{AE_1}{1.09} = 100 + \frac{6}{1.09} = \mathbf{105.50}$

C. Book value of investment = 80

- Earnings, Year 1 = 115 – 80 = 35
- $AE_1 = 35 - (0.09 \times 80) = 27.8$
- Value of investment = 80 + PV of expected AE = $80 + \frac{27.8}{1.09} = \mathbf{105.50}$

D) Under the same assumptions, DCF and abnormal earnings models give identical solutions. The initial investment C) is smaller than in A), but the expected abnormal earnings are greater. These effects offset each others.

Analysis Example

Consider the cash flows (see next slide) by Wal-Mart and Home Depot, the two big retailers, during their growth stage, and General Electric (GE), he industrial conglomerate with a finance arm. Suppose you were evaluating these firms at the beginning of the years indicated here and were told what the cash flows and earnings were going to be, for sure. You also know sure that:

i. by January 31,1992, Wal-Mart traded at $67,649 million

ii. by January 31,1998, Home Depot traded at $43,103 million

iii. by December 31, 1999, General Electric traded at $508,329 million.

Required

a) Discuss the relative merits of each performance measure (CFO, FCF, and earnings). Do you think the notion “Cash Is King” is well served?

b) Compute P/E ratios for all three companies at the beginning of the years.

Accounting performance measures for Wal-Mart Stores, Home Depot, and General Electric (in millions of dollars)

Wal-Mart Stores Inc.					
	1992	1993	1994	1995	1996
Cash from operations	1,553	1,540	2,573	3,410	2,993
Cash investments	2,150	3,506	4,486	3,792	3,332
Free cash flow	(597)	(1,966)	(1,913)	(382)	(339)
Earnings	1,608	1,995	2,333	2,681	2,740
EPS	0.70	0.87	1.02	1.17	1.19

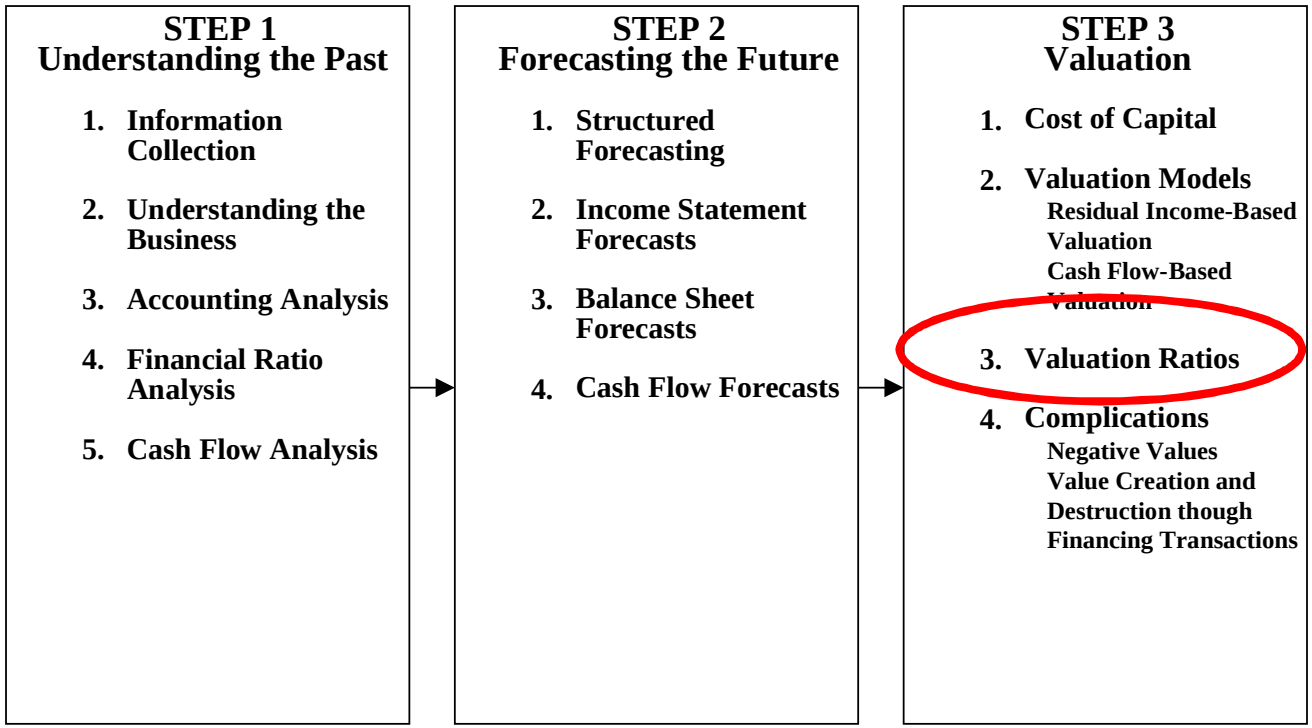
Home Depot Inc.					
	1998	1999	2000	2001	2002
Cash from operations	1,055	1,894	2,439	2,977	5,942
Cash investments	1,376	2,273	2,620	3,521	3,406
Free cash flow	(321)	(379)	(181)	(544)	2,536
Earnings	1,160	1,614	2,320	2,581	3,044
EPS	0.80	1.10	0.73	1.11	1.30

General Electric Co.					
	2000	2001	2002	2003	2004
Cash from operations	30,009	39,398	34,848	36,102	36,484
Cash investments	37,699	40,308	61,227	21,843	38,414
Free cash flow	(7,690)	(910)	(26,379)	14,259	(1,930)
Earnings	12,735	13,684	14,118	15,002	16,593
EPS	1.29	1.38	1.42	1.50	1.60

Bottom Line on Valuation Models

- Discounted dividends, discounted free cash flow and discounted residual income are all theoretically valid valuation models.
- Your valuations should always be based on a complete and consistent set of forecast financial statements, in which case you will get the same value regardless of the valuation model used.
- Your forecast horizon must extend out far enough that you reach a constant terminal growth rate in the flow that you are discounting – at which point you can make a terminal value computation.

Framework for Business Analysis and Valuation



Determinants of Valuation Ratios

- By re-arranging the residual income valuation model, we can identify the determinants of common valuation ratios.
- The algebra is not important, but the intuition behind the resulting expressions is useful.

Residual Income Model and the Market-to-Book Ratio

$$\frac{P_0}{BVE_0} = 1 + \sum_{t=1}^{\infty} \frac{\left(\frac{NI_t}{BVE_{t-1}} - r_e\right) * \frac{BVE_{t-1}}{BVE_0}}{(1+r_e)^t}$$

The key to a high market-to-book ratio is:

1. Generating a long-run ROE that exceeds the cost of capital (focus on profit margin and asset turnover)
2. Growing the size of the investment base on which the ROE is generated (focus on sales and sales growth)

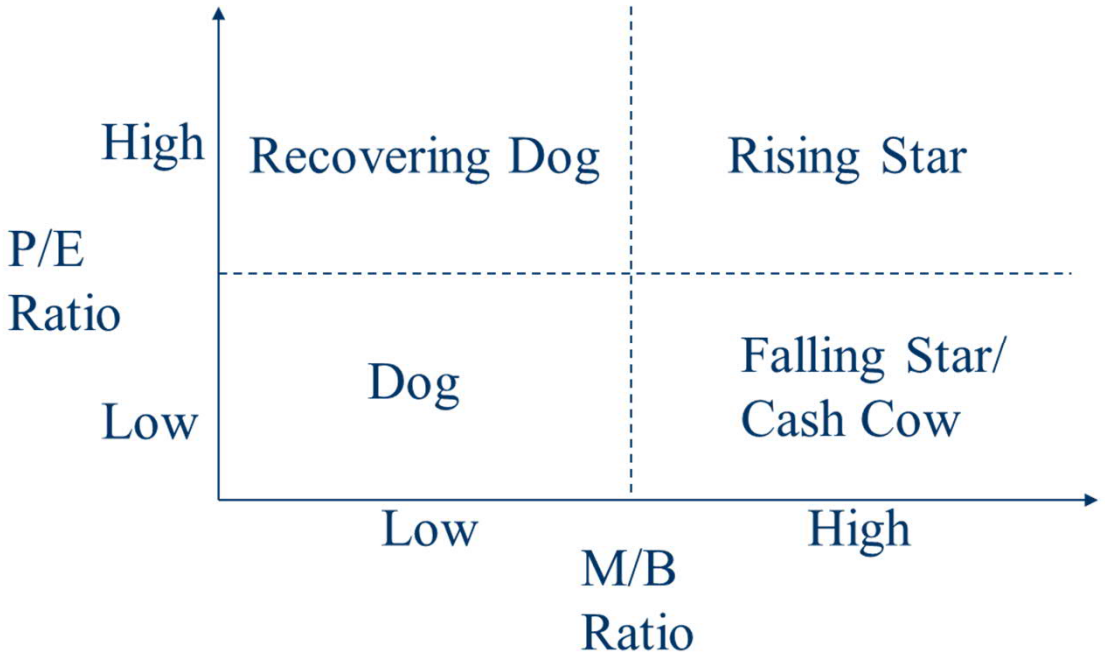
Determinants of the Market-to-Book Ratio

- The Market-to-Book ratio, P_0/BVE_0, is:
  - High for firms whose future ROE is expected to be high relative to r
  - Low for firms where future ROE is expected to be low relative to r
  - Growth magnifies the above effects

Determinants of the Price-to-Earnings Ratio

- The Price-to-Earnings Ratio, P/E, is:
  - High for firms whose future ROE is expected to be high relative to its current ROE
  - Low for firms whose future ROE is expected to be low relative to its current ROE
  - Growth magnifies the above effects

Valuation Ratio Classifications



Key Takeaways

- Valuation ratios are simple heuristics and are not a substitute for thorough valuation analysis.

- Valuation ratios are useful for preliminary assessments of the expectations about future fundamentals that are built into stock prices.

Valuation Ratios

- Valuation ratios, such as the book-to-market ratio and the price-to-earnings ratio are frequently used in decisions involving the ‘fair value’ of investments:
  - comparing two alternative investments to see which one is most attractively valued
  - determining the value of an investment that is not publicly traded
  - evaluating the reasonableness of a takeover bid

Richardson et al. (2010, *JAE*) survey

Sent to active members of *CFA Institute* and well-known academics

Q6: Over the last 12 months, how often have you used the following valuation techniques in your work? (Practitioner—solid/*Academic—italics*)

	Frequently (%)	Infrequently (%)	Never (%)
Earning multiples	74 *54***	2 *33*	3 *13***
Book value multiples	52 *38**	41 *50*	7 *12*
Cash flow multiples	53 *25***	39 *29*	8 *46***
Discounted free cash flow model	59 *58*	28 *38*	13 *4***
Discounted dividend model	26 *21*	43 *50*	31 *29*
Residual income (economic profit) model	16 *71***	46 *17***	38 *12***
Other multiples	26 *23*	25 *41**	49 *36**
Other valuation models	25 *29*	22 *38***	53 *33***