Equity Analysis FN 451

-Role of an equity analyst

<u>Fundamental analysis:</u>

- Approach of fundamental analysis & assets allocation

-Economic, industry and firm analysis and financial forecast

<u>Valuation Technique:</u>

- Fundamental of assets valuation
- Dividend discount model
- **Discounted cash flow model**
- Market multiples

- Workshop: Equity research report writing and analyst presentation technique

THAMMASAT
BUSINESS SCHOOL

- Banking sector analysis

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Discounted cash flow model

Course lecturer: Sirinattha Techasiriwan

When to apply FCF models?

- Analysts like to use free cash flow valuation models (FCFF or FCFE) to value a stock when:
  - the firm is **not dividend paying**
  - the firm is dividend paying but **dividends differ significantly from the firm's capacity to pay dividends**

How to determines a firm's fundamental, or intrinsic, value?

Intrinsic value is the sum of all the future expected **free cash flows** when converted into today's dollars (present value):

$$\text{Value} = \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \dots + \frac{FCF_\infty}{(1+r)^\infty}$$

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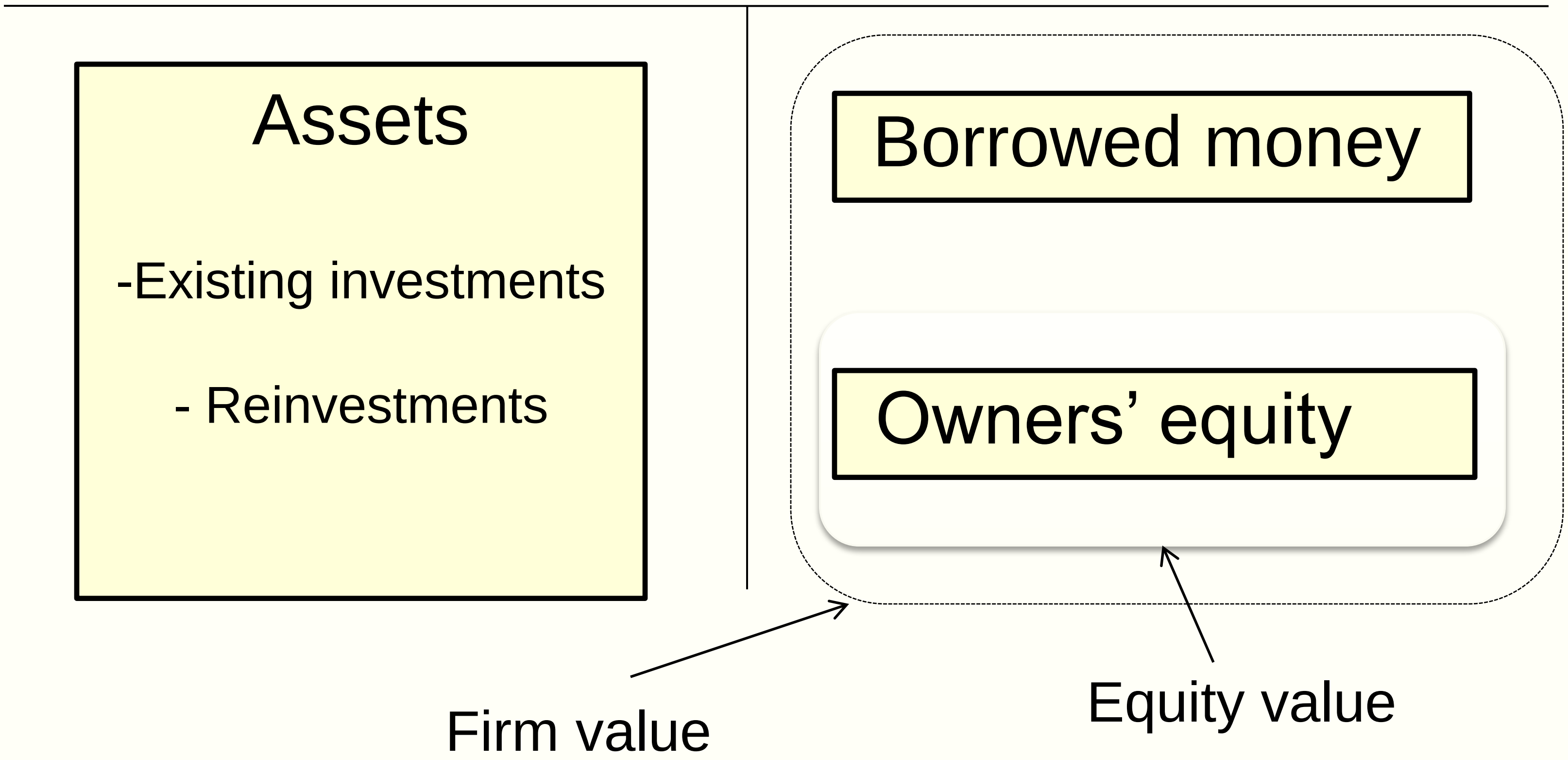
View of a firm



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Free cash flow to the firm (FCFF)

- **Free cash flow to the firm (FCFF)** is the cash flow after all operating expenses have been paid and **necessary investments in working capital and fixed capital** have been made.
  - **It is the cash flow available to the firm's suppliers of capital**
  - **The firm's suppliers of capital** include common stockholders, bondholders, and, sometimes, preferred stockholders.

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Free cash flow to equity (FCFE)

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

Valuing the firm

The FCFF valuation approach

- The value of the firm is the present value of future FCFF discounted at the **weighted average cost of capital (WACC)**

$$\text{Firm Value} = \sum_{t=1}^{\infty} \frac{\text{FCFF}_t}{(1+\text{WACC})^t}$$

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How to determine WACC?

- If the suppliers of capital are creditors and stockholders, the required rates of return for debt and equity are the **after-tax required rates** of return for the firm under **current market conditions**.
- The weights that are used are the proportions of the total **market value** of the firm that are from each source, debt and equity.

$$WACC = \frac{MV(debt)}{MV(debt)+MV(equity)} r_d (1 - Tax \quad rate) + \frac{MV(equity)}{MV(debt)+MV(equity)} r_e$$

- MV(debt) and MV(equity) are the **current market values of debt and equity**, not their book or accounting values. The weights will sum to 1.0.

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How to calculate equity value from the firm value?

- Equity Value = Firm Value – **Market Value of Debt**
- Subtracting the market value of debt from the firm value gives the **value of equity**.
- Dividing the total value of equity by the number of outstanding shares gives the value per share.

Equity value from FCFE

The FCFE valuation approach

- The value of equity can also be found by **discounting FCFE at the required rate of return on equity (r):**

$$\text{Equity Value} = \sum_{t=1}^{\infty} \frac{\text{FCFE}_t}{(1+r)^t}$$

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Single-stage constant-growth FCFF valuation model

- **The value of the firm if FCFF is growing at a constant rate is**

$$\text{Firm Value} = \frac{\text{FCFF}_1}{\text{WACC} - g} = \frac{\text{FCFF}_0(1+g)}{\text{WACC} - g}$$

Single-stage, constant-growth FCFE valuation model

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

$$\text{Equity Value} = \frac{\text{FCFE}_1}{r-g} = \frac{\text{FCFE}_0(1+g)}{r-g}$$

* *The discount rate is r, the required return on equity.*

Two-stage FCF model: FCFF

- A general expression for the two-stage FCFF valuation model is

$$\text{Firm Value} = \sum_{t=1}^{n} \frac{\text{FCFF}_t}{(1+\text{WACC})^t} + \frac{\text{FCFF}_{n+1}}{(\text{WACC}-g)} \frac{1}{(1+\text{WACC})^n}$$

Terminal value

Two-stage FCF model: FCFE

- The general expression for the two-stage FCFE valuation model is

$$\text{Equity} = \sum_{t=1}^{n} \frac{\text{FCFE}_t}{(1+r)^t} + \frac{\text{FCFE}_{n+1}}{r-g}\frac{1}{(1+r)^n}$$

Terminal value

Important note on “g”

- The growth rate of FCFF and the growth rate of FCFE are frequently <u>not</u> equivalent.

Important note on "discount rate"

The discount rate should be consistent with both **riskiness** and the **type of cash flows being discounted**.

The rate at which the cash flows are discounted to equity is **the cost of equity (k_e)**.

The rate at which the cash flows are discounted to firm **The cost of capital (WACC)**.

Important note on “WACC”

- WACC is affected by:
  - Capital structure (the firm’s relative use of debt and equity as sources of financing)
  - Interest rates
  - Risk of the firm / Investors’ overall attitude toward risk

Three aspects of cash flows on an investment's value

- Amount of expected cash flows
- Timing of the cash flow stream
- Risk of the cash flows

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Example: Proust Company

Proust Company has free cash flow to the firm of $1.7 billion and free cash flow to equity of $1.3 billion. Proust's weighted average cost of capital is 11 percent and its required rate of return for equity is 13 percent. FCFF is expected to grow forever at 7 percent and FCFE is expected to grow forever at 7.5 percent. Proust has debt outstanding of $15 billion.

- What is the total value of Proust's equity using the FCFF valuation approach?

- What is the total value of Proust's equity using the FCFE valuation approach?

Proust Company solution

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Example: BHP Billiton Ltd.

Watson Dunn is planning to value BHP Billiton Ltd. BHP is a provider of a variety of industrial metals and minerals. The financial information Dunn has assembled for his valuation is:

- 1,852 million shares outstanding
- market value of debt is $3.192 billion
- free cash flow to the firm is currently $1.1559 billion
- equity beta is 0.90, the market risk premium is 5.5 percent, and the risk-free discount rate is 5.5 percent
- before-tax cost of debt is 7.0 percent
- tax rate is 40 percent
- for purposes of calculating the WACC, assume the firm is financed 25 percent debt
- FCFF growth rate is 4 percent

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BHP Billiton Ltd. solution

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Computing FCFF

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Computing FCFF from Net Income

FCFF = **Net income** available to common shareholders
Plus: Net Non-Cash Charges
Plus: Interest Expense times (1 – Tax rate)
Less: Investment in Fixed Capital
Less: Investment in Working Capital

FCFF = NI + NCC + Int(1 – Tax rate) – Inv(FC) – Inv(WC)

- Some common **non-cash charges (NCC) and the adjustments to net income** to get cash flow are:

Non-Cash Item	Adjustment to NI to arrive at CF
Depreciation	Added Back
Amortization of intangibles	Added Back
Restructuring Charges (expense)	Added Back
Restructuring Charges (income resulting from reversal)	Subtracted
Losses	Added Back
Gains	Subtracted
Amortization of long-term bond discounts	Added Back
Amortization of long-term bond premium	Subtracted
Deferred taxes	Warrants special attention

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Non-cash charges: Deferred taxes

- Deferred taxes result from a difference in timing of reporting income and expenses on the company's tax return.
- The income tax expense deducted in arriving at net income for financial reporting purposes is not the same as the amount of cash taxes paid.
- **Over time these differences between book and taxable income should offset each other and have no impact on aggregate cash flows.**
- In this case, **no adjustment would be necessary for deferred taxes.**

Non-cash charges: Deferred taxes

- In some circumstances, however, **a company may be able to persistently defer taxes until a much later date.**
- **If a company is growing and has the ability to indefinitely defer tax liability, an analyst adjustment (add-back) is warranted.**
- An acquirer must be aware, however, that these taxes may be payable at some time in the future.

Computing FCFF from cash flow statement

Cash flow from operations (CFO) consists of the inflows and outflows of cash resulting from transactions that affect the firm's net income.

Cash flow from investing activities (CFI) consists of the inflows and outflows of cash resulting from acquisition or disposal of **long-term** assets and investments.

Cash flow from financing activities (CFF) consists of the inflows and outflows of cash resulting from transaction affecting capital structure

Computing FCFF from CFO

FCFF = Cash Flow from Operations + Interest Expense (1 – Tax rate)
- Investment in Fixed Capital ……..as the case with U.S. GAPP

U.S. GAPP cash flow classification

Operating Activities

1. Cash received from sale of goods or services
2. Cash paid to suppliers and employees
3. Receipt of dividends (TAS: Investing)
4. Receipt of interests (TAS: Investing)
5. Payment of interests (TAS: Financing)
6. Receipt of insurance proceeds
7. Income taxed paid

Investing Activities

1. Acquisition of debt instruments of other entities
2. Sale of debt instruments of other entities
3. Acquisition of equity instruments of other entities
4. Sale of equity instruments of other entities
5. Acquisition of property, plant and equipment
6. Sale of property, plant and equipment
7. Capital expenditures
8. Payment for purchase of another entity

Financing Activities

1. Issuance of equity instruments
2. Payment of dividends (TAS: Financing)
3. Repurchase of equity instruments
4. Proceeds from short-term borrowings
5. Repayment of short-term borrowings
6. Proceeds from issuance of bonds and other long-term borrowings
7. Repayment of bonds and other long-term borrowings

NOTE:

The acquisition of debt and equity investments (other than trading activities) and loans made to others are classified as investing activities. However**, income from these investments is classified as an operating activity.**

Principal amounts borrowed from others are reported as financing activities. However **the interest paid is classified as an operating activity**.

Dividends paid are classified as financing activities, while dividends received are classified as operating activities.

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Other ways of computing FCFF

FCFF = EBIT (1-T) + Depreciation – Capital expenditure +/- Chg in NWC

FCFF = EBITDA(1 – Tax rate) + Dep(Tax rate) – Inv(FC) – Inv(WC)

Computing FCFE

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Finding FCFE from NI or CFO

- Free cash flow to equity is cash flow available to equity holders only.

Free cash flow to equity (FCFE)

= **net income** + depreciation + other net noncash charges – change in noncash working capital - CAPEX + **new debts – debts repayment**

FCFE = NI + NCC – Inv(WC) - Inv(FC)

+ Net borrowing

FCFE = CFO – Inv(FC) + Net borrowing

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Finding FCFE from FCFF

- Free cash flow to equity is cash flow available to equity holders only.

FCFE = Free cash flow to the firm

Less: Interest Expense x (1 – Tax rate)

Plus: Net Borrowing

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

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Forecasting free cash flows

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Methods of forecasting free cash flows

- One approach is to find **historical** free cash flow and apply some constant growth rate.

- This approach would be appropriate if:

  - Free cash flow for the firm tended to **grow at a constant rate**; and

  - Historical relationships between free cash flow and fundamental factors were **expected to be maintained.**

Methods of forecasting free cash flows

- Another approach is to **forecast the individual components of free cash flow.**
- The components of FCFF in these equations are often forecasted **in relation to sales.**

Capital expenditures

- Capital expenditures have two components:

  - those expenditures necessary to maintain existing capacity (fixed capital replacement);

  - and those incremental expenditures necessary for growth.
- When forecasting, the former are likely to be related to the current level of sales, while the latter are likely to be related to the forecast of sales growth.

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What about dividends and stock repurchases?

Recall two formulas for FCFF and FCFE,

FCFF = NI + NCC + Int(1 – Tax rate) – Inv(FC) – Inv(WC)

FCFE = NI + NCC – Inv(FC) – Inv(WC) + Net borrowing

To find FCFF or FCFE, ignore dividends and stock repurchases.

•FCFF and FCFE are the cash flows *available* to investors or to stockholders.

•Transactions between the firm and its shareholders (through cash dividends, share repurchases and share issuances) do not affect free cash flow.

Preferred stock in the capital structure

- In many respects, the existence of preferred stock in the capital structure has many of the same effects as the existence of **debt**, except that preferred stock dividends paid are **not tax deductible** unlike interest payments on debt.

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Example: Bron

Bron has earnings per share of $3.00 in 2002 and expects earnings per share to increase by 21 percent in 2003. Earnings per share are going to grow at a decreasing rate for the following five years, as shown in the table below. **In 2008, the growth rate will be 6 percent and is expected to stay at that rate thereafter.** Net capital expenditures (Capital expenditures minus depreciation) will be $5.00 per share in 2002, and then follow the pattern predicted in the table**. In 2008, net capital expenditures are expected to be $1.50, and then to grow at 6 percent annually after that.** The **investment in working capital parallels the increase in net capital expenditures and is predicted to equal 25 percent of net capital expenditures each year**. **In 2008, investment in working capital will be $0.375 and is predicted to grow at 6 percent thereafter.** Bron will use **debt financing to fund 40 percent** of net capital expenditures and 40 percent of the investment in working capital.

Year	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Growth rate eps	21%	18%	15%	12%	9%	6%
Net capex per share	5.00	5.00	4.50	4.00	3.50	1.50

The required rate of return for Bron is 12 percent. **Find the value per share using a two-stage FCFE valuation approach.**

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Bron solution

- FCFE is shown in this table:

Bron solution

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Example: Alcan, Inc

An aggressive financial planner who claims to have a superior method for picking undervalued stocks is courting one of your clients. **The planner claims that the best way to find the value of a stock is to divide EBITDA by the risk-free bond rate.** The planner is urging your client to invest in Alcan, Inc. (NYSE: AL). Alcan is the parent of a group of companies engaged in all aspects of the aluminum business. **The planner says that Alcan's EBITDA of $1,580 million divided by the long-term government bond rate of 7 percent gives a total value of $22,571 million.** Since there are 318 million outstanding shares, this gives a value per share of **$70.98**. Shares of Alcan, Inc. are currently trading for **$36.50**, and the planner wants your client to make a large investment in Alcan through him.

Example: Alcan, Inc.

A. Provide your client with an alternative valuation of Alcan based on a two-stage FCFE valuation approach. Use the following assumptions:

- Net income is currently $600 million. Net income will grow by 20 percent annually for the next three years.
- **The net investment in operating assets (capital expenditures less depreciation plus investment in working capital)** will be $1,150 million next year and grow at 15 percent for the following two years.
- **Forty percent of the net investment in operating assets will be financed with net new debt financing.**
- Alcan's beta is 1.3, the risk-free bond rate is 7 percent, and the market risk premium is 4 percent.
- After three years, the growth rate of net income will be 8 percent and the net investment in operating assets (Capital expenditures minus Depreciation plus Increase in working capital) each year will drop to 30 percent of net income. Debt financing will continue to fund 40 percent of the net investment in operating assets.
- There are 318 million outstanding shares.

Find the value per share of Alcan.

B. Criticize the valuation approach that the aggressive financial planner used.

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Alcan, Inc. solution

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Alcan, Inc. solution

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Alcan, Inc. solution

The planner's estimate of the share value of $70.98 is much higher than the FCFE model estimate of $49.21. There are several reasons for the differing estimates.

First, **taxes and interest expenses**, which were $254 and $78 million, have a prior claim to the company's cash flow and should be taken out. These cash flows **are not available to equity holders.**

Second, **EBITDA does not account for the company's reinvestments in operating assets**. By distributing depreciation charges (which were $561 million), the planner is essentially liquidating the firm over time, much less accounting for the net investments that the firm is making over time.

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Alcan, Inc. solution

Third, **EBITDA does not account for the firm's capital structure**. Using EBITDA to represent a benefit to stockholders (as opposed to stockholders and bondholders combined) is a mistake.

Finally, dividing EBITDA by the bond rate commits major errors, as well. **The risk-free bond rate is an inappropriate discount rate for risky equity cash flows.** The required rate of return on the firm's equity should be used. Dividing by a fixed rate also assumes erroneously that the cash flow stream is a fixed perpetuity. EBITDA cannot be a perpetual stream because, if it were distributed, the stream would eventually decline to zero (because of no capital investments). Alcan is actually a growing company, so assuming it to be a non-growing perpetuity is a mistake.