



Preliminaries



Corporate Finance

Corporate finance

- Corporate finance studies the set of financial decisions corporations must make:
 1. What long term investments should a corporation make? (*capital budgeting*)
 2. How should it finance itself? (*optimal capital structure*)
 3. What should be its dividend policy?
 4. How should it manage its short-term liquidity needs? (*working capital management*)
 5. ...
- The premise: the corporation (=its management) should act to maximize the market value of shareholder equity



Warm-up example

- A corporation has the option to prepay (*call*) a bond with 5 years to maturity, \$100M in remaining principal, a 10% yearly rate, fixed and monthly payments
- It can replace it with a 5 year bond with the same payment structure but a 9% yearly rate
- It believes rates will fall no further
- Prepayment penalties are 2% of outstanding principal
- Should it exercise the option?



The algebra

- Current payment is \$2,124,704.47
 - New payment would be \$2,075,835.52, for a monthly saving of \$48,869.95
 - Appropriate discount rate for the corresponding string of cash flows is 9% (Why?)
 - Gross value of refi: \$2,354,182.11
 - This exceeds prepay costs, *the call option is in the money*, so yes, exercise...
 - ... as long as you are confident in your belief that rates will fall no further
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Deeper option considerations

- Exercising the option kills the option
 - If rates fall to, say, 8.5% in two months, the gap between 9% and 8.5% will not suffice to cover prepay costs, so you'll be stuck at 9%
 - Had you waited to exercise, you would be able to lower your rate to 8.5%
 - What is the value of waiting to exercise an option that is already in the money?
 - We will also learn how to answer tough questions like that
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Corporation

- A legal entity (separate and distinct from its owners) that owns *assets* and issues *liabilities*
- Asset: store of value over which property rights can be well defined
- Liability: claim against the cash flows associated with all or some of these assets



Assets: three key taxonomies

- *Assets in place*: assets in which the corporation has already invested
- *Growth opportunities*: options to invest at a later date which the corporation controls

- *Current assets*: assets ‘expected’ to convert to cash within a year
- *Fixed real assets*: real assets purchased for long-term use (buildings, equipment...)
- *Fixed financial assets*: investment in external securities and assets held for sale expected to be held more than one year
- *Fixed intangible assets*: trademarks, patents...

- *Operating assets*: assets currently generating operating cash-flows
- *Non-operating assets*: other assets (excess cash, undeveloped land, construction projects, financial assets...)



Assets: valuation

- *Book value*: the cost at which an asset is acquired
- *Market value*: the price the asset would sell for in the market place
- Can be very, very different from one another
- Why?



Liabilities: three key taxonomies

- *Current liability*: fully due within a year
 - *Long-term liability*: not fully due within a year

 - *Debt*: a contract that stipulates a specific financial obligation but does not carry ownership or control rights
 - *Common Equity*: a residual claim to the corporation cash flows that carries ownership and control rights
 - *Hybrids*: claims with both debt and equity features, such as preferred equity and debt contracts with conversion features

 - *Private claims*: traded in private markets (restricted and opaque)
 - *Public claims*: traded in public markets (much less restricted and much more transparent)
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Cash-flow rights vs. control rights

- Common equity is sometimes divided into different classes (A, B, ...)
- Typically, all classes get equal distributions. They have the same **cash flow rights**
- But **voting/control rights** can differ greatly across shareholders
- Example: At Facebook, class A shares have one vote per share, class B shares have 10 votes per share
- Even though Mark Zuckerberg only holds around 15% of outstanding shares, he controls the company



What is a public corporation? (take 1)

- A *public corporation* or *publicly traded corporation* is a corporation whose common equity trades in public markets
- Public corporations can and do issue private claims
- Private corporations can and do issue public claims
- Public does **not** mean *listed* on a public exchange



What is a public corporation? (take 2)

“In general, we use the term to refer to a company that has public reporting obligations. Companies are subject to public reporting requirements if they:

- 1. Sell securities in a public offering (such as an initial public offering, or IPO);*
- 2. Allow their investor base to reach a certain size, which triggers public reporting obligations; OR*
- 3. Voluntarily register with us.”*

From Investors.gov, i.e. the SEC



Liabilities: valuation

- *Book value*: the face value of the obligation (= the size of the loan, e.g.)
- *Market value*: the price the liability would sell for in the market place
- Can be very, very different from one another
- Why?



The fundamental identities

- Book value of Assets = Book value of Liabilities
+ Book value of Equity

- Market value of Assets = Market value of Liabilities
+ Market value of Equity



Valuation: a primer

- What is the market value of a corporation's equity?
- Three broad steps:
 1. Calculate the market value of assets: V , for short
 2. Calculate the market value of liabilities: $MV(D + H)$
 3. Subtract line 2 from line 1: $MV(E) = V - MV(D + H)$
- Two main approaches:
 1. $V =$ Multiple of current profits or sales + value of non operating assets
 2. $V =$ PV(cash flows associated with operating assets) + value of non operating assets



EBITDA and free cash flows

- EBITDA \approx Operating income – Operating expenses
 - = Net income
 - + Interest
 - + Taxes
 - + Depreciation and amortization
- Free cash flows to the firm (FCFF) = EBITDA – Investment (I) – Taxes (T)
- I is investment in long-term operating assets (“McKinsey convention”)
- $MV(\text{Operating assets}) = PV(\text{FCFF})$, at the appropriate discount rate



Standard valuation approach

- “Company X should trade at a *forward EBITDA multiple* of 10”
- Translation: $Enterprise\ value = 10 \times EBITDA_1$

where $EBITDA_1$ is the net operating income the company is projected to generate over the next year while

$$EV = MV(Debt) + MV(Hybrids) + MV(Equity) \\ - Excess\ Cash - Other\ Nonoperating\ Assets$$

- Knowing EV we just need to add the value of cash and non-ops, subtract the value of debt and non-common equity and we are done
- But where do people pull EBITDA multiples from?



DCF approach

$$MV(\text{operating assets}) = \sum_{t=1}^{\infty} \frac{FCFF_t}{(1+r)^t}$$

where r is the return stakeholders are requiring from this type of corporation

Recall that from basic finance principles:

$$r = r_F + \text{premium}$$

where the premium is compensation investors require for taking on more risk or less liquidity



The holy trinity of valuation

- Assume that
 1. EBITDA and cash flows grow at a constant rate g
 2. All assets are operating, so that $V = EV = MV$ (operating assets)

- Then
$$r = y + g$$

where
$$y = \frac{FCFF_1}{V}$$

is the *current yield* to investors



Fundamentals of EBITDA multiples

- Company X is trading at 10 times EBITDA while company Y is trading at 15 times EBITDA
- What could explain/justify this difference?
- Exactly 4 acceptable types of answers to this common question



Fundamentals of EBITDA multiples

$$y = \frac{FCFF_1}{V} = r - g$$

⇓

$$\frac{EBITDA_1 - I_1 - T_1}{V} = r - g$$

⇓

$$\frac{EBITDA_1}{V} = r + \frac{I_1}{V} + \frac{T_1}{V} - g$$



In plain English...

Company X should trade at a higher EBITDA multiple than company Y if:

1. It is safer or more liquid (lower r , more generally)
2. Its cash-flows are expected to grow faster
3. It has lower investment needs
4. Its tax burden is lower

There is nothing else.



EBIT vs EBITDA

- $EBIT = EBITDA - \text{Depreciation and Amortization}$
- Taxable income from operations for the unlevered firm



Cash flow road map

$$\begin{aligned} \text{BTCF} &= \text{EBITDA} - I \\ &= \text{EBIT} + \text{Dep} - I \end{aligned}$$

$(-T)$

$(-T - \tau Dr^D)$

$$\begin{aligned} \text{FCFF} &= \text{BTCF} - T \\ &= \text{EBITDA} - I - T \\ &= (1 - \tau)\text{EBIT} + \text{DEP} - I + \tau Dr^D \end{aligned}$$

$$\begin{aligned} \text{Unlevered FCFF} &= \text{BTCF} - T - \tau Dr^D \\ &= \text{EBITDA} - I - T - \tau Dr^D \\ &= (1 - \tau)\text{EBIT} + \text{DEP} - I \end{aligned}$$

$(-Dr^D)$

$(-Dr^D + \tau Dr^D)$

$$\begin{aligned} \text{FCFE} &= \text{FCFF} - Dr^D \\ &= (1 - \tau)(\text{EBIT} - Dr^D) + \text{DEP} - I \end{aligned}$$

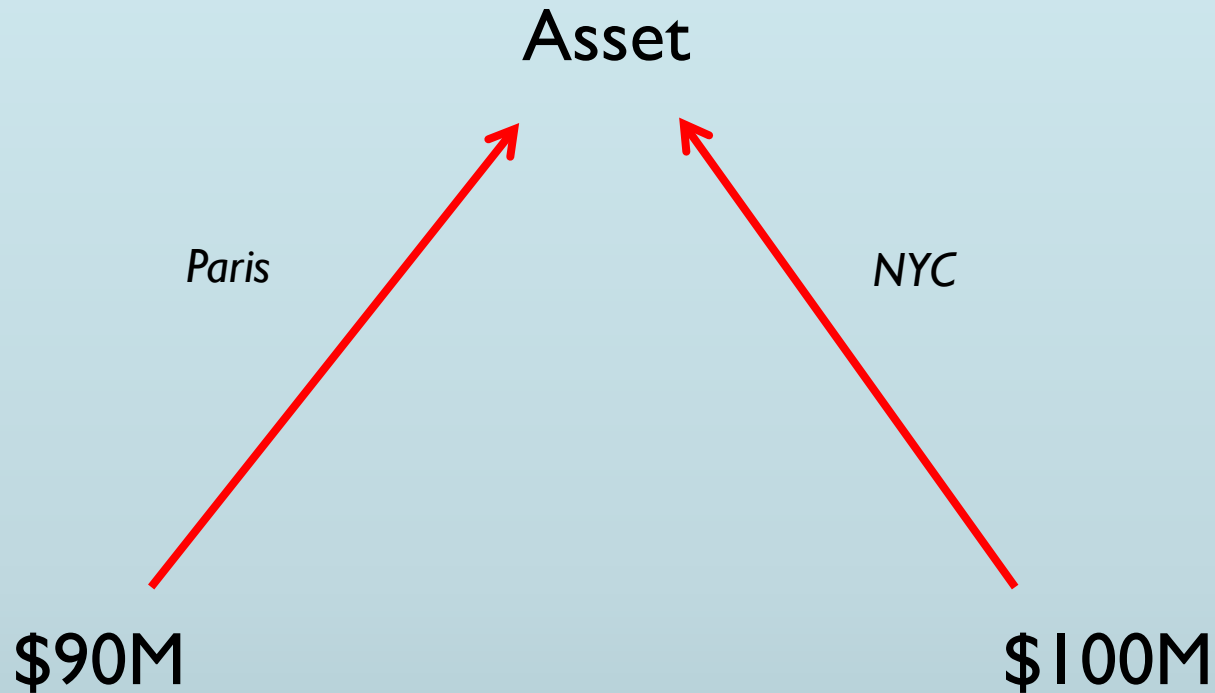


Fundamentals of capital budgeting

- Should a company buy (or sell) a particular asset? Should it invest in (or divest) a particular investment project?
- When markets function well, trivially, a company creates value for its stakeholders by investing if it can purchase an asset at a cost no higher than its market value
- Arbitrage principle: “similar” assets should be priced in such a way that they earn similar returns
- Otherwise...



Arbitrage opportunities



Opportunity cost of capital

- Investing in a given asset is foregoing the opportunity to invest in other assets with similar properties
- Investor should be compensated for foregoing that opportunity
- Asset under consideration, therefore, should yield at least the same return as other similar assets



Capital budgeting in practice

- How much should a corporation be willing to pay for a particular project?
- Value of the asset = Value cash flows to debt-holders + Value of cash flows to equity
- We know what return (YTM) debt-holders require and what they are willing to pay for their piece of the action

- So, buy if:

$$\text{cost of asset} - \text{debt financing} < \text{PV}(\text{cash flows to equity})$$

- But what return do equity holders require?
 - That's a traditional asset pricing question
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Canonical (MM) example

- Consider a project whose EBIT, each period and for ever, is either $\$80M$ or $\$100M$ with equal probability
- The project is financed with interest-only perpetuity with face value $\$300M$
- Debt-holders require $r^D = 5\%$
- Equity-holders require $E(r^E) = 10\%$
- Investment is $\$20M$ each period, as is depreciation
- The company pays $\tau = 30\%$ in income taxes
- What is the project worth?



WACC

Under strong assumptions, this is equivalent to buying if:

$$PV(\text{unlevered FCFF}) > \text{cost}$$

using the weighted average of all stakeholder's expected returns as discount rate, a discount rate known as the **W**eighted **A**verage **C**ost of **C**apital



Bottom line

- Invest if $PV(\text{cash flows})$ at opportunity cost of capital exceeds investment cost
- Equivalently, invest if NPV of investment is non-negative
- This breaks down capital budgeting in practice into two subtasks:
 1. Forecast expected cash flows
 2. Measure the opportunity cost of capital



Fundamentals of capital structure management

- Holding its portfolio of assets fixed, can a corporation create value simply by changing the way it finances itself?
- In pure and perfect markets, no
- But we do not live in a world of pure and perfect markets:
 1. Debt has tax advantages
 2. Bankruptcy or even the risk of bankruptcy destroys value
 3. Managers' objectives are not fully aligned with the corporation's (*agency costs*)
 4. Certain security types seem "special" and in short supply (markets are *incomplete*)



Leverage mechanics: the case of M-Reits

- REITs are corporations that are exempt from corporate taxation as long as:
 1. They invest mostly in real estate assets
 2. They distribute most of their net income each quarter
 3. They have a diffuse shareholder base
 4. ...
- Mortgage REITs invest in mortgages and mortgage-backed securities
- Their dividend yield oscillates between 10 and 20 percent a year (!)
- How? Massive leverage



Capital structure matters: Evidence from asset-backed securitization

- Securitization = pooling + tranching
- What purpose does pure repackaging serve?
- Caters to the needs of heterogeneous investors by creating securities with different risk and return characteristics
- Completes the markets
- A machine to create safe securities backed by assets that are not...
- ... at a time mere global appetite for AAA seems insatiable (the saving glut)
- Tranching makes profitable (positive NPV) investments that would not be profitable otherwise



Finance matters

- The explosion of securitization (insatiable appetite for AAA) led to a deterioration of lending standards...
- ... which, once residential housing values turned south, fueled a century mark global crisis

