Corporate Finance

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The Art of Being Fundamentally Sound

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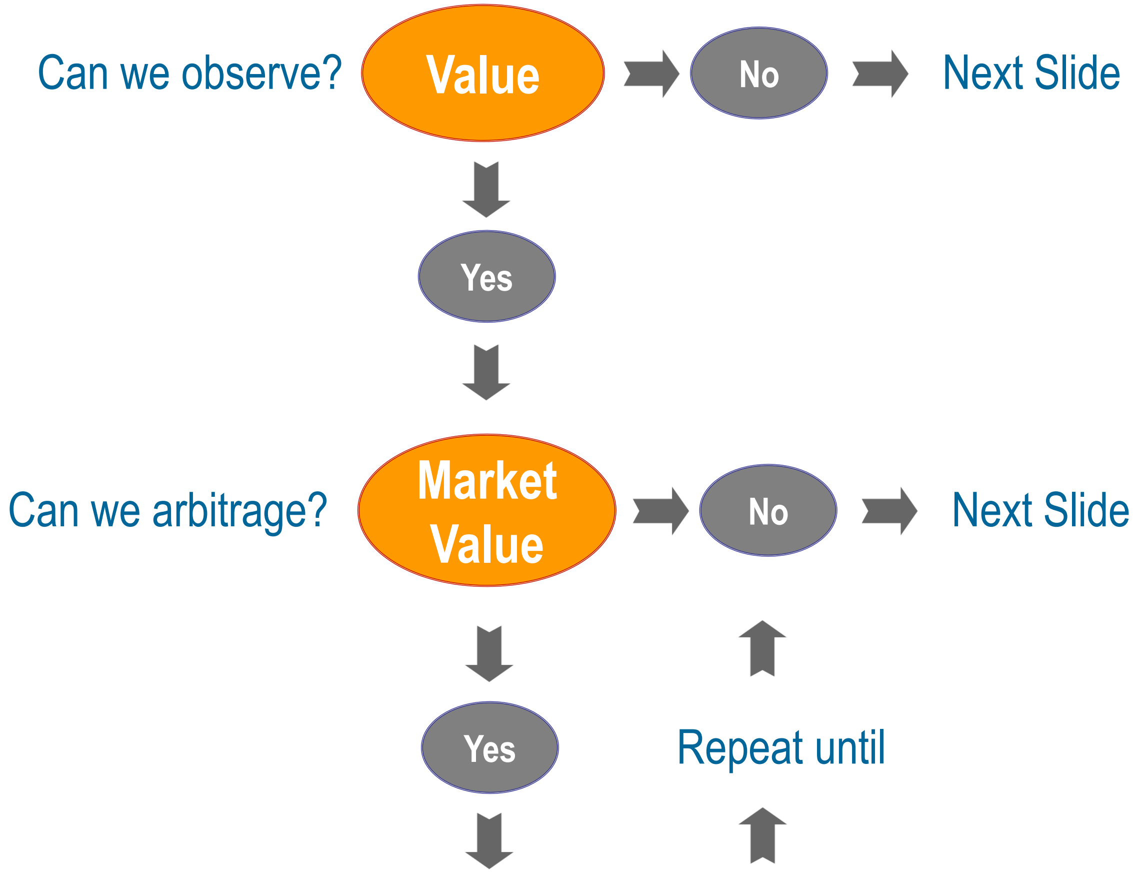
Objects, Tools and Theories

Arbitrage approach identifies relatively mispriced assets but provides NO indication of true or fair value!

Examples: futures & commodities, currency and rate forwards, options

Beware of fake arbitrage: Counterparty Risk



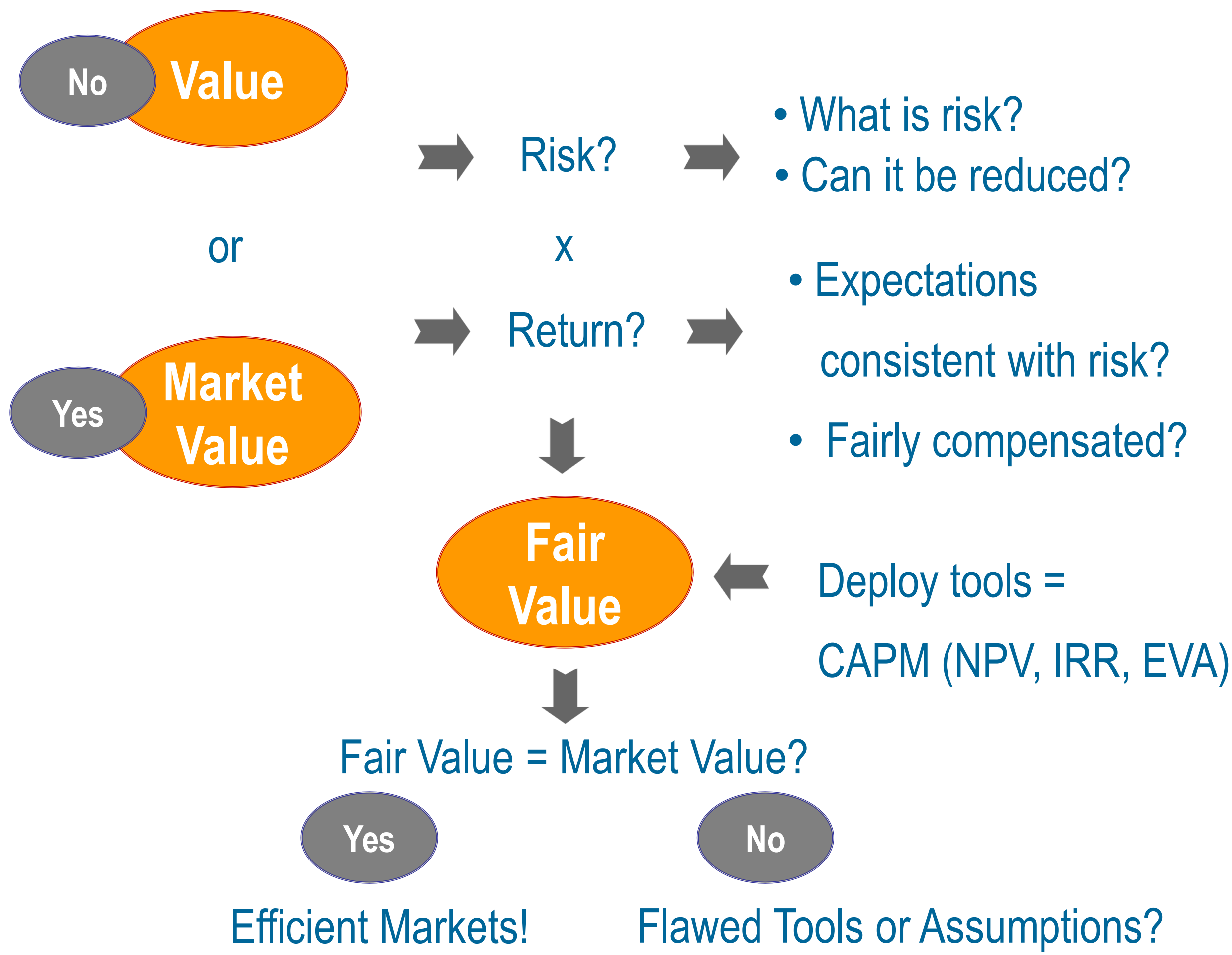
Deploy tools = Sell expensive / Buy cheap = Riskless Profits

Objects, Tools and Theories, cont'd

The core task of corporate finance is to measure and to maximize value.

Return vs. Risk framework provides foundation for ANY valuation tool

The concept of risk materially evolved over time in theory and practice



Grandfather of Risk Measurement

Invented in 1966 the Sharpe Ratio is used to this day in asset management

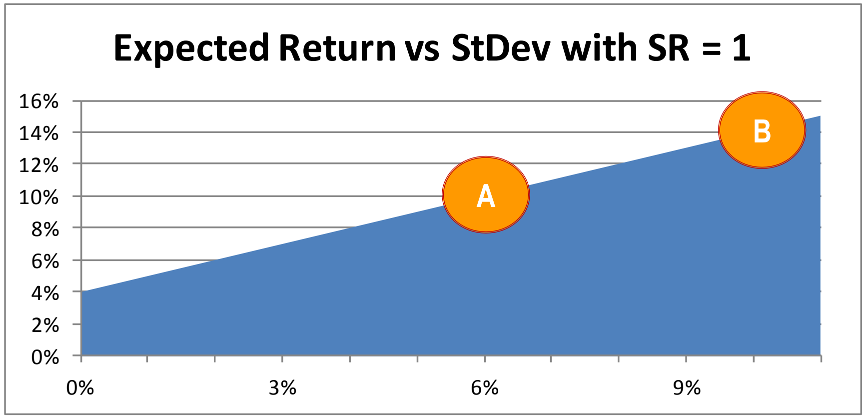
The fundamental breakthrough of SR was to define risk as volatility of expected returns

Cornerstone of modern CF as we know it

- Sharpe Ratio formula gained popularity due to being straightforward and transparent

$$S(x) = (Rx - Rf)/\sqrt{VARx}$$

Rx – return on asset, Rf – risk free rate, VARx – volatility of Rx



- Easy to compare investments relative to each other or a benchmark
- However, is dimensionless and does not price standalone investment or risk

Efficient Market Hypothesis

In the 1970s Eugene Fama defined an efficient financial market as "one in which prices always fully reflect available information”

Which market are we in? Is theory useless if markets are not efficient?

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- The efficient-market hypothesis (EMH) theory states that in any given time, the prices on the market already reflect all known information, and also change fast to reflect new information
  - Arbitrage should NOT exist in efficient markets!
- Asset prices only reflect the expected flows of payments associated with holding assets
  - All formulas in valuation toolkit are only valid within this framework!
- However, evidence exists that the EMH may be easily violated
  - In simple terms to achieve full or strong efficiency the cost of information gathering and processing should be ZERO

Irrationality, Solvency and Noise

In his 1986 article “Noise” (a must read!), Fischer Black famously stated –

- Trading on noise as if it were information provides essential missing ingredient [AD: to EMH]

- We might define an efficient market as one in which price is within a factor of 2 of value

- The price of stock will tend to move back toward its value over time

Value is only observed as Range

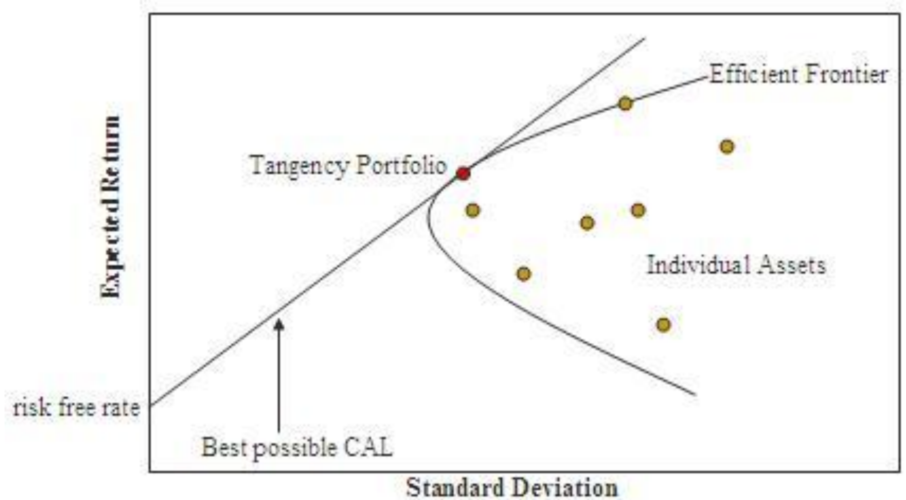
- Markets stay irrational longer than one can stay solvent

Markowitz Bullet or Efficiency Frontier

Harry Markowitz introduced Modern Portfolio Theory in a 1952 article and a 1959 book

Fundamental breakthrough and insight into portfolio risk underpinning CAPM

- The concept behind MPT is that the assets in an investment portfolio should not be selected individually
- Rather, it is important to consider how each asset changes in price relative to other assets in portfolio



$$\mathrm{E}(R_p) = w_A \,\mathrm{E}(R_A) + w_B \,\mathrm{E}(R_B) = w_A \,\mathrm{E}(R_A) + (1 - w_A)\,\mathrm{E}(R_B).$$
$$\sigma_p^2 = w_A^2 \sigma_A^2 + w_B^2 \sigma_B^2 + 2 w_A w_B \sigma_A \sigma_B \rho_{AB}$$

R – return on P(ortfolio), A and B assets, W – weight, σ – volatility, ρ – correlation between expected returns for A and B

Capital Asset Pricing Model, or CAPM

The CAPM was introduced in 1961-1965 by various scientists

Central doctrine behind CAPM is that only systematic risk is rewarded as all investors should diversify

- (CAPM) is used to determine a theoretically appropriate required rate of return of an asset,
  - if that asset is to be added to an already well-diversified portfolio
- The CAPM formula is – $E(R_i) = R_f + \beta_i(E(R_m) - R_f)$
  - $E(R_i)$ expected asset return
  - R_f risk free rate
  - β_i asset beta, which is $\beta_i = \frac{\mathrm{Cov}(R_i, R_m)}{\mathrm{Var}(R_m)}$
  - $E(R_m)$ expected market return
  - $E(R_m) - R_f$ the market premium
- Elegant as it is CAPM has serious limitations
  - Assumes one single market (EM premium not existent)
  - Is a single period model (implications for DCF)
  - Known to work better for sectors than individual stocks (never believe in random averages for assorted stocks)
  - Empirically size matters but not referenced in theory

Modigliani–Miller Theorem

The authors were awarded Nobel Prizes in 1985 and 1990

MM theorem forms the basis for modern thinking on capital structure

- The basic theorem or MM1 states that
  - Under the classical random walk, in the absence of taxes, bankruptcy costs, agency costs, and asymmetric information, and in an efficient market, the value of a firm is unaffected by how it is financed
- E.g. the only source of risk is underlying asset!
- But as long as debt % is tax deductable there is an incentive to leverage, hence MM2 –

$$\mathrm{WACC} = \frac{MV_e}{MV_d + MV_e} \cdot R_e + \frac{MV_d}{MV_d + MV_e} \cdot R_d \cdot (1-t)$$

  - MV – market values for equity (e) and debt (d)
  - R – expected returns for equity (e) and debt (d)
  - t – corporate tax rate
- Note that –
  - Change in leverage changes beta of equity,
  - MM assumes constant level of debt, and
  - MVs are circular if WACC is used to value MVs

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Introducing Mechanics of DCF

Transparency, limited number of inputs and consistency with theory makes DCF a primary valuation tool

If discount rate is WACC remember that cash flows need to be unlevered!

- When valuing an enterprise DCF formula has not changed since 1930
  - save for introduction of WACC

$$NPV = \sum_{t=1}^{n} \frac{UFCF_t}{(1+WACC)^t} + TV$$

- The inputs are straightforward:

$$UFCF = EBITDA - Working\_Capital - CAPEX - Unlevered\_Tax$$

$$Unlevered\_Tax = EBIT \times (1 - Effective\_Tax\_Rate)$$

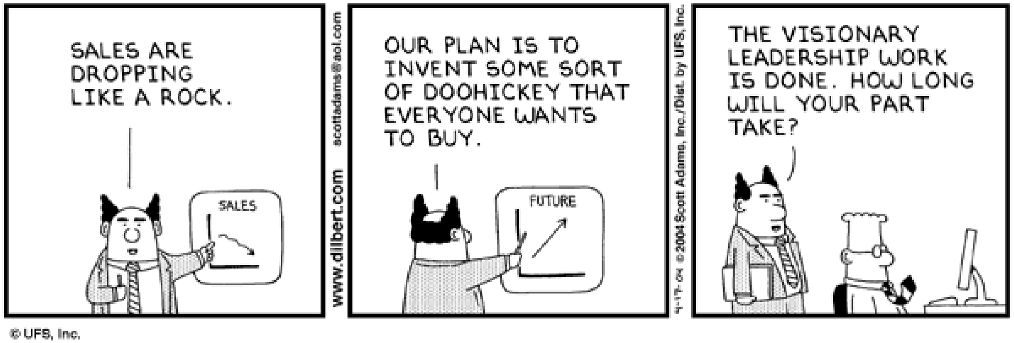
$$TV = EBITDA \times Muliple\_EBITDA$$, or growth rate?

- Fundamentally NPV = APV = EVA
  - Derivative valuation methods is repackaging
- But there is no free lunch ➡ Next Slide

DCF Pitfalls – Forecasting Cash Flows

Matching uncertainty of cash flows to chosen WACC is art and not science

Rubbish cash flows invalidate the whole exercise = GIGO



- When forecasting cash flow items one needs to aim for most realistic expectations
  - Too ambitious or too conservative would mismatch risk assumptions embedded in WACC
  - Budgets do not equal long range forecasts, or equity research differs from management's view
- Consider implications for NPV
  - Massaging front years is less sensitive than getting TV wrong
  - Always do industry benchmarks!

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DCF Pitfalls – Computational Errors

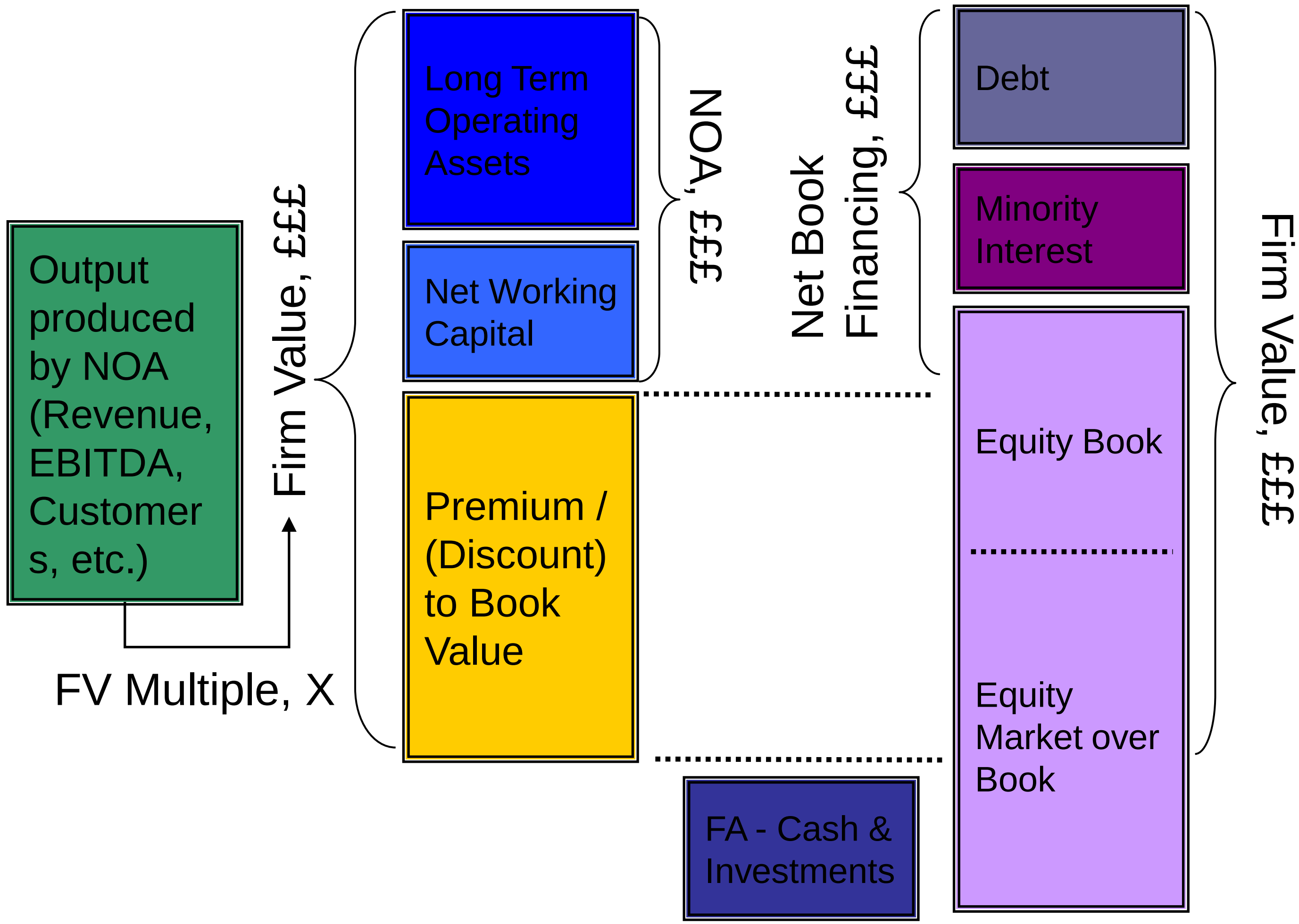
There is a number of mechanical errors which would invalidate NPV

Computational errors in tax, discount factors and firm value adjustments are most common in real life

- Cashflow's input is by definition unlevered
  - Tax effect is captured in WACC
  - Alternatively do APV (which is my favourite)
  - Hence need unlevered tax calculation off EBT (imagine a 100% equity financed firm as in MM1)
- What discount factor are you using?
  - Standard NPV in Excel assumes factor of 1
  - Unless some distinct seasonality pattern is present default assumption should be factor of 0.5
- Finally, remember that NPV = Firm Value (or EV)
  - How do we make sure we value equity right?
  - Rule of sum: check what is captured in UFCF

Firm Value Schematic

- FV is an abstract concept representing collective claims of all stakeholders (equity, debt, unfunded pensions, etc. whatever) on cash generating assets



Final DCF Considerations – Terminal Value

TV multiple or perpetuity growth rate should yield same TV if applied consistently

Whether you use multiples approach or growth rate approach it is always worth cross referencing the two

- There are two known ways to approach TV, multiples or perpetuity growth rate -

$$TV = \frac{UFCF \times (1 + Growth)}{WACC - Growth}$$

,or

$$TV = EBITDA \times Multiple$$

- As EBITDA multiple represents a proxy for UFCF the results should not differ materially
- My preference would be for multiples
  - Represents narrow range and is less sensitive to arbitrary assumptions
  - Can be benchmarked against industry comps
  - If the two approaches are not aligned useful signal that something is wrong in underlying assumptions

Private Equity - Common Features

Intuitively, there are certain features that all Private Equity players have in common:

TIMING, VALUE and FOCUS!

- Timing: counter-cyclical to public market:
  - Private Equity activity declines during bull markets
  - "Not to act in our business is probably a more valuable talent than any other" the Vulture Investors
- Value: capital more expensive than public
  - Unlikely to win a bidding war against strategic…
  - …but a public company may be constrained / guided by market sentiment
- Focus: active outside of strategic footprint / public markets
  - Not all industries are dominated by public companies and not all companies are suitable for public space
  - Relationships matter: MBO's bring unique insight into target's true value / add value

Private Equity Investment Cycle

- The fact that Private Equity investment is finite in time, unlike Strategic play, completely reverses investment decision process:

Thoughts on Valuation

While there are circumstances in which one particular valuation approach produces unnecessary or useless data, such situations are rare

- Investment community primarily uses three valuation approaches:
  - DCF,
  - trading multiples, and
  - precedents
- Each has its own merits and shortcomings
- After full set of analysis is performed, step back and think:
  - Which methodology is more appropriate to employ in this situation (e.g. is it IPO or a private placement)?
  - Is there a reason why one methodology may give a higher answer?
  - Does the fact that the analyses yield the same / different results mean at least one is invalid?
  - Would competitive environment play a role in your valuation / recommendations?

Wrapping It All Up