University of California, Berkeley

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Introduction to Corporate Finance, and Applications to Regulated Industries

IRLE Aspen Meadows

May 2013

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The “wordsoup” of finance

Outline

A. Motivation
  - What *is* corporate finance?
  - Why is it important for utilities regulation?

B. Nuts & Bolts of Valuation
  - Valuing **T**ime
  - Valuing **R**isk
    - **C**apital **S**tructure (Debt & Equity; ROD; ROE)
    - Weighted Average Cost of Capital (WACC)

C. Different approaches for estimating inputs into the WACC
  - Direct Observation
  - Benchmarking from other regulators
  - Discounted Cash Flow (DCF) analysis
  - Capital Asset Pricing Model (CAPM)

D. Challenges unique to utilities regulation
  - Purported Asymmetry of Regulatory Error
  - Regulatory Risk
  - 8 ways to scrutinize a valuation expert

A. Motivation

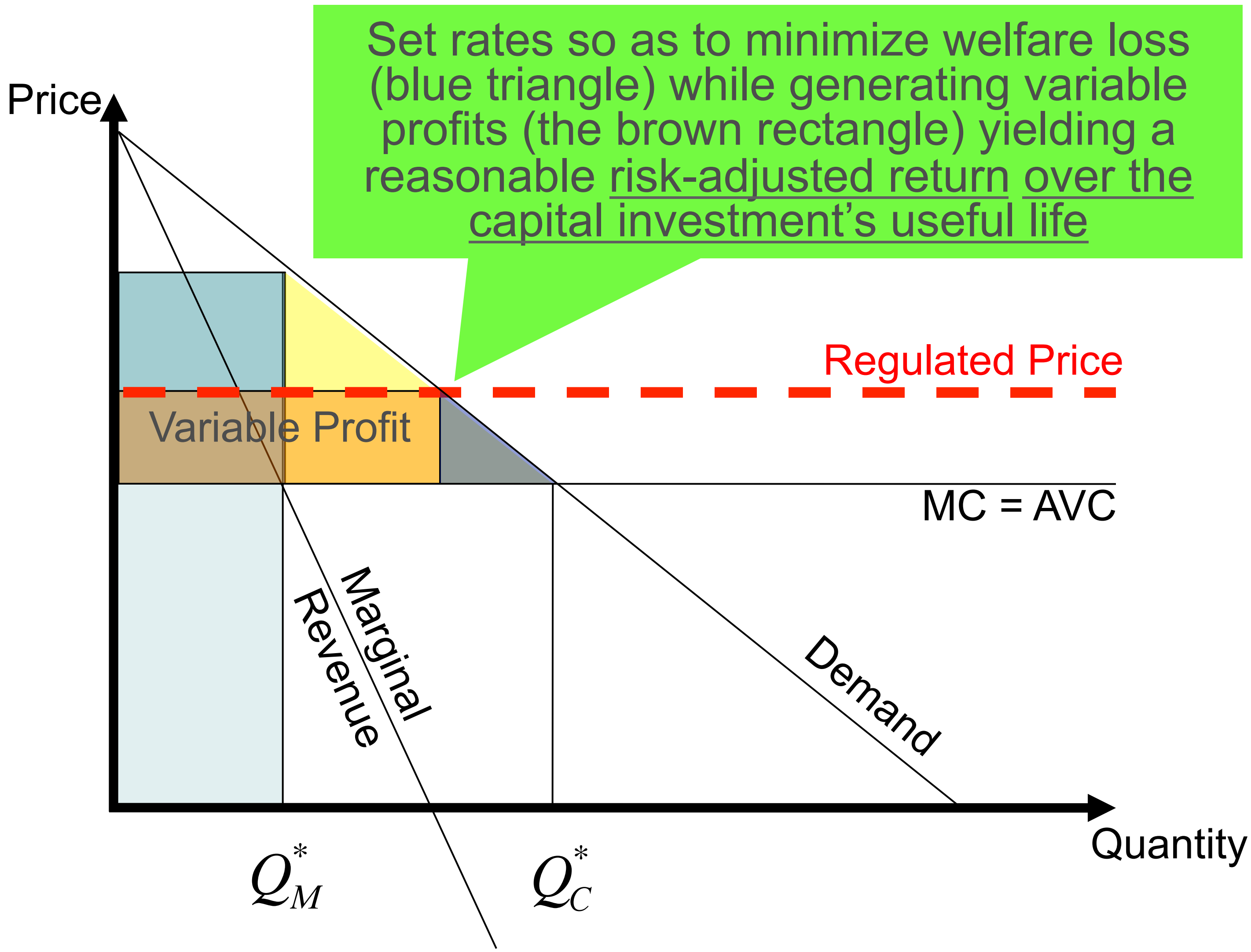
- What *is* corporate finance?
  - Understanding how financial claims & prospective cash flows from a business (a) are valued; and (b) affect behavior.
  - Most (but not all) of our conversation today will be about (a)
- How is (a) different than accounting?
  - Forward-looking (or at least it's supposed to be)
  - Cash flows most critical (not accruals)
  - Fair Market Value (FMV) predominates.
- Why should regulators / commissioners / staff care?
  - Cost-of-Service / RoR Regulation: Critical for determining reasonable rate of return to attract capital (meet Ave. Econ. Cost)
  - Price/Revenue Cap Regulation: Cap setting / X-adjustment still must be calibrated against reasonable rate of return (among other things)
  - Incentive regulation: Profit opportunities should be commensurate with risk to induce optimal continuation / entry
  - The law requires you to…

Legal Mandates

- *"A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties, but it has no constitutional right to such profits as are realized or anticipated in highly profitable enterprises or speculative ventures."*
  – *Bluefield Waterworks v. Public Service Comm'n, 262 U.S. 679 (1923)*

- *"The return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital"*
  – *FPC v. Hope Natural Gas Company, 320 U.S. 591 (1944)*

Microeconomics Account of Regulation



Microeconomics Account of Regulation

t=0

Initial Capital Investment

Var. Profit	Var. Profit	Var. Profit	Var. Profit	Var. Profit	…
t=1	t=2	t=3	t=4	t=5	

Present Discounted Value of future free cash flows generated during useful life

Reasonable risk-adjusted rate of return

Doing this correctly requires a general understanding of:

- Time Valuation
- Adjustments for Risk

B. Nuts and Bolts of Valuation
1. Time Valuation

- The Basic Idea:
  - Cash flows (positive or negative) that occur early in time carry greater weight with financial decision makers than those that occur later in time
  - Why? The ability to use cash flows for some other purpose during the interim period is valuable
    - E.g., alternative investments during delay period
- What's worth more – a right to receive $1000 today or the right to receive $1000 in a year?
  - Almost always the former: $1000 received today can (for example) be invested in a financial asset that pays back the invested amount *plus interest* in a year; it will thus be worth more than $1000 at that time.

Some (unavoidable) Notation

t = time (*today* is frequently denoted as "t=0")

T = terminal or "end" period (e.g., useful life)

C_t = cash flow at time *t*

– Alternatively denoted as F_t or P_t (depending on use)

r = "rate of return" from two periods of time

Most financial economists speak the language of returns

– One Period Return (between t=0 and *t*=1): $\boldsymbol{r_{0,1}}$

$$r_{0,1} = \frac{P_1 - P_0}{P_0} = \frac{P_1}{P_0} - 1$$

– Multi-period Return (between t=0 and date t): $\boldsymbol{r_{0,t}}$

$$r_{0,t} = \frac{P_t - P_0}{P_0} = \frac{P_t}{P_0} - 1$$

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Simple Example

- If you invest $10 today, and are promised to be paid back $15 in 10 years, what is the 10-year rate of return?

$$r_{0,10} = \frac{\$15 - \$10}{\$10} = 0.5$$

$$= 50\%$$

Aside on Jargon: Basis Points

- BPS ("BiPS") = "BASIS POINTS"
  – 1 Basis point = (Difference in percentage rates) x 100
- Many finance experts express rate differences / changes in terms through BPS rather than percentages. Why?
  – Often very small % differences make for very big $ differences
  – Sounds clever / raises barriers to entry (don't discount this!)
  – Nomenclature may help avoid ambiguity…
- Compare 15% and 20%.
  – Is 20% is 5% more than 15%?
  – Or is it 33.3% more than 15%?
  – Basis points help avoid that ambiguity
    - 20% is 500 BPS more than 15%.

Discounting and Compounding: (Get ready for a few formulas)

Key Point

- Functional Descriptions:
  - Compounding: How much will \$X invested today be worth in T years?
  - Discounting: How much is a future payment of \$X realized in T years worth today?
- The Baseline Formula(s)
  - Compounding: For a one-period investment of *P* dollars at rate $r_{0,1}$, its future value *F* will be equal to:

$$F = P \times (1 + r_{0,1})$$

  - Discounting: The investment P necessary today at rate $r_{0,1}$ to generate F dollars in the future will be equal to:

$$P = \frac{F}{(1 + r_{0,1})}$$

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Compounding Over Multiple Periods

- Compound interest over many (e.g., 20) periods:

$$(1+r_{0,20}) = (1+r_{0,1})\times(1+r_{1,2})\times\ldots\times(1+r_{19,20})$$

- In most contexts (though not all), the per-period rate of return remains constant over time (at "*r*"). In this case, the 20-period compound interest is:

$$(1+r_{0,20}) = \underbrace{(1+r)\times(1+r)\times\ldots\times(1+r)}_{\textit{20 times}} = (1+r)^{20}$$

Compounding & Discounting when return is expected to remain constant

- Compounding (from last slide):

$$F_t = P_0 \times (1+r)^t$$

- Discounting to "Net Present Value" (for each future cash payment):

$$P_0 = \frac{F_t}{(1+r)^t}$$

- Discounting a "stream" of cash flows:

$$P_0 = NPV = F_0 + \frac{F_1}{(1+r)^1} + \frac{F_2}{(1+r)^2} + \ldots + \frac{F_T}{(1+r)^T}$$

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Using time discounting to value a project: Example

- Suppose a utility could build a new plant for $1 million today. After one year, the plant will be operational, but not at full capacity, and will generate net operating revenues of $200K. In the remaining 4 years of its useful life, it will generate $300K in net annual revenues, at full capacity. It has zero salvage value at the end of 5 years.
- Should the utility invest in the new plant now? Assume that the utility discounts payoffs at the rate of:
  a) 5.0%?
  b) 10.0%?
  c) 15.0%?

Table of NPVs for Running Example

		Discount Rate		
		5.00%	[illegible]	[illegible]0%
Year	Cash Flow	*Sum Up…*		
0	-$1,000,000	-$1,000,000	[illegible]$1,000,000	-$1,000,000
1	$200,000	$190,476	$181,818	$173,913
2	$300,000	$272,10[illegible]	$247,934	$226,843
3	$300,000	$259,151	$225,394	$197,255
4	$300,000	$246,811	$204,904	$171,526
5	$300,000	$235,058	$186,276	$149,153
NPV		**$203,605**	**$46,327**	**-$81,310**

$$P_0 = \frac{F_t}{(1+r)^t} = \frac{\$300{,}000}{(1+0.05)^3}$$

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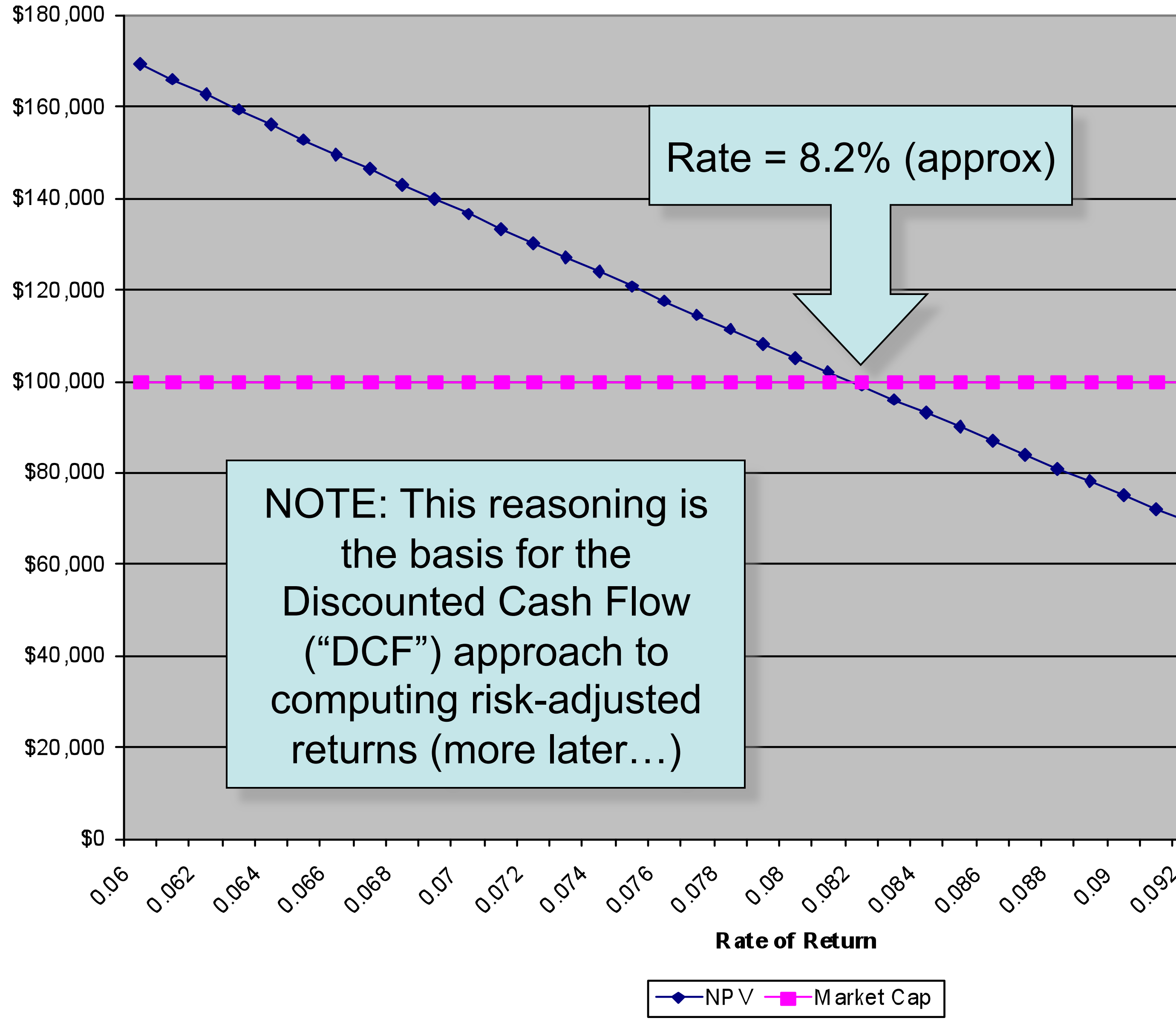
Running Example (continued)

- Suppose a utility could build a new plant for $1 million today. After one year, the plant will be operational, but not at full capacity, and will generate net sales revenues of $200K. In the remaining 4 years of its useful life, it will generate $300K in net annual revenues, at full capacity. It has zero salvage value at the end of 5 years.
- Should the utility invest in the new plant now? Assume that the utility discounts payoffs at the risk-free rate:
  a) 5.0%?
  b) 10.0%?
  c) 15.0%?
- Suppose the utility decides to invest in the above project, and this is its only activity. Suppose that the utility is publicly traded, has no debt, and pays all its net revenues out as dividends each year. Its 100,000 shares trade for $1 each (total equity value = $100,000). At what rate of return do investors appear to discount the utility's market value?

Rate of return that justifies price (“Yield to Maturity”; IRR)



r	NPV	Mkt Cap
0.06	$169,370	$100,000
0.061	$166,028	$100,000
0.062	$162,701	$100,000
0.063	$159,389	$100,000
0.064	$156,091	$100,000
0.065	$152,807	$100,000
0.066	$149,538	$100,000
0.067	$146,283	$100,000
0.068	$143,041	$100,000
0.069	$139,814	$100,000
0.07	$136,601	$100,000
0.071	$133,402	$100,000
0.072	$130,217	$100,000
0.073	$127,045	$100,000
0.074	$123,887	$100,000
0.075	$120,742	$100,000
0.076	$117,611	$100,000
0.077	$114,494	$100,000
0.078	$111,389	$100,000
0.079	$108,298	$100,000
0.08	$105,220	$100,000
0.081	$102,156	$100,000
0.082	$99,104	$100,000
0.083	$96,065	$100,000
0.084	$93,040	$100,000
0.085	$90,027	$100,000
0.086	$87,027	$100,000
0.087	$84,039	$100,000
0.088	$81,064	$100,000
0.089	$78,102	$100,000
0.09	$75,152	$100,000

Discounting when rate of return (r) is constant and cash flows (F) have consistent pattern

- *Constant stream* of cash flows (annuity of \$F / period):

$$NPV = \frac{F}{(1+r)^1} + \frac{F}{(1+r)^2} + \ldots + \frac{F}{(1+r)^T} = \frac{F}{r} \times \left(1 - \frac{1}{(1+r)^T}\right)$$

- Note: as *T* grows arbitrarily large (perpetuity of \$F/period):

$$NPV = \frac{F}{r}$$

- *Constantly growing stream* of cash flows (at rate *g*)

$$NPV = \frac{F}{(1+r)^1} + \frac{F(1+g)^1}{(1+r)^2} + \ldots + \frac{F(1+g)^{T-1}}{(1+r)^T} = \frac{F}{r-g} \times \left(1 - \frac{(1+g)^T}{(1+r)^T}\right)$$

- As T grows arbitrarily large (and assuming $g < r$):

$$NPV = \frac{F}{r-g}$$

Commonly used in DCF valuation analyses (Gordon Div. Growth Model; see below).

Rules of Thumb from Time Valuation

Key Point

- Most investors / financial decision makers will make an investment only when the Net Present Value (NPV) of the project is positive (discounted at appropriate rate).
- Holding all else constant, the NPV of a "typical" investment's cash flow pattern ***increases*** when…

1. …up-front costs decrease
2. …the size of follow-on benefits increases
3. …the period over which follow-on benefits accrue increases
4. …the rate at which market actors discount the future decreases

Economic factors / policies that bring about (1) – (4) tend to catalyze investment.

And, vice versa, things that reverse (1) – (4) tend to discourage investment.

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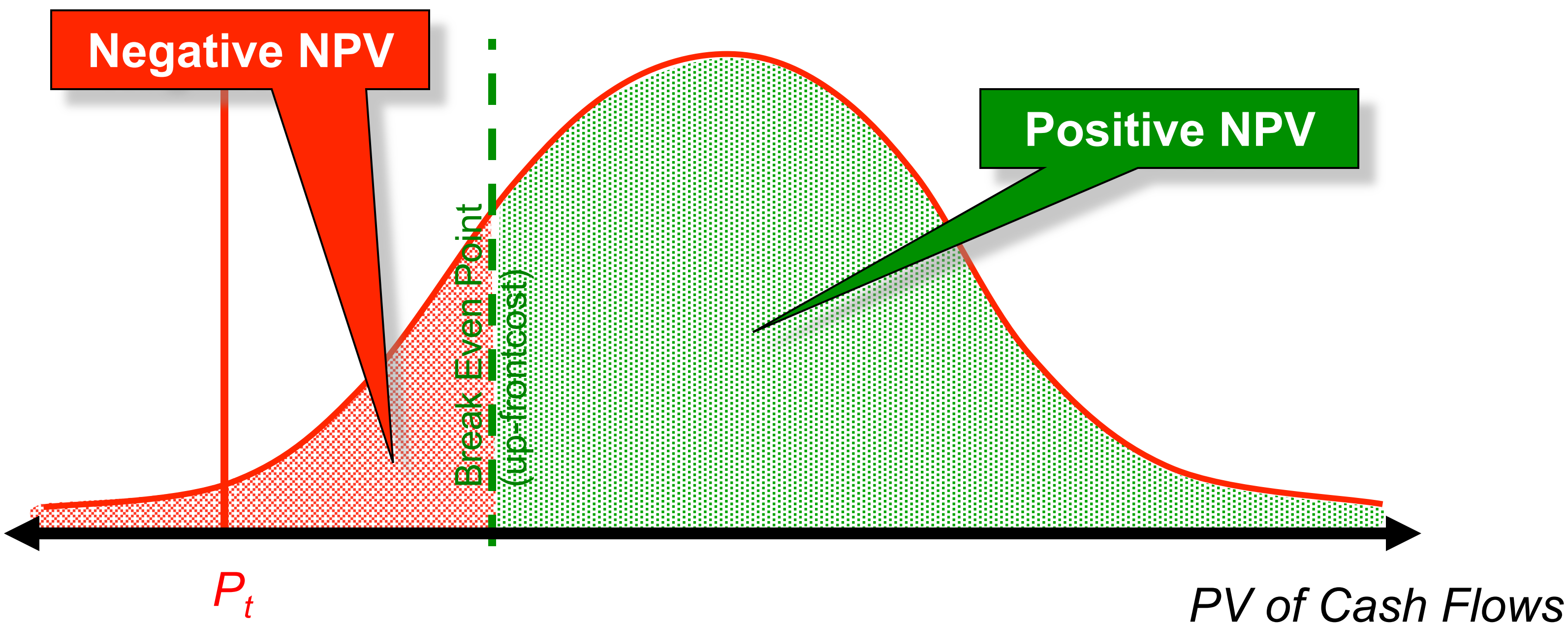
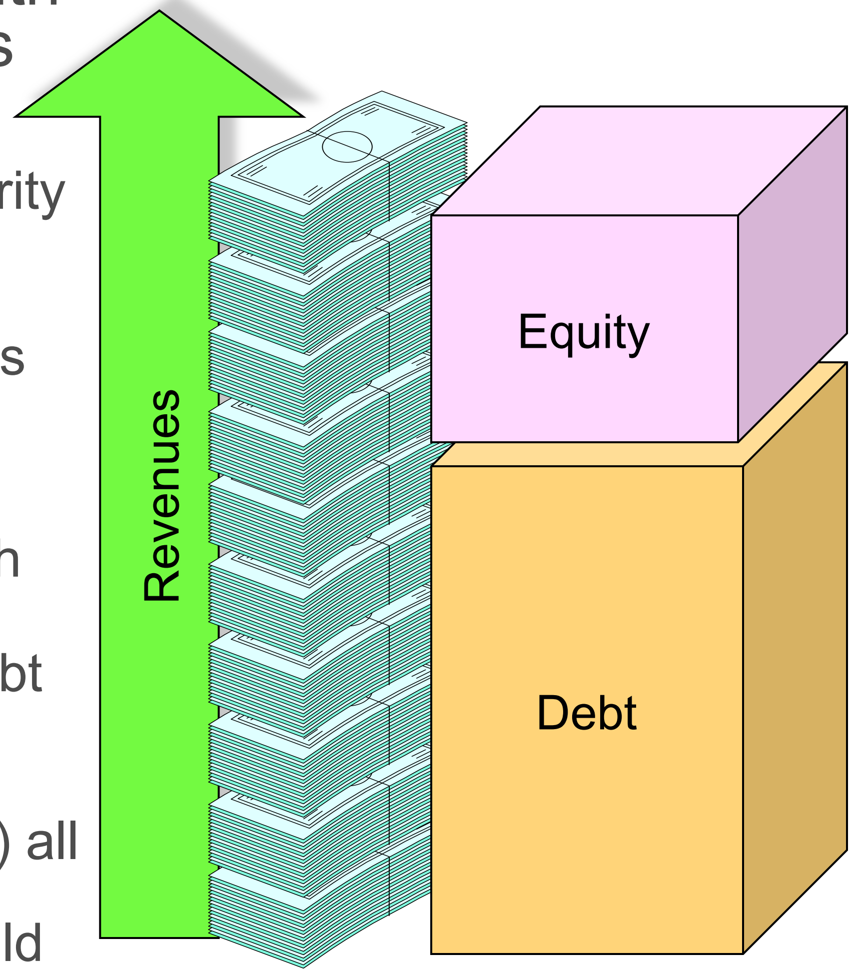
Complication #1: RISK

- Challenge:
  - Prior discussion: future cash flows were **certain**; key was to find projects yielding positive NPV (above break even threshold)
  - Most realistic economic settings, however, are risky ones (particularly in businesses) – cash flows are **probabilistic**



Complication #2: CAPITAL STRUCTURE

- Many utilities have multiple classes of investors, each with different claims on cash flows
- Simplest distinction:
  - Debt/Bonds: "Fixed" claim; priority (first dibs) on revenues
  - Equity/Stock: "Residual" claim; back seat on claims to revenues
- Consequences of capital structure (+ risk) for finance:
  - For a given pattern of risky cash flows, debt is safer than equity.
  - Expected/required return on debt (ROD) is lower than expected return on equity (ROE)
  - ROD, ROE, and Δ=(ROE-ROD) all tend to increase in leverage (though total cost of capital could go up or down)



Adjusting valuation analysis to account for the risky environments

- The Good News:
  - Most of the rules of thumb about time discounting / compounding still hold
  - In fact, all of the FV / PV expressions above still apply, in very much the same forms before…
- The Bad News:
  - Applying of these formulas can be a bit more complex, in at least three ways. We now must focus on:
    - *Expected* cash flows (e.g., cash flows "on average");
    - *Risk-Adjusted Expected* rates of return;
    - *Combining Expected Returns Different Classes of Investors* (e.g., ROD & ROE) using the "WACC"

The Good News: Adjusting valuation formulas is easy

Certain Payoffs

- Compounding

$$F_t = P_0 \times (1 + r)^t$$

- Discounting

$$P_0 = \frac{F_t}{(1 + r)^t}$$

Risky Payoffs

- Compounding

$$E(F_t) = P_0 \times (1 + E(R))^t$$

- Discounting

$$P_0 = \frac{E(F_t)}{(1 + E(R))^t}$$

Identical adjustments for all the other NPV formulas outlined above (e.g., annuities, perpetuities, growing annuities/perpetuities)

Multiple rates of return & Weighted Average Cost of Capital (WACC)

- *Economists tend to equate WACC with the best measure of reasonable RoR (min for attracting investment)*
- WACC = Weighted average of ROE and ROD, where weights correspond to the relative fair market value of utility's debt & equity to total value (D & E, respectively):

$$WACC = \left(\frac{D}{D+E}\right) \times ROD + \left(\frac{E}{D+E}\right) \times ROE$$

- For taxable entities, the version you'll usually see is a bit more complicated, and is adjusted to account for the tax advantages of debt. If entity has marginal tax rate *T*…

$$WACC = \left(\frac{D}{D+E}\right) \times ROD \times (1-T) + \left(\frac{E}{D+E}\right) \times ROE$$

Reason for Adjustment: Utility gets to fob off T% of its interest payments to tax payers as a deduction

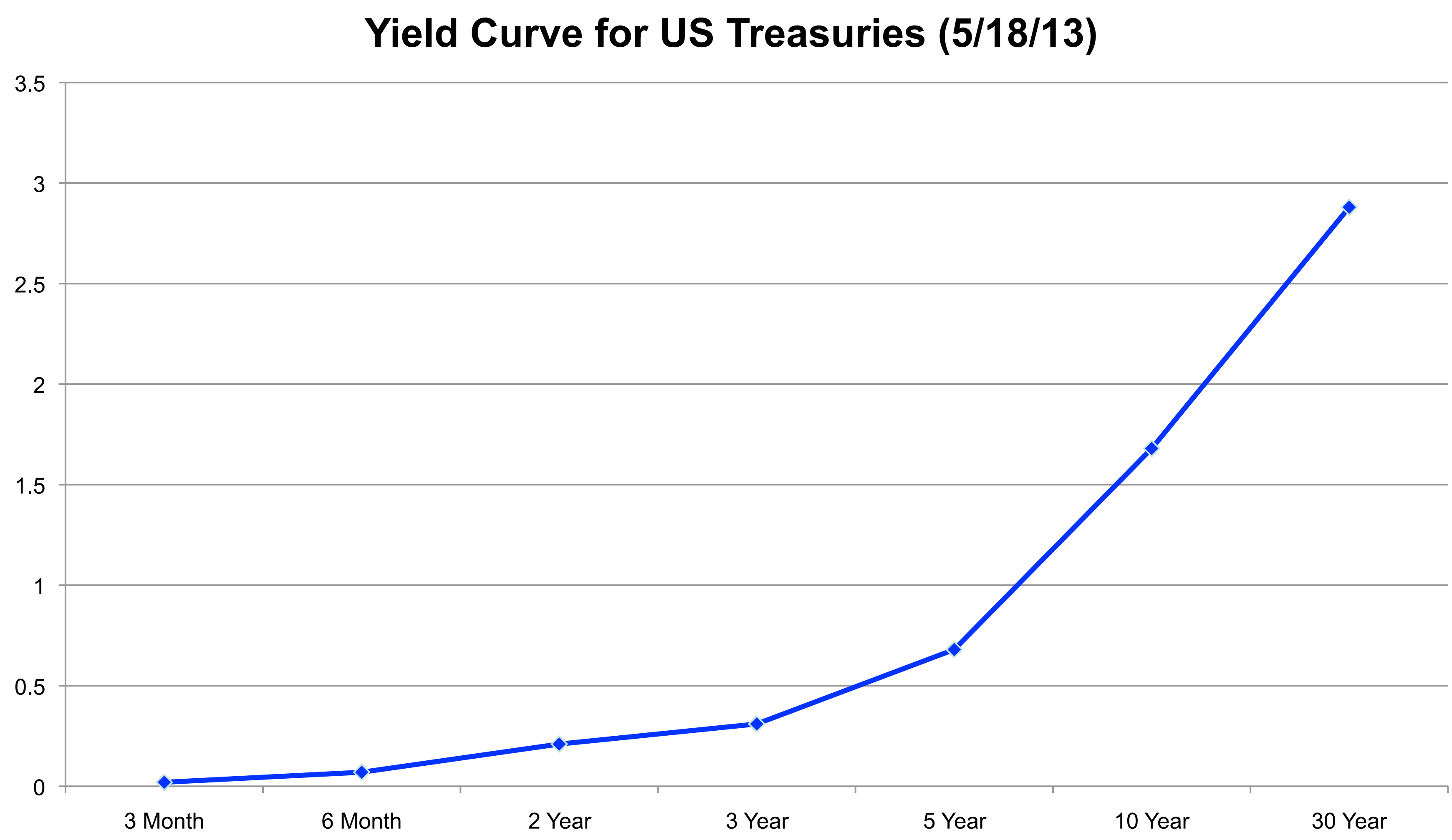
Estimating WACC requires an estimating expected returns of capital claims (ROE; ROD)

- Usually, estimating ROE is far more difficult (and contentious) than estimating ROD
- Instead, they forecast an *expected return:*
  – Effectively, what return they expect to receive on average from holding the investment across periods
  – They then can use those expected returns to discount future cash flow payments.
- Dominant ways to estimate ROE/ROD:
  A. Direct Observation (ROD)
  B. Precedent rates set in the regulatory "market" (ROE)
  C. Discounted Cash Flow (DCF) approach (ROE)
  D. Capital Asset Pricing Model (CAPM) approach (ROE)
  E. Other Approaches (won't cover; less accepted)

(A) Direct Observation (ROD)

- Use the yield on the utility's current debt obligations (or closest comparison)
  - Yield on the utility's publicly traded bonds (or as close a comparable measure as possible).
  - If none, approximate using yield on comparably rated debt securities (e.g., other utilities' public debt; implied rates from credit derivatives)
- Drawbacks
  - Can't be applied to ROE (current yield not observable)
  - Even for ROD, can inject some imprecision, particularly if there are not good comps, you use the wrong comps
    - Holding Co Structures; Leverage effects;Term/maturity structure of the debt market;
    - (More later)

Interest *Rate*? Which one?



Source: Wall St. Journal

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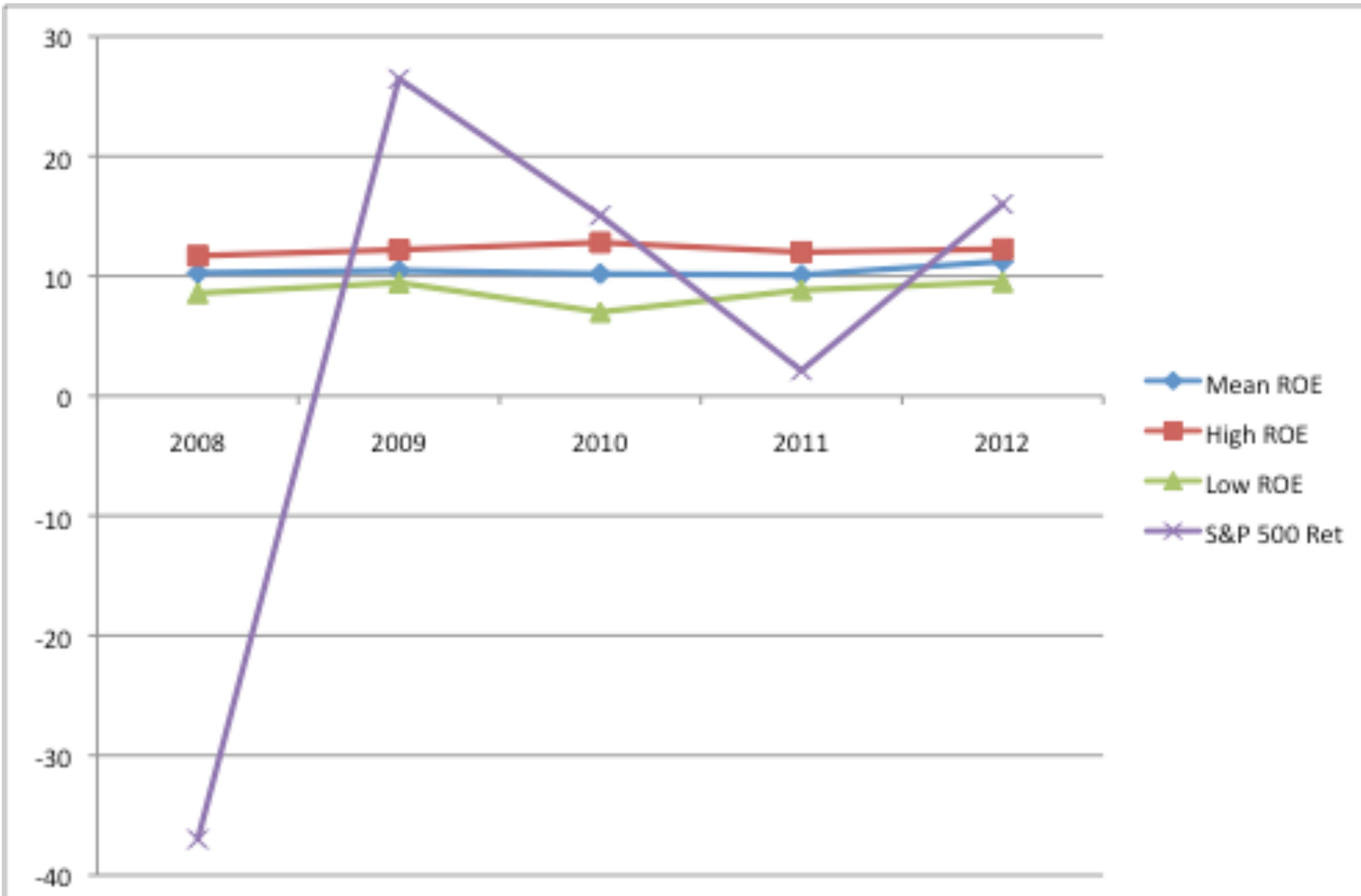
(B) Appeal to Precedent: Prior / Contemporaneous Approved ROEs

- Increasingly common type of "reality check" / benchmarking exercise on the ROEs by other regulatory authorities (controlling for industry)
- Facilitated by availability of robust data
  – *Public Utilities Fortnightly* Utilities ROE Survey (raw data is now – as you likely know – available on-line)
- Potentially helpful, but also problematic…
  – "Heisenbergian" Dilemma: PUF data is most useful *if all other surveyed PUCs ignore the survey* in their own rate proceedings…but they don't…
  – "Echo Chamber" effect (Cf: Exec Comp surveys)

Rate-Setting by Precedent
"Benchmark" Regulatory Trends in ROE

Approved ROE, 2007-11
(Gas + Electric, in Percentages)



Source: Public Utilities Fortnightly

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(C) Discounted Cash Flow (DCF) (Principally for ROE)

- Best suited for for stocks paying regular dividends, and whose future pattern of dividends can itself be projected reliably (such as preferred stocks)
- Idea: Current price of a stock = PV of future expected dividends (which are usually assumed to grow at constant rate in perpetuity)

$$P_0 = \frac{E(F)}{E(R) - E(g)} = \frac{E(Div_1)}{ROE - E(g)}$$

$$\longrightarrow \quad ROE = \frac{E(Div_1)}{P_0} + E(g)$$

- NOTE: Because the components of this expression are often measured imprecisely, most experts estimate (as they should) a Lo-Hi range for ROE

DCF Example

- A public utility is financed by both debt and equity, and faces a marginal tax rate of 20%.
  - It has 1,000 “zero-coupon” bonds outstanding, each of which matures in 3 years and has a face value of $1,000. The current market price of each bond is $850 (and thus total market value of debt is $850,000).
  - It also has 10,000 shares of stock and regularly pays dividends. Next year, it is expected to pay a $2 dividend, and its dividends are expected to grow 3% / for the foreseeable future going forward. The utility’s current stock price is $30 (and thus total market value of equity is $300,000).
- What is the firm’s expected return on debt (ROD)?
- What is its expected return on equity (ROE)?
- What is the company’s WACC?

Example continued…

Return on Debt

(Observed Rate or Yield)

$$P_0 = \frac{E(F_t)}{(1+E(R))^t}$$

$$\$850 = \frac{\$1000}{(1+ROD)^3}$$

$$ROD = 5.5667\%$$

Return on Equity

(Gordon Growth Model)

$$P_0 = \frac{E(F)}{E(R)-E(g)}$$

$$\$30 = \frac{\$2}{ROE-0.03}$$

$$ROE = 9.6667\%$$

WACC

$$WACC = \left(\frac{D}{D+E}\right) \times (ROD) \times (1-T) + \left(\frac{E}{D+E}\right) \times (ROE)$$

$$= \left(\frac{850K}{850K+300K}\right) \times (5.567\%) \times (1-0.2) + \left(\frac{300K}{850K+300K}\right) \times (9.667\%)$$

$$= 5.8136\%$$

Caveats/issues with the DCF method

- Not appropriate for all types of equity
  - Particularly sketchy for stocks with no regular dividend pattern
- Leans (too?) heavily on efficient pricing in securities market for a single company at a given time
  - Single company "noise" / observation error
  - Problem of multi-division firms and holding companies
- No clear guidance on using single company or peer group
  - Defining appropriate peers (leverage ratios; industry; outliers)?
- Single period, or "average" over multiple periods?
  - Which periods? What sort of average (arithmetic/geometric)?
- Projected dividend growth rate (*g*) hugely speculative
  - Historical patterns? Earnings? Ad hoc approach? Commercial Services (e.g., IBES)? Sustainable?

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(D) The Capital Asset Pricing Model (Principally for ROE)

- Alternative method for estimating equity returns from finance theory; *does not* require dividend-paying stocks
- Assumptions
  1. Investors care only about mean and variance in returns; no transaction costs; no restrictions on short selling
  2. There exists a risk free rate on "safe" asset: r_f
  3. Expected Rate of Return on the Market: $E(R_{Market})$;
     - "Market" = extremely broad portfolio of investments, weighted by their market value (such as S&P 500 or Wilshire 5000)

Financial asset's risk summarized by β = the risk of asset relative to market risk (a.k.a., "undiversifiable" risk):

$$\beta = \frac{\text{cov}(R_{Asset}, R_{Market})}{\text{var}(R_{Market})}$$

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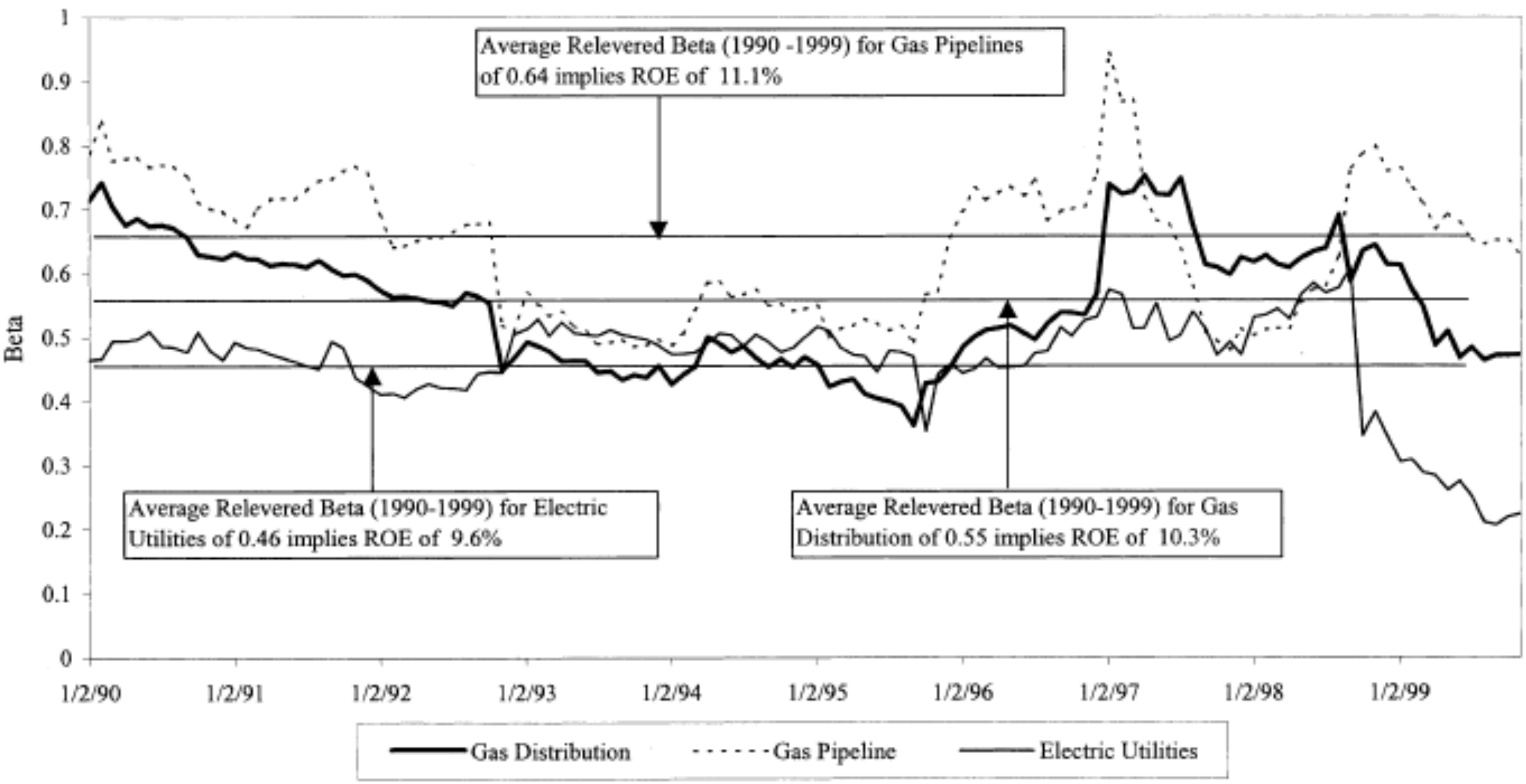
Core characteristics of β

- While β could take on any value in theory (+ or -), in most practical applications, an investment's β will be positive (and almost always between 0 and 3).
  - By definition, a risk free asset such as a (non-Greek) government bond has a $\beta = 0$
  - By definition, the market portfolio has a $\beta = 1$
- Relatively safe companies/assets tend to have $\beta < 1$, while relatively risky ones tend to have $\beta > 1$.
  - Utilities are often cited as a good example of "low β" stocks
    - Why? Part of the answer to this puzzle comes from the Alexander et al reading for later today
  - Note: Even companies with highly variable returns may have low βs: Variance can be uncorrelated with market risk
    - Systematic versus Diversifiable Risk
- Combinations of investments:
  - A portfolio of a set of investments has β equal to the (value weighted) average across those investments

Select Historic Utility Equity βs (by sector)



Source: Cragg et al (2001)

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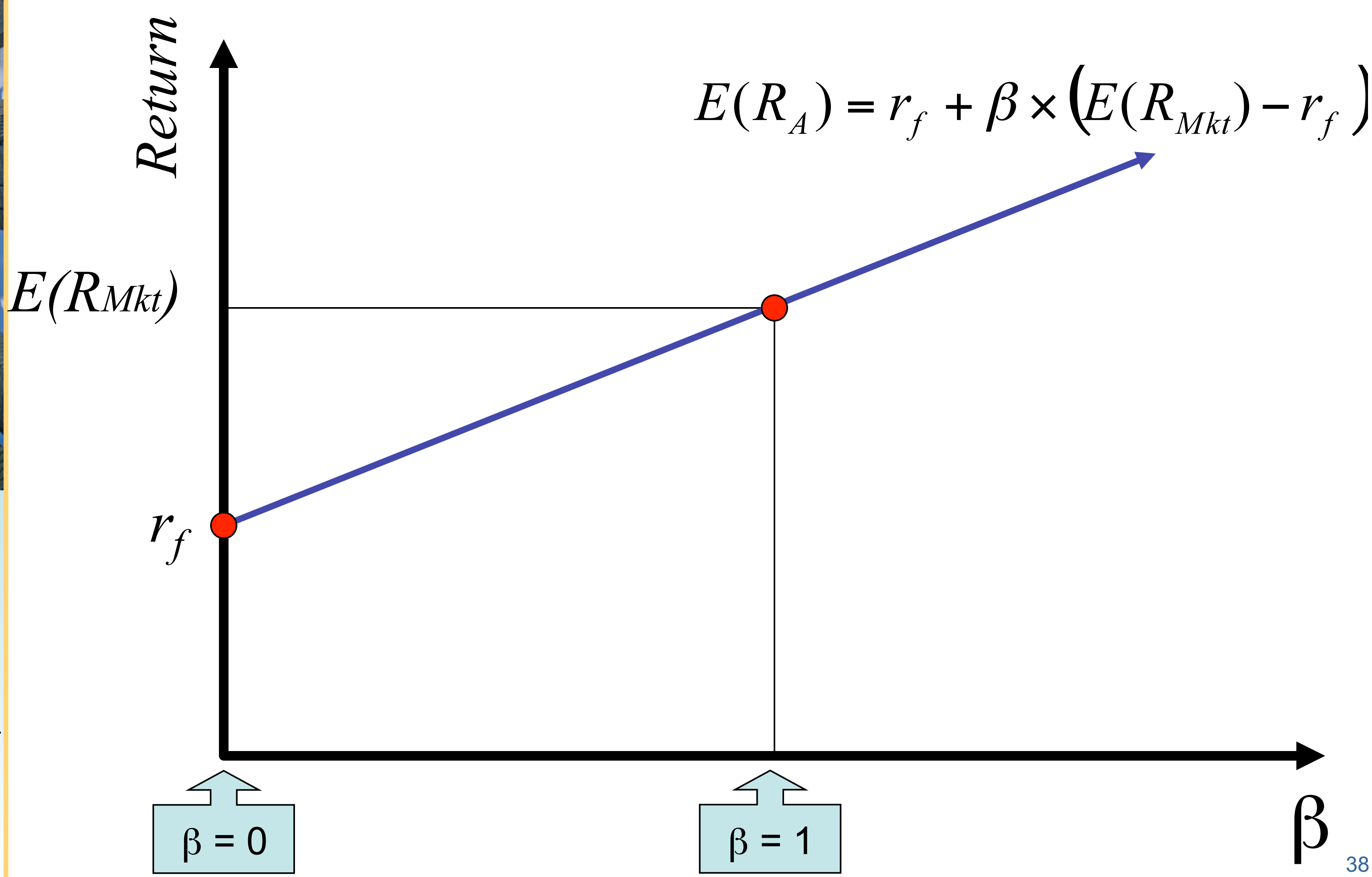
Using β to estimate expected return: The CAPM Securities Market Line



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Example…

- Return to previous example, and add following facts:
  - Utility's estimated equity β = 0.7
  - Utility's estimated debt β = 0.1
  - Rate on T-bills = 5%
  - Expected return on market portfolio is 12%
- Use CAPM to re-estimate the utility's ROD; ROE & WACC.
- ROD & ROE:

$$\begin{aligned} ROD &= r_f + \beta_{Debt} \times \left(E(R_{Mkt}) - r_f\right) \\ &= .05 + 0.1 \times (0.12 - 0.05) \\ &= 5.7\% \end{aligned}$$

$$\begin{aligned} ROE &= r_f + \beta_{Equity} \times \left(E(R_{Mkt}) - r_f\right) \\ &= .05 + 0.7 \times (0.12 - 0.05) \\ &= 9.9\% \end{aligned}$$

- WACC:

$$\begin{aligned} WACC &= \left(\frac{D}{D+E}\right) \times (ROD) \times (1-T) + \left(\frac{E}{D+E}\right) \times (ROE) \\ &= \left(\frac{850K}{850K+300K}\right) \times (5.7\,\%) \times (1-0.2) + \left(\frac{300K}{850K+300K}\right) \times (9.9\,\%) \\ &= 5.953\,\% \end{aligned}$$

Important caveats/problems with CAPM

- What's the risk free rate?
  - None actually exists; use proxies (e.g., US t-bill rate; LIBOR(!))
  - Key issue: applicable term/maturity (term mismatch)
- What's the market's expected rate of return?
  - Even harder to know with precision.
  - Experts often use historical average market returns, sometimes augmented with analyst forecasts / prediction markets
- How do we compute the company's β?
  - Estimated by historical data (if publicly traded), using regression
    - Many services (e.g., Yahoo Finance) publish this information
  - Problem: Data is unreliable / time variant
    - Pool industry / international data (but don't assume β=1!)
  - Problem: What if company is privately held?
    - Must utilize comparable firm/industry/int'l data (if available)
  - Problem: What if utility is division of larger firm / holding company?
    - Firm β likely inappropriate; other "monoline" peers better?

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Generalizations/Alternatives to the CAPM

- CAPM does not predict perfectly
  - Premia for small firms, high market to book firms, "momentum" trading
  - CAPM's assumptions may be too special
- Some have attempted to generalize / augment CAPM in the last two decades:
  - APT & multi-"factor" models (Fama & French 1993; Carhart 1997)
    - Seems to explain better; a little *ad hoc*
  - Adjustments / controls for peer companies
- CAPM is still by far the most widely accepted approach for asset pricing (warts and all)

Key Point

Rules of Thumb from Risk Valuation

- Financial decision makers make risky investment choices according the NPV rule *adjusted for risk.*
- Holding all else constant, the risk-adjusted NPV of a typical investment's cash flow pattern ***increases*** when…

1. …up-front costs decline
2. …the *expected* size of downstream benefits increases
3. …the period over which downstream benefits accrue lengthens
4. …the risk free rate of return decreases
5. …the expected market rate of return decreases
6. …the company's market β decreases

Economic factors / policies that bring about (1) – (6) tend to catalyze investment.

And, vice versa, things that reverse (1) – (6) tend to deter investment.

Coda: Regulator's Dilemma: Asymmetry and the Cost of Regulatory "Error"

- Setting regulated RORs is not an exact science
  - Regulators can err by setting ROR too high or too low
- PUCs fear (are told) that mistakenly setting RoE too low implies asymmetrically large dangers. Argument Structure:

ROE mistakenly set too low → Ratings agencies downgrade debt → Cost of Capital (ROD) skyrockets → End of Civilization as We Know It

- Plausible argument? *Yeah, I guess;* but bear in mind:
  - Evidence of ratings downgrades following reductions in permitted ROE far from overwhelming (often forecastable too)
  - Increases in ROD & ROE become part of next rate case
  - Timing of next rate case not (perhaps) not set in stone
  - Costs of setting ROE too high (deadweight loss; overinvestment) are borne by customers/society: poorly organized / represented

Post-hoc Fudge Factors

- Financial experts often try to "adjust" their ROE estimates to to capture something (allegedly) not picked up by valuation model.
- Example: "Flotation costs":
  - Idea: if company sells new equity, lawyers / bankers will skim z% of the price in fees. Reasonable rate of return should compensate for transaction cost
  - Under DCF approach:

$$ROE = \frac{E(Div_1)}{P_0(1-z)} + E(g)$$

- Is this justified? Maybe; but invites abuses, too:
  - Do we know utility will sell equity (vs self-finance)?
  - Why not issue new debt instead (lower cost; tax adv.)?
  - All issuers face/pay flotation costs (regulated or not!)

Kicking the tires of DCF/CAPM
8 Questions you can (should) pursue

1. Is project appropriate (in size / quality) for needs (RoR)?
2. Leverage and effects on appropriate ROE / ROD?
3. Does expert offer a single estimate or range for β; DCF?
4. Track Record: Is Realized ROE persistently > Permitted?
5. Basis for choosing comparable companies?
   – Different regulatory regimes, industries, leverage, holding co's?
6. Is there a real basis for post-analysis adjustments (e.g., "flotation" costs; remediation recovery) or is it merely *ad hoc* fudging?
7. Does cost of capital estimate attempt to adjust for regulatory risk unnecessarily?
   – Why not already incorporated into of utilities' DCFs / βs?
   – Need sophisticated regulators (e.g., IRLE veterans) have to adjust?
8. Dueling Experts: Split Baby or "Baseball" Arbitration?
   – Cede v. Technicolor, Inc., (Del. Ch. 10/19/1990) (appraisal action)

End of program

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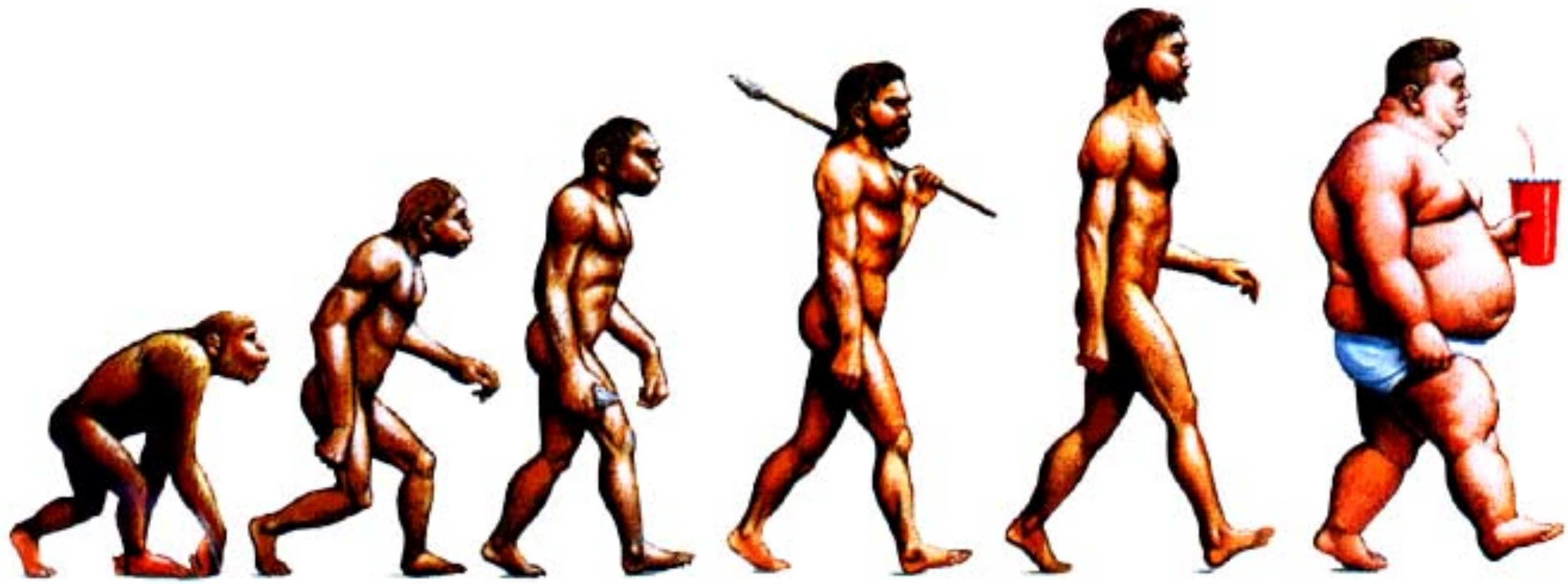

The evolving regulatory state