# *Balance Sheet Optimization Strategies*

**January 2012**

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## Prologue

➢ This presentation summarizes my more than 25 years of applied research experience covering empirical finance topics including: macroeconomics, optimal capital structure and cash holdings, liability management, foreign exchange exposure management, shareholder payout, domestic and international cost of capital, mergers and acquisitions, and the causes and cures of conglomerate discounts such as spin-offs and carve-outs.

➢ My clients in the Financial Strategies Group at Salomon/Citigroup, Credit Suisse, and Ramirez have included major corporations around the globe, financial institutions, and sovereigns.

➢ The "academic" section of the presentation focuses on fixed-income liability management from a corporate treasurer's perspective.

# Executive Summary

**Economic Outlook**

➢ The economic outlook presents a duality consisting of:

  o Persistent, though diminishing, output gap, and

  o Increased inflationary expectations driven by quantitative easing, and developed-country sovereign budget deficits

➢ The Okun Rule suggests that for unemployment to drop from its current 8.5% level to a steady state 5% level, GDP has to grow by about 7% p.a. above its long-run rate. As this scenario is unlikely, the current unemployment picture is likely to persist over the medium horizon.

➢ Given the current unemployment picture, the Taylor rule suggests a prolonged period of extremely low, even negative, short-term interest rates – as underscored by expectations embedded in futures and options markets.

➢ Though the economic picture is improving in the US, US investment activity holds the key to an improving unemployment picture – as verified by statistical evidence once again posited buy economist John Taylor. US investment activity in turn is largely dependent upon the housing sector and business fixed investment, both of which are negatively affected by uncertainty.

➢ On the other hand, the Fed's balance sheet, commodity and foreign-currency prices, and market-imputed inflationary expectations suggest rising inflationary expectations. These expectations are likely to materialize as the rate of growth of M1 and M2 start approaching the rate of growth of high powered money.

**Optimal Capital Structure**

➢ Unlike academics, industry executives frame the "optimal capital structure" question as an "optimal credit rating" question.

  o Statistical models, typically with high $R^2$s, help us establish correlations and convergences among concepts such as market value leverage, book value leverage, debt to EBITDA, interest coverage, and credit ratings.

➢ The academic models of optimal capital structure notwithstanding, inertia and management entrenchment often drive the capital structure decision. Management will deliberately change its "steady-state" credit rating profile primarily in the face of "life-altering events" such as:

  o Mergers and acquisitions

  o Shareholder activism

➢ Allegedly, credit-ratings are economic-cycle proof. As such, we cannot say that management deliberately alters its credit-rating profile in response to macroeconomic shocks. On the other hand management does alter its leverage targets in a lagged, pro-cyclical response to macro shocks, possibly amplifying the effects of such shocks.

# Executive Summary

## Liability Management

➢ Our historical efficient frontier analysis confirms that a barbell funding strategy consisting of the shortest-term and the longest-term funding instruments are on the efficient frontier.

➢ Just because we know what the efficient frontier looks like does not mean at which point on the efficient frontier we need to operate. Participants decide on the this point based on:

    o Expectations

    o Pain tolerance levels, and

    o Comparables analysis

➢ A current 10-Year vs. 30-Year; or 100-Year vs. 30-Year funding decision will likely benefit the longer-funding choice if the yield curve shits by about 150-225 basis points. Such a shift is very likely given that the risk-free real interest rate is more than two standard deviations to the left of its mean, and that inflation is likely to pick up to smooth-out sovereign budget imbalances.

➢ Pain tolerance levels depend on a capital structure and industry comparables. Yet most CFOs do not like to see more than a 20% change in EPS as a result in moves in interest rates.

## Foreign Exchange Exposure Management

➢ According to a 1998 Wharton study, foreign exchange is the most commonly managed risk by non-financial corporations. Nonetheless, most hedging activity covers transaction exposure, whereas translation or economic exposure is seldom hedged using financial instruments.

    o In a well-known Chicago area pharmaceutical firm case, the Firm had to reverse its "correctly hedged" translation exposure due to its counterparty market-to-market exposure of its derivatives contracts that were hedging its Euro assets.

    o This example suggest that even rational economic decisions might result in "disaster" if the size of the transaction is too big and bumps up against psycho-social norms.

    o Though economic mean-reverting theorems such as purchasing power parity (burger economics) and interest rate parity (the carry trade) frequently enter foreign currency hedging discussions, unlike interest rate forecasts, they rarely affect hedging decisions.

# Executive Summary

**Shareholder Payout**

➢ Management typically treats dividends very similarly to corporate coupon payments. That is, management will not lower dividends as long as it can, even when it faces adverse circumstances. As such, dividends are largely determined by comparables analysis.

➢ Share buybacks, on the other hand, are largely driven by market sentiment. Management typically buys back shares not when they are "undervalued" but when they feel good about the markets.

➢ We recommend NPV and IRR approaches to the share buyback decision. To determine the appropriate cost of equity capital, we use a forward-looking equity market risk premium and an extended CAPM approach. Our extended CAPM betas are similar to single-factor CAPM betas. We do find evidence for the small-cap and value factors, but typically no evidence of momentum.

**Mergers and Acquisitions**

➢ Most Mergers and Acquisitions (M&A) activity is driven by a desire to increase the growth rate of earnings as stock prices are very sensitive to expected growth rates.

➢ M&A is also driven by a desire to improve credit ratings and to diversify business profiles.

➢ Some contend that M&A is also driven by hubris.

➢ The preponderance of academic evidence that we share suggests that M&A is frequently value destructive for the acquirers.

**Conglomerate Discounts**

➢ Spin-offs and equity carve-outs are two transactions that can help diversified firms become more focused and potentially reduce any valuation discounts resulting from diversification.

➢ Subsequent to spin-offs and equity carve-outs, companies tend to out-perform the broader market.

➢ The adage that companies tend to spin their "dogs" and carve-out their jewels seems to be true.

# Economic Growth Leads the Unemployment Rate and is More Volatile – The Okun Rule



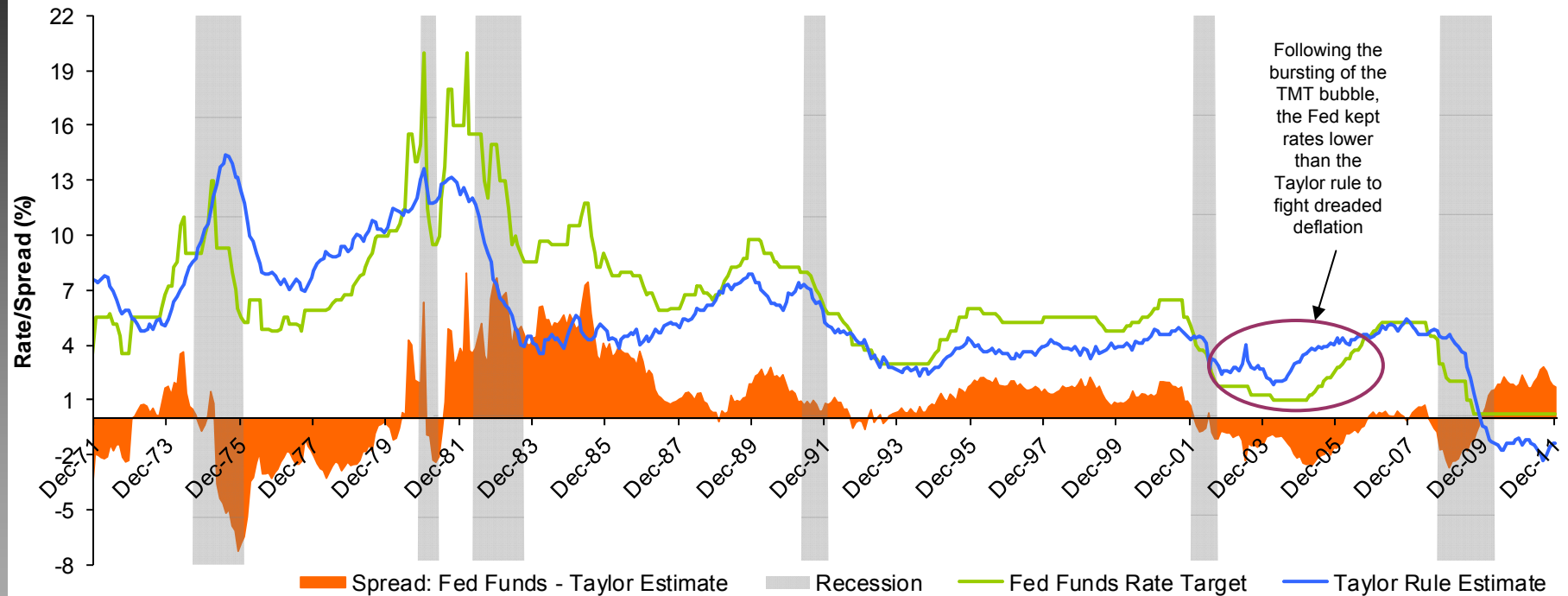US Unemployment Rate and Rate of Growth of U.S. GDP, 1948-September 2011

Recession    Real GDP (QoQ, %)    Change in Unemployment (QoQ, %)
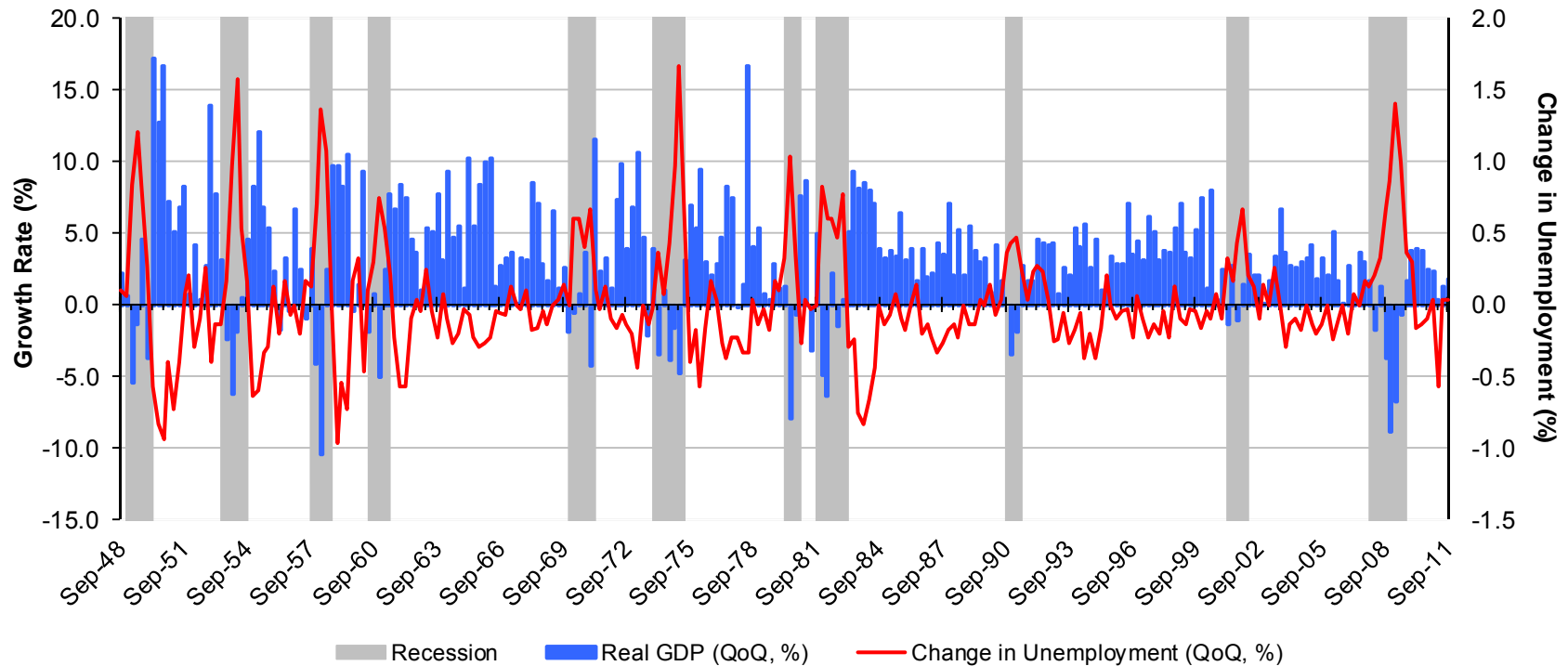
- **GDP growth = 3.42  –   1.81*(change in unemployment)**
  **t statistics:   (18.43)   (15.57)**
  **Adj. R² = 48.93%**

- **This confirms the study by Abel and Bernanke, 2005**

*Note: Regression shows non-annualized figures.*

*Source: Bloomberg.*

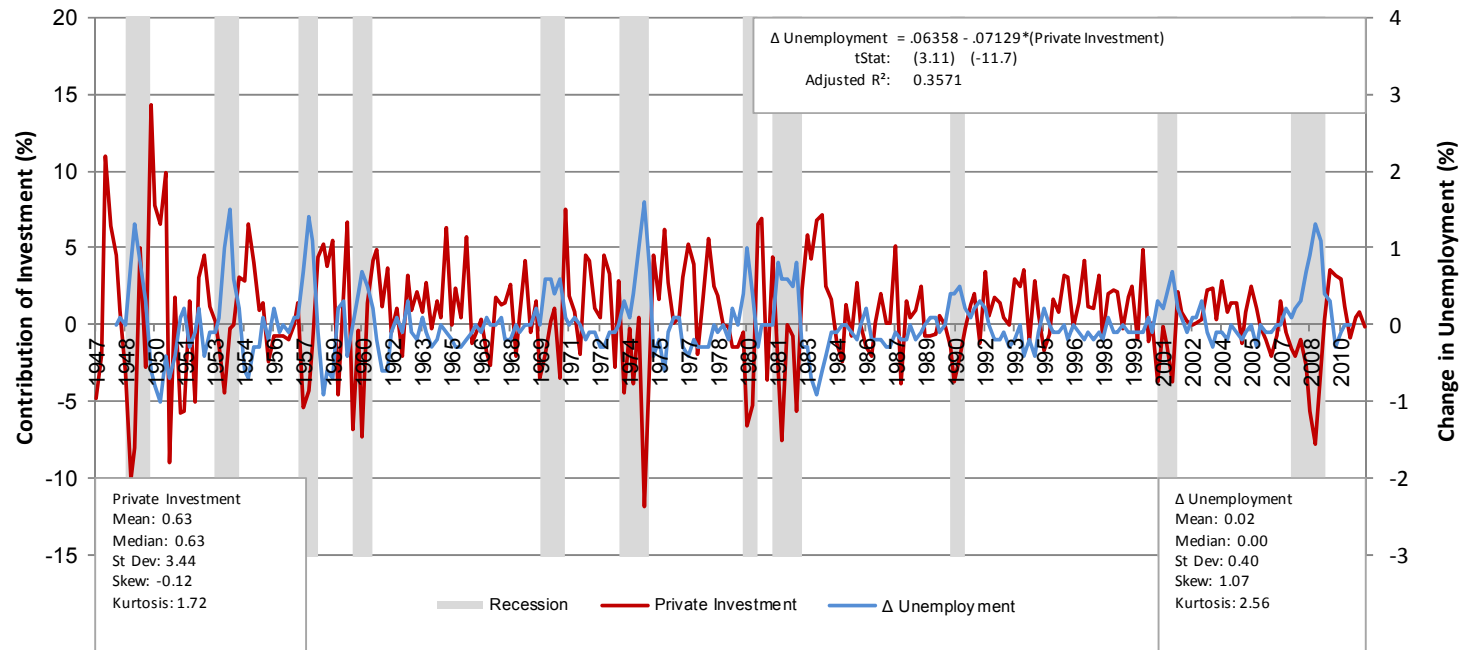# The Fed's Reaction Function and the Taylor Rule, 1971-2012



Following the bursting of the TMT bubble, the Fed kept rates lower than the Taylor rule to fight dreaded deflation

**Rate/Spread (%)** axis ranging from -8 to 22

X-axis: Dec-71, Dec-73, Dec-75, Dec-77, Dec-79, Dec-81, Dec-83, Dec-85, Dec-87, Dec-89, Dec-91, Dec-93, Dec-95, Dec-97, Dec-99, Dec-01, Dec-03, Dec-05, Dec-07, Dec-09, Dec-11

Legend: Spread: Fed Funds - Taylor Estimate | Recession | Fed Funds Rate Target | Taylor Rule Estimate

- ◆ **The Taylor rule is widely used to explain Fed-fund targets rates**
  - ⇨ *Real Rate+Core Inflation+½\*(Inflation–Target Inflation)+½\*Okun Factor\*(Normal Unemployment–Unemployment)*
- ◆ **In the current environment with unusually high unemployment and low inflation the rule calls for negative rates**
  - ⇨ *This is yet another indication that short rates may stay low for some time*

*Source: Bloomberg, NBER.*

# Private Investment and Unemployment

*Investment activity seems to hold the key to solving the unemployment problem.*
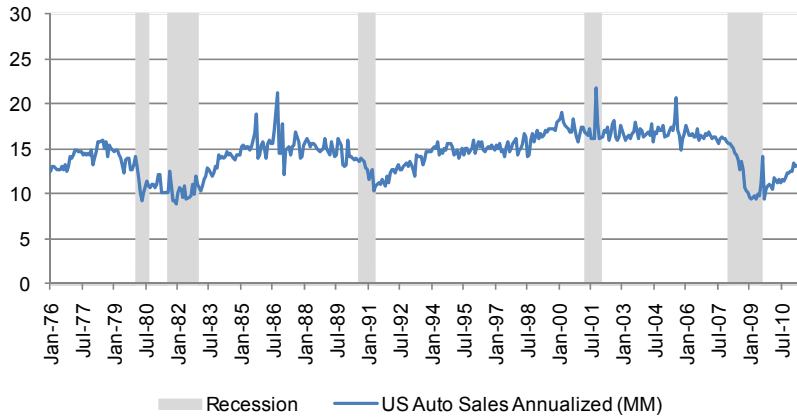
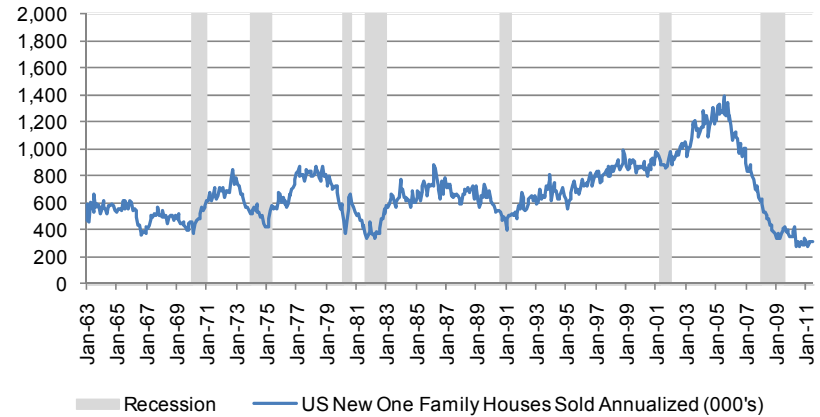**Contribution of Private Investment to GDP Growth and Change in Unemployment**



$\Delta \text{Unemployment} = .06358 - .07129 * (\text{Private Investment})$
tStat: (3.11) (-11.7)
Adjusted R²: 0.3571

Private Investment
Mean: 0.63
Median: 0.63
St Dev: 3.44
Skew: -0.12
Kurtosis: 1.72

Δ Unemployment
Mean: 0.02
Median: 0.00
St Dev: 0.40
Skew: 1.07
Kurtosis: 2.56

Recession — Private Investment — Δ Unemployment

*Source: Bloomberg*

# Private Investment Indicators

## Auto Sales



Recession ▬ US Auto Sales Annualized (MM)

## New Home Sales



Recession ▬ US New One Family Houses Sold Annualized (000's)

## Private Investment



▬ US Gross Private Domestic Inv. ▬ GPDI/Nominal GDP (right axis)
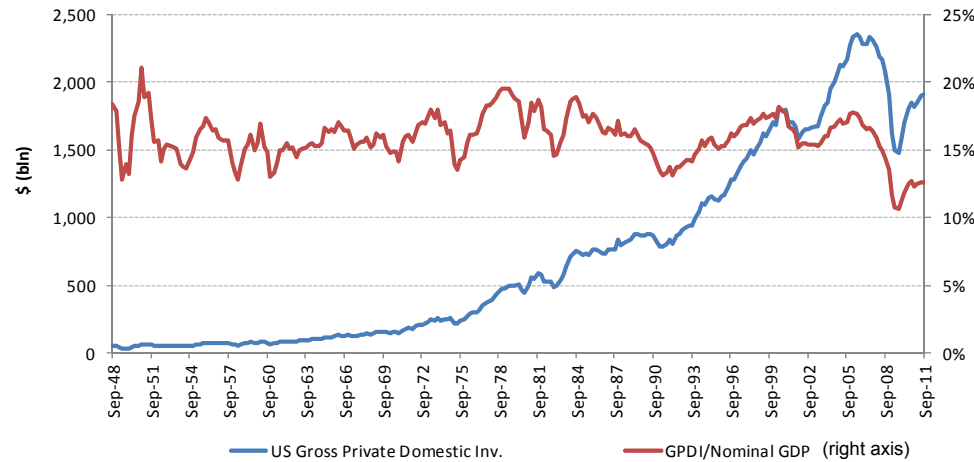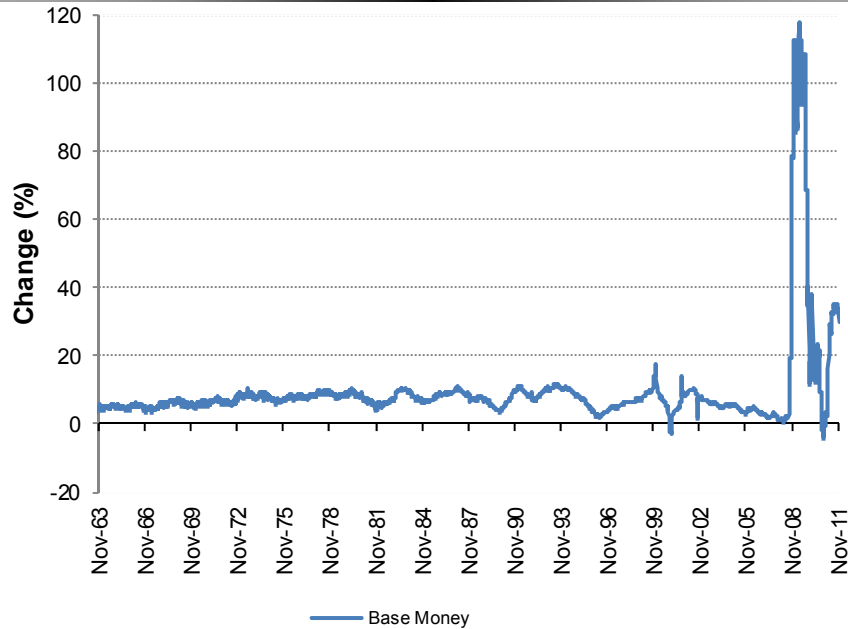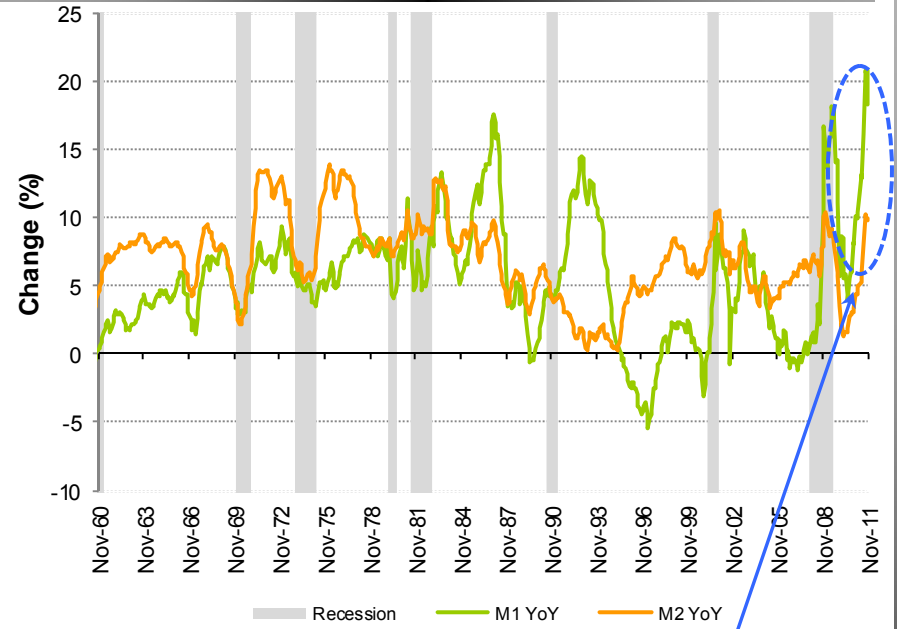
*Source: Bloomberg.*

# US Money Supply Growth and Inflation

## Base Money, 1963-Nov 2011



## M1, M2 YoY, 1960-Present



- ◆ **M1, which includes banknotes, current accounts and overnight deposits, grew by 10% in the 12 months to November, while M2, which also includes savings accounts, rose by just 7% over the same period**

- ◆ **As the U.S. money supply has spiked, the dollar has declined significantly**

- ◆ **Moreover, the rate of growth of M1 and M2 has not even come close to the rate of growth of base money, suggesting relatively lackluster bank lending.**
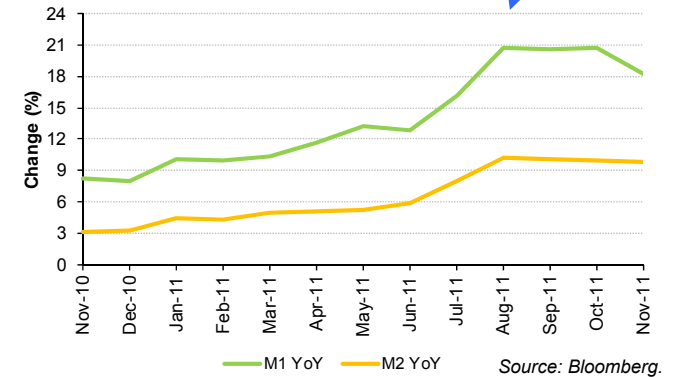


*Source: Bloomberg.*

# The Dollar, Commodities and Inflation

*Increasing gold and commodity prices and a depreciating dollar may be the harbingers of future inflation.*

*Because Purchasing Power Parity holds only in the medium term, about five years, the declining dollar may bring inflation over the medium horizon.*

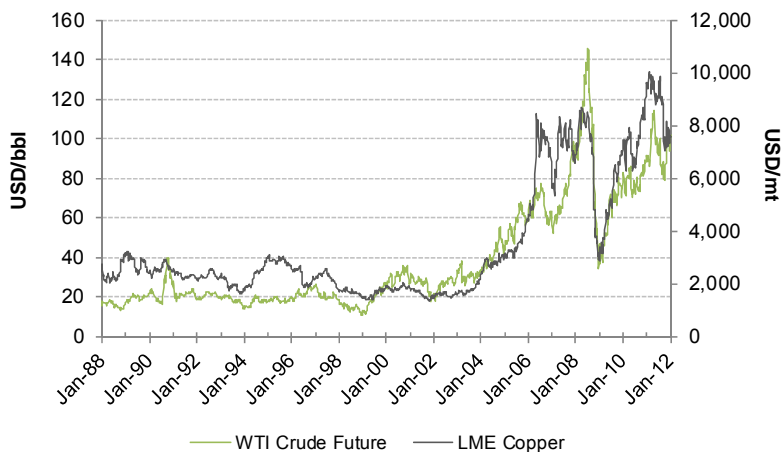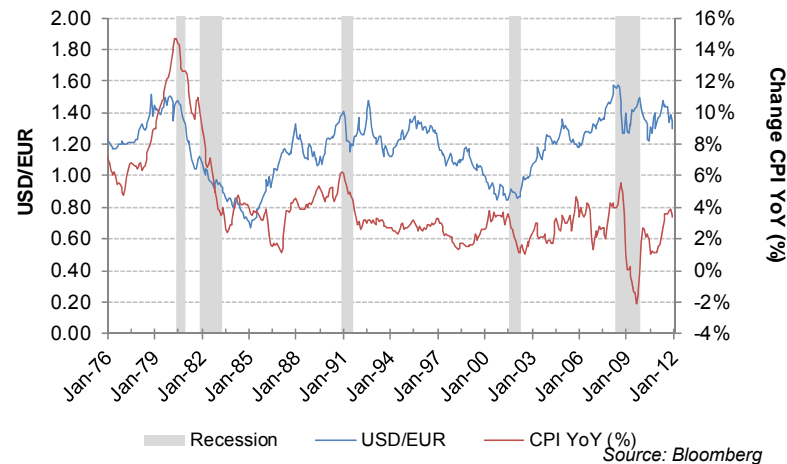## Gold, 1971 – Present



## The U.S. Dollar, 1975 – Present



## WTI Oil & LME Copper 1987 – Present



Legend: WTI Crude Future, LME Copper

## Inflation and the Dollar, 1975 – Present



Legend: Recession, USD/EUR, CPI YoY (%)

*Source: Bloomberg*

# Expectations of Future Fed-Funds Rates

**Based on its most recent meeting, the FOMC has stated that it will maintain the Fed-Funds rate at 0-25bps and continues to anticipate that economic conditions are likely to warrant exceptionally low levels of the Fed-Funds rate for an extended period.**

**In synchrony with that statement, the options-markets see higher probability of rates staying near zero in 2012.**



Options-Implied Fed Funds Rate, Present – October 2012
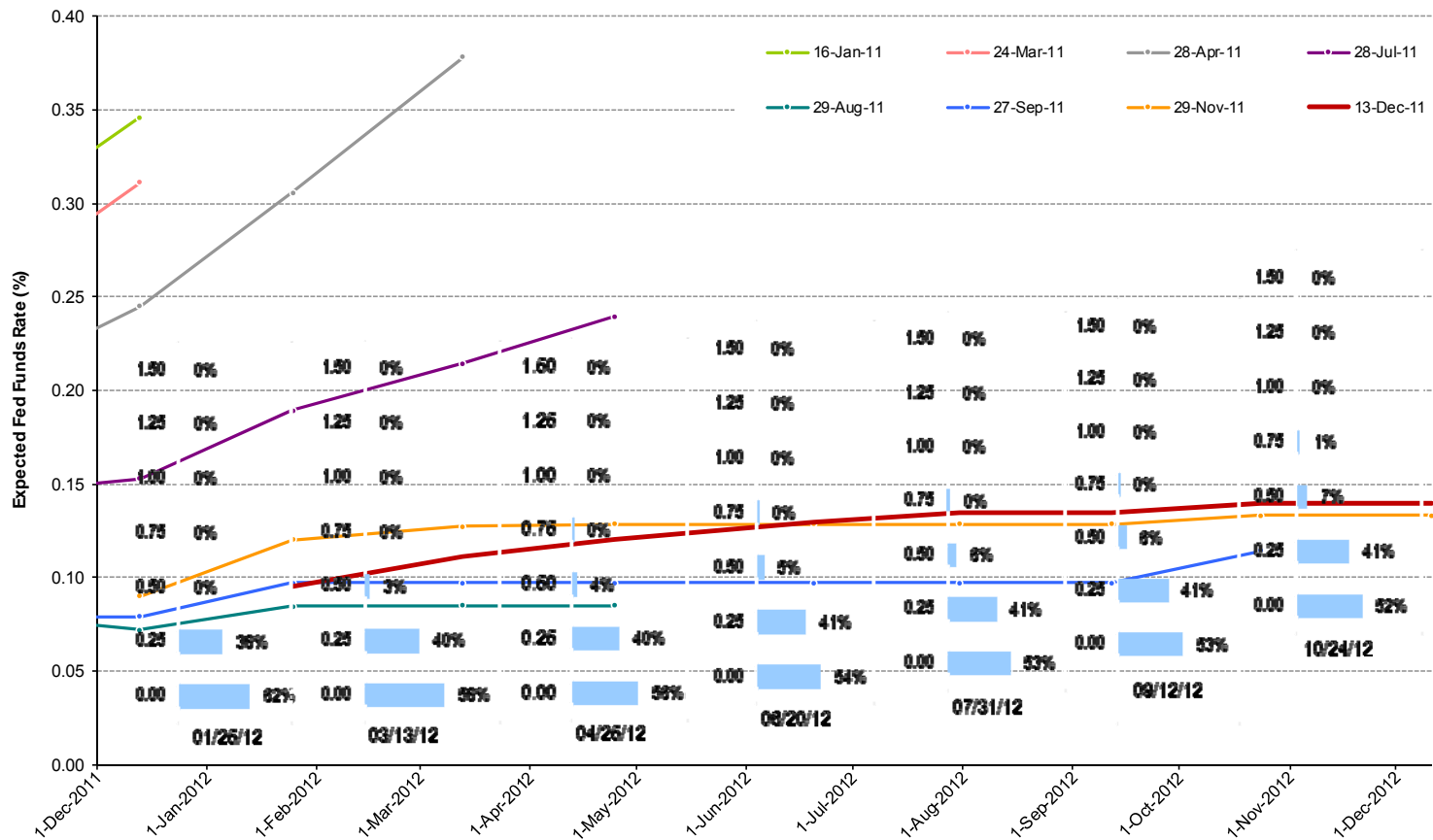
# US Interest Rates: Reading the Markets

## UST Yield Curves, Jan 11 – Jan 12



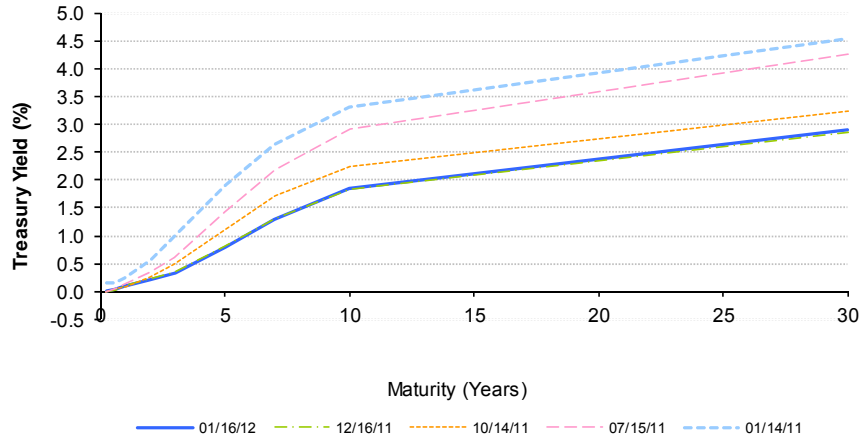Treasury Yield (%) vs Maturity (Years)

Legend: 01/16/12, 12/16/11, 10/14/11, 07/15/11, 01/14/11

## US TIPS Curves, Jan 11 – Jan 12



TIPS Yield (%) vs Maturity (Years)

Legend: 01/16/12, 12/16/11, 10/14/11, 07/15/11, 01/14/11
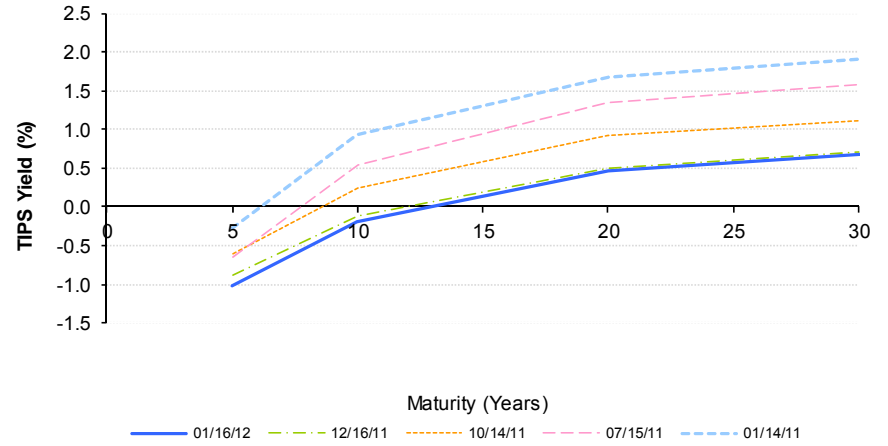
## Breakeven Rates, Jan 11 – Jan 12



Breakeven Rate (%) vs Maturity (Years)

Legend: 01/16/12, 12/16/11, 10/14/11, 07/15/11, 01/14/11
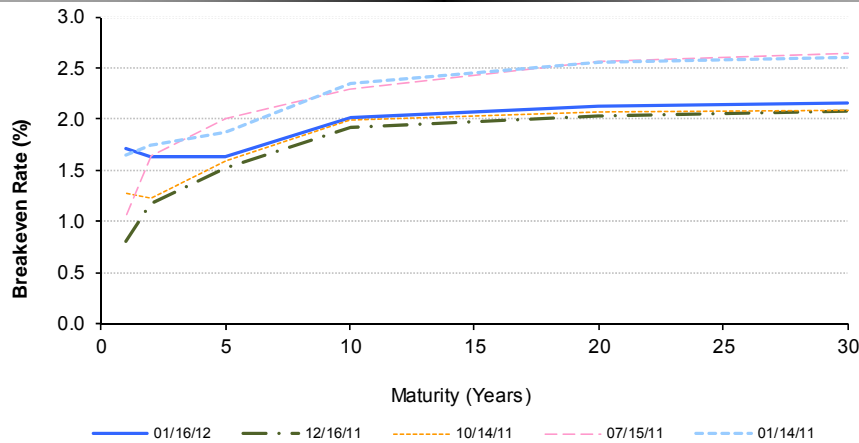
## Corporate Yields and Spreads, Sep 10 – Jan 12
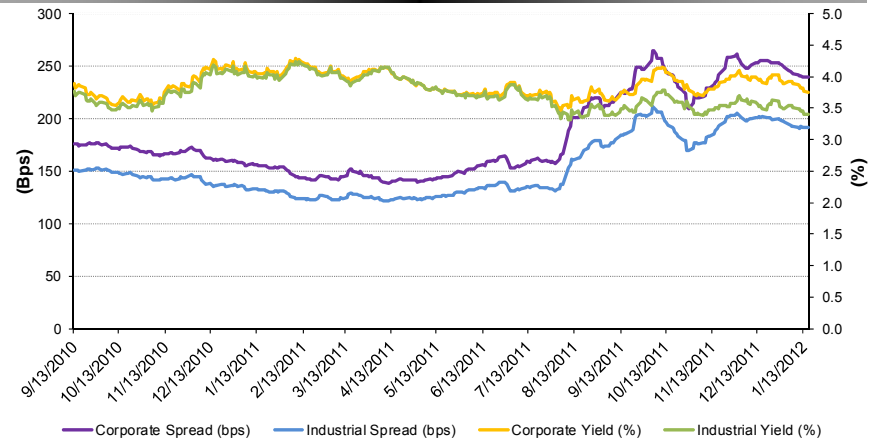


(Bps) and (%) vs dates 9/13/2010 – 1/13/2012

Legend: Corporate Spread (bps), Industrial Spread (bps), Corporate Yield (%), Industrial Yield (%)

*Source: Bloomberg.*

# Leverage: The Markets are Fickle

## Investor Survey: What Would You Most Like to See Companies Do with Cash Flow?
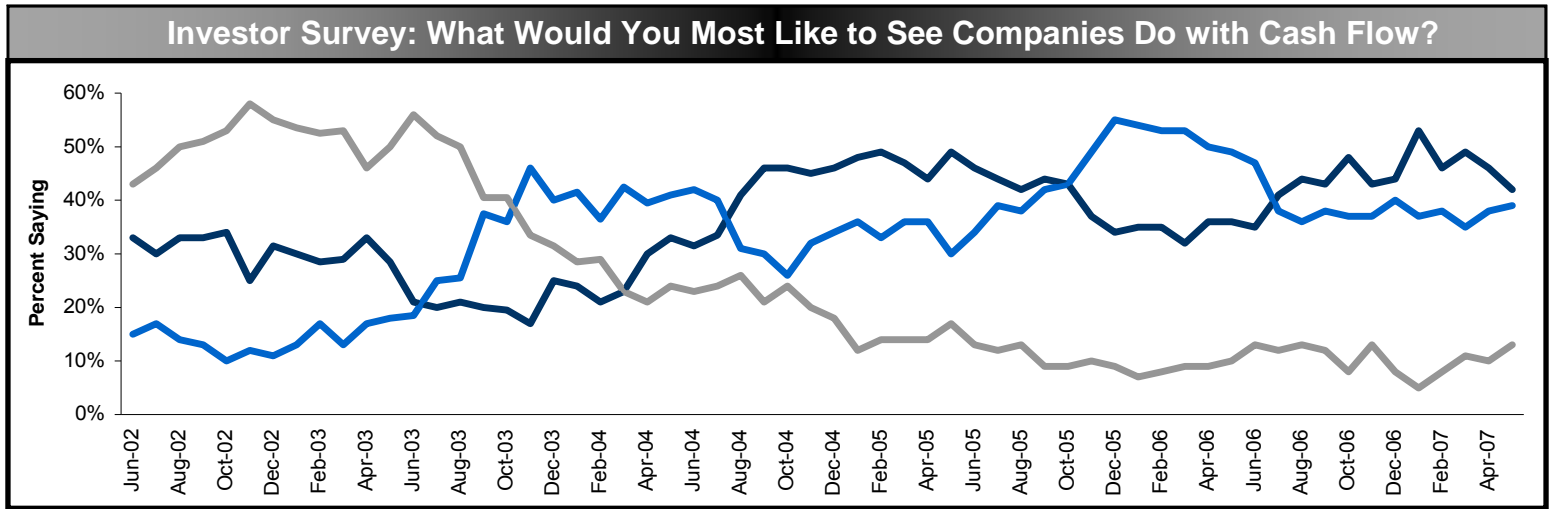


## Factors Influencing Capital Structure

▶ Cost of Capital

▶ Shareholder Value Strategy

▶ Consistency of Market Access

▶ Debt Mitigates Principal - Agent Problems

▶ Debt- Equity Arbitrage

▶ Risk Tolerance

▶ Funding Requirements

▶ Capacity for Acquisitions

## Empirical Drivers of the Leverage Decision

**(4 = Very Important; 0 = Not Important)**



| Factor | Value |
|---|---|
| Financial Flexibility | 2.59 |
| Credit Ratings | 2.46 |
| Earnings & Cash Flow Volatility | 2.32 |
| Tax Advantage of Debt | 2.07 |
| Transaction Cost of Issuing Debt | 1.95 |
| Comparables Leverage | 1.49 |
| Vendors / Suppliers Worry about Financial Stability | 1.24 |
| Bankruptcy Cost / Financial Distress Cost | 1.24 |

**Factors in Choosing Debt Level**

Source: "The Theory and Practice of Corporate Finance: Evidence from the Field," Graham and Harvey (2001). The study compiled the responses of nearly 340 CFOs.

# Capital Structure Affects Both Value and Risk

**Static capital structure optimization:**

- ➢ Maximizes the net present value of the tax shield
  - o Rule of thumb: 10% change in market value leverage (debt/enterprise value) increases firm value by 3.5%
- ➢ Offset by distress costs
- ➢ Tempered by agency costs and signaling considerations

**Dynamic capital structure optimization considers:**

- ➢ The Company and its management
- ➢ Industry dynamics
- ➢ Capital market realities
  - o Including the volatility of industry and company cash flows
- ➢ The economy
- ➢ Government regulation
- ➢ Social trends

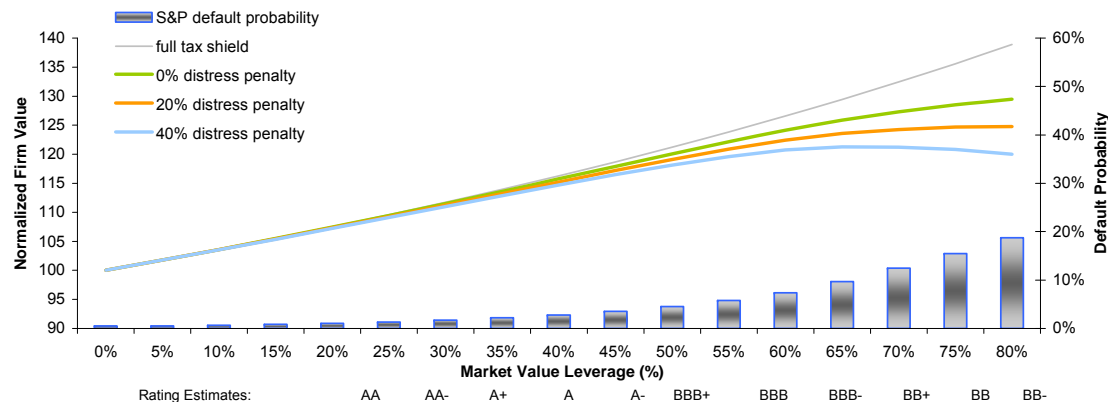**Delevering may create value especially in distressed times through exchanges of:**

- ➢ Equity for debt
- ➢ Debt for debt
- ➢ Assets for debt
- ➢ Cash for debt

**Levering may create value in good times through exchanges of:**

- ➢ Debt for equity
- ➢ Convertibles for equity

# Optimizing Firm Value in the Presence of Taxes and Distress Costs

## Long Term Default Probabilities



Legend:
- S&P default probability
- full tax shield
- 0% distress penalty
- 20% distress penalty
- 40% distress penalty

Y-axis (left): Normalized Firm Value (90–140)
Y-axis (right): Default Probability (0%–60%)
X-axis: Market Value Leverage (%)

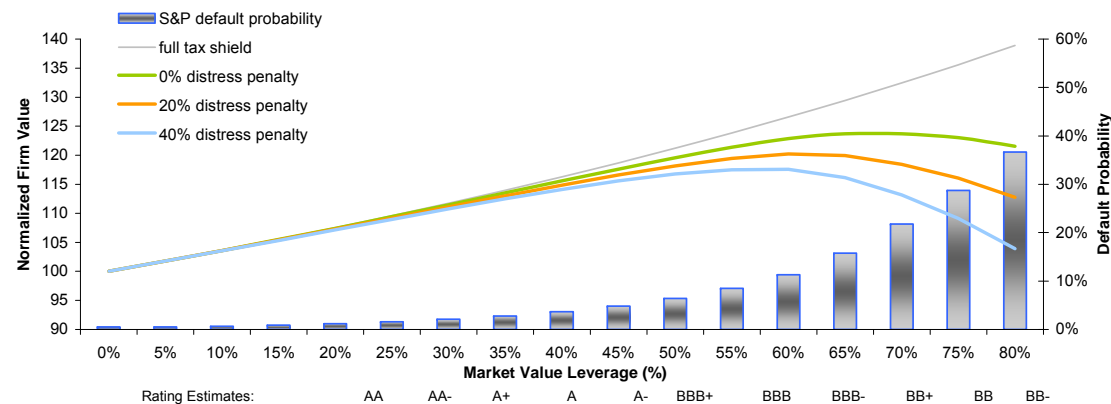Rating Estimates: AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-

*If there were no distress costs and the firm could utilize all of its tax shield, it would be 100% levered. In reality, with 20% distress costs, the firm would be about 75%-80% levered, while with 40% distress costs, the firm would be 60%-75% levered.*

*Specifically, in a low-risk environment, a high-yield rating seems optimal.*

## Recession Default Probabilities

*In a downturn, expected distress costs increase due to the high probability of downgrade and default. As a result, high distress costs suggest a more conservative capital structure, and a delevering by 15%-20%.*

*Specifically, in a risky environment, an investment grade rating seems optimal.*



Legend:
- S&P default probability
- full tax shield
- 0% distress penalty
- 20% distress penalty
- 40% distress penalty

Y-axis (left): Normalized Firm Value (90–140)
Y-axis (right): Default Probability (0%–60%)
X-axis: Market Value Leverage (%)

Rating Estimates: AA, AA-, A+, A, A-, BBB+, BBB, BBB-, BB+, BB, BB-

*Note:* Credit Rating estimates are based on a statistical relationship between ratings and market value leverage for a typical industry or company, suggesting that 10% change in leverage results in 1.5 notches change in rating.

# Optimizing Firm Value Through the Weighted Average Cost of Capital



WACC
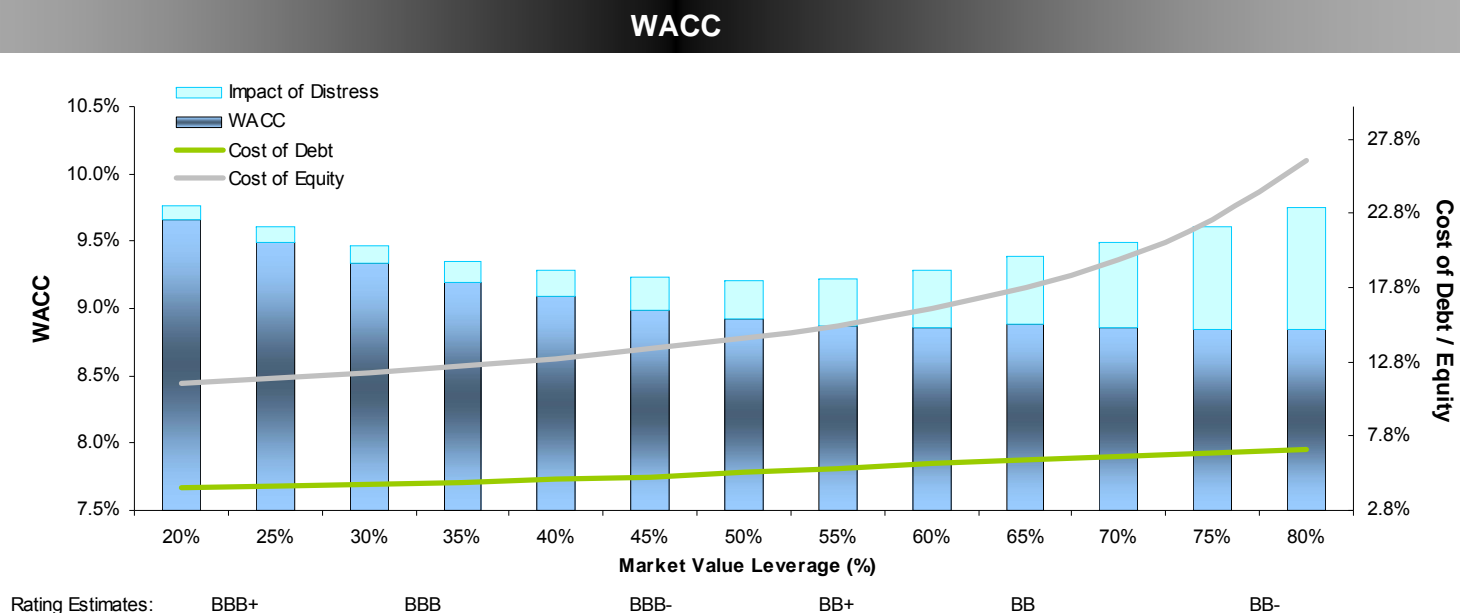
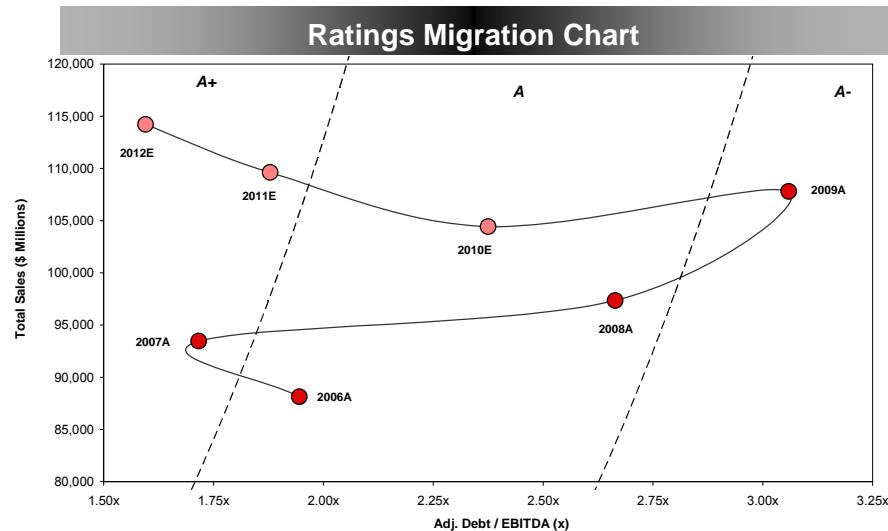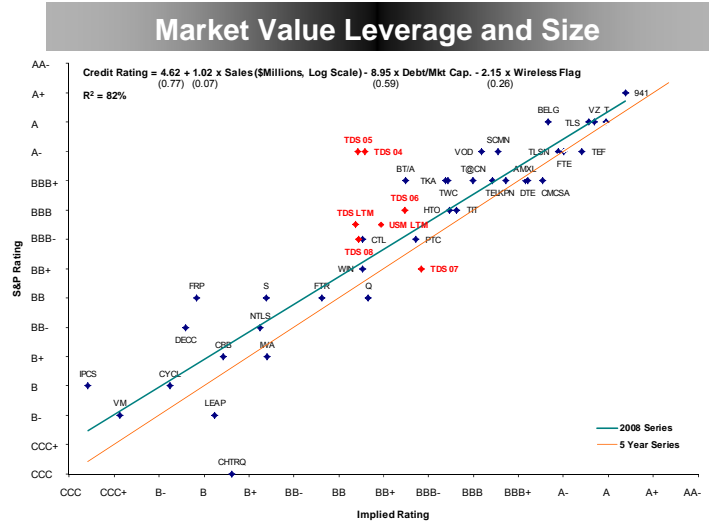| Market Value Leverage (%) | 20% | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Debt ($ millions) | 1,102 | 1,377 | 1,653 | 1,928 | 2,204 | 2,479 | 2,755 | 3,030 | 3,306 | 3,581 | 3,857 | 4,132 | 4,408 |
| Incremental Debt ($ millions) | -1,295 | -1,019 | -744 | -468 | -193 | 83 | 358 | 634 | 909 | 1,185 | 1,460 | 1,736 | 2,011 |
| Credit Quality Estimate | BBB+ | BBB+ | BBB | BBB | BBB | BBB- | BBB-/BB+ | BB+ | BB+/BB | BB | BB | BB- | BB- |
| Cost of Equity | 11.37% | 11.70% | 12.09% | 12.53% | 13.04% | 13.65% | 14.38% | 15.27% | 16.38% | 17.81% | 19.73% | 22.40% | 26.41% |
| Cost of Debt | 4.36% | 4.44% | 4.52% | 4.66% | 4.86% | 5.08% | 5.33% | 5.60% | 5.91% | 6.26% | 6.47% | 6.65% | 6.85% |
| Impact of Distress | 0.10% | 0.11% | 0.12% | 0.15% | 0.19% | 0.24% | 0.29% | 0.34% | 0.43% | 0.51% | 0.63% | 0.77% | 0.91% |
| WACC | 9.76% | 9.61% | 9.46% | 9.35% | 9.28% | 9.23% | 9.21% | 9.22% | 9.28% | 9.38% | 9.49% | 9.61% | 9.75% |
| Benefit as % of Current Firm Value | -5.32% | -3.84% | -2.34% | -1.18% | -0.41% | 0.12% | 0.35% | 0.27% | -0.44% | -1.53% | -2.62% | -3.81% | -5.24% |

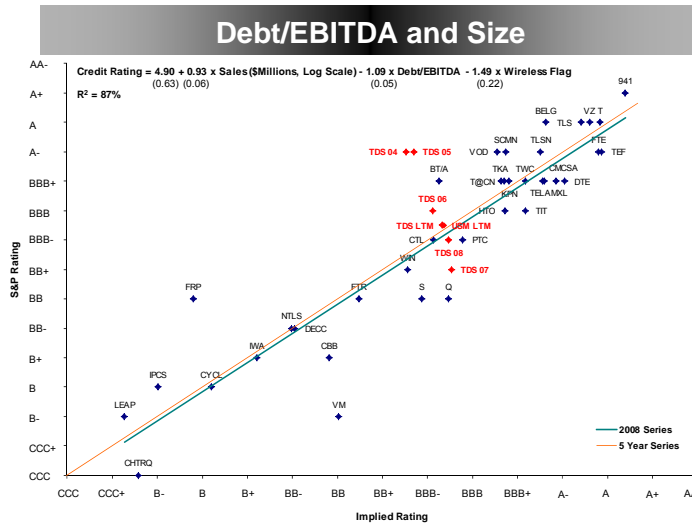- ◆ **The company's cost of capital is optimized when its rating is BBB-/BB+**

*Note: The analysis assumes CAPM based cost of equity: 5Y weekly beta of 1.20, equity market risk premium of 7.69% (=1/13 S&P500 P/E). Cost of debt is as per Bloomberg. Credit quality estimates are based on statistical relationship between ratings and book value leverage, size and business rank for utilities. Debt figures include all S&P adjustments.*

# Statistical Determinants of Credit Ratings and Ratings Migration

*A combination of leverage, size and an indication of business risk such as exposure to the wireless sector explains more than 80% of credit ratings in the telecom industry.*

*The implied credit quality for a company above the regression line is lower than the actual rating.*



**Debt/EBITDA and Size**

Credit Rating = 4.90 + 0.93 x Sales($Millions, Log Scale) - 1.09 x Debt/EBITDA - 1.49 x Wireless Flag
(0.63) (0.06) (0.05) (0.22)
$R^2 = 87\%$

*Source: S&P, Ramirez & Co's analysis.*



**Market Value Leverage and Size**

Credit Rating = 4.62 + 1.02 x Sales($Millions, Log Scale) - 8.95 x Debt/Mkt Cap. - 2.15 x Wireless Flag
(0.77) (0.07) (0.59) (0.26)
$R^2 = 82\%$

*Source: S&P, Ramirez & Co's analysis.*



**Ratings Migration Chart**

*Source: BofA Projections, S&P, Company Filings.*

Note: Credit Rating = 4.90 + 0.93 x Sales ($ millions, Log Scale) – 1.09 x Debt/EBITDA – 1.49 x Wireless Flag
(0.63) (0.06) (0.55) (0.22)

# Credit Deterioration and Defaults

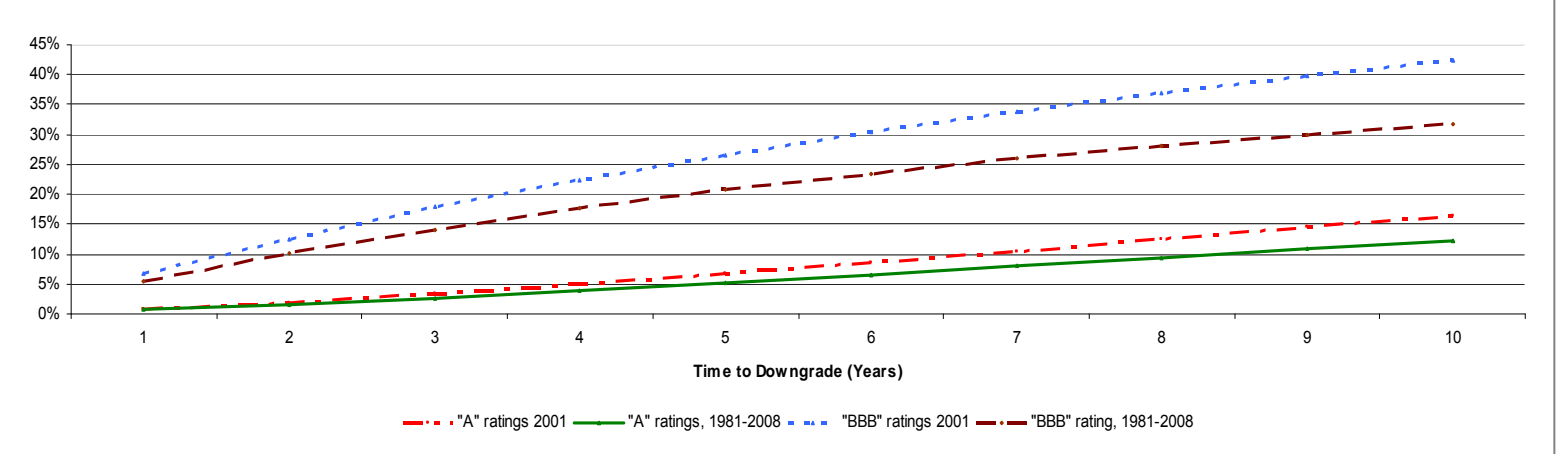Percentage Default Rate, 1981-2008
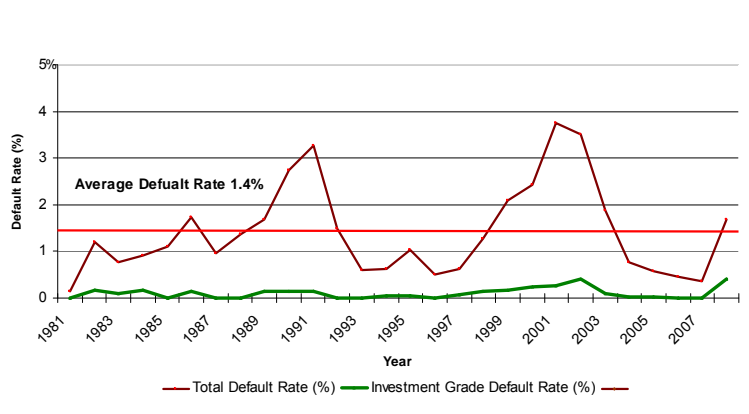


Total Number of Defaults and $B Value, 1981-2008
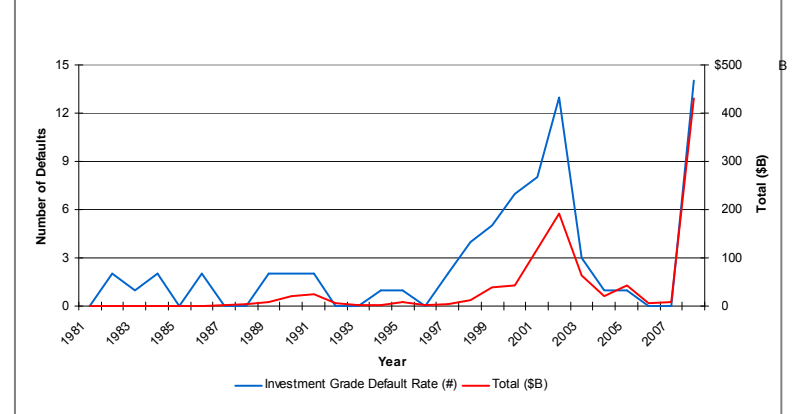


Probability of Losing High-Grade Rating, 1981- 2008

*Source: S&P data for global defaults*

# Market Value Leverage in the Pre- vs. Post-Crisis Worlds

*As a result of the financial crisis of 2007-2009, the median market value leverage for S&P 500 companies increased to 22.9%, with an increase in tail risk. This change corresponds to a credit rating downgrade of about one notch.*



Market Value Leverage for S&P 500 Companies, Dec 06

Median 13.4%
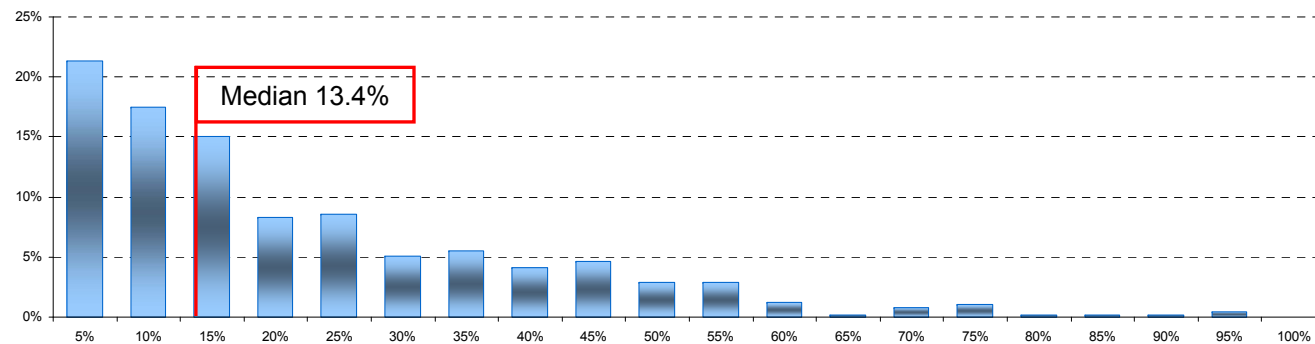


Market Value Leverage for S&P 500 Companies, Aug 09

Median 22.9%
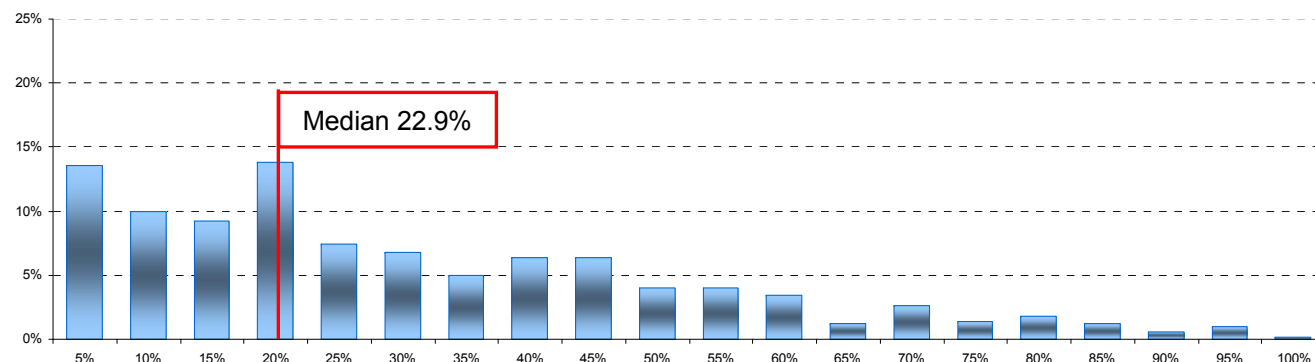
*Source : Bloomberg*

# Ratings Distributions in the Pre- vs. Post-Crisis Worlds



S&P 500, Aug 89

Median: A
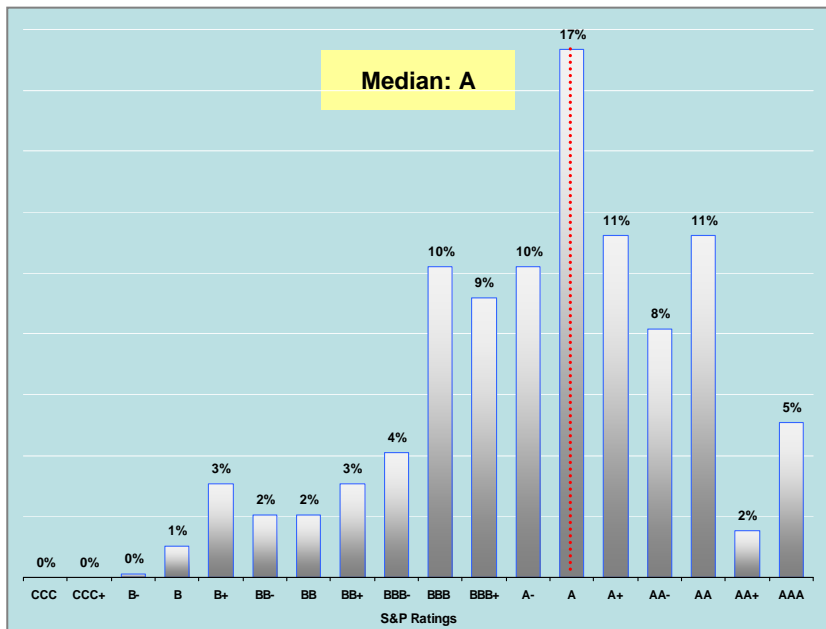
S&P 500, Aug 09
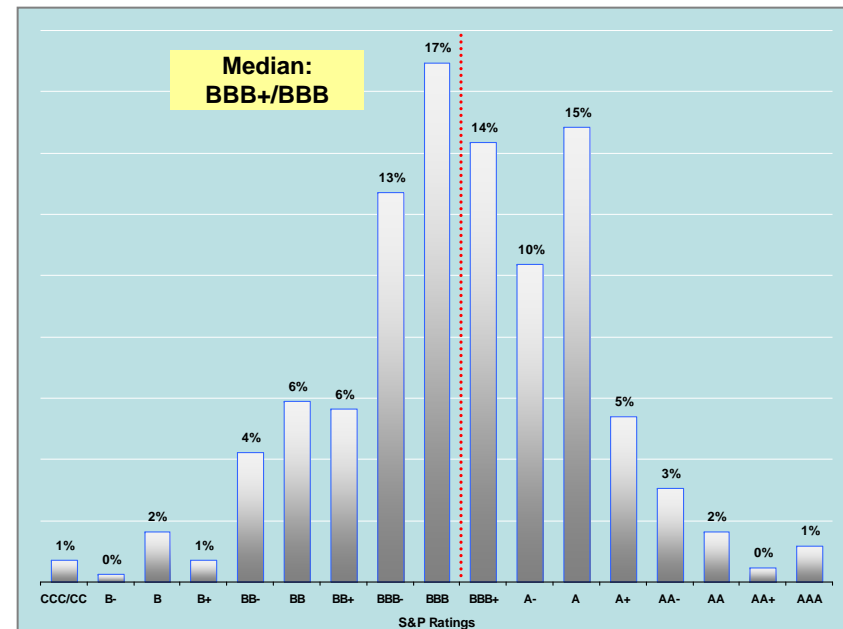
Median: BBB+/BBB

- ◆ **Credit Ratings estimated for S&P 500 companies have deteriorated in the last two decades, with the median moving from "A" to "BBB"**

- ◆ **Both "A" and "BBB" ratings may be considered sweet spots as they respectively allow issuers A-1/P-1 and A-2/P-2 commercial paper ratings; and as such easy access to short-term funding.**

*Source : Bloomberg*

# Capital Structure and the Business Cycle

**As Interest Rates Reach Low Absolute Levels:**

➤ Investment-grade companies start to reliquify

    o In 1H09, U.S. based investment-grade companies raised $461 billion in the U.S. market vs. $449 billion during the same period in 2008

    o A number of investment grade companies, particularly in regulated industries, have issued equity

➤ Typically, below-investment-grade companies follow suit by raising capital through new issues of equity, debt, and convertibles

**As Balance Sheets Begin to Improve:**

➤ Corporations with strong balance sheets start acquiring others

    o In April 2009, Roche raised $40 Billion to acquire Genentech

**In Order to Improve Balance Sheets:**

➤ Companies issue bonds with the intention to fully or partially pay off short-term debt

    o Sempra, Dow Chemical, Verizon, Time Warner, UPS, and Coca-Cola Co.

➤ They also issue equity with the same objective

    o Bunge, MGM Mirage, Dow Chemical, AEP, and GE

➤ As well as convertible debt

    o U.S. Steel, FPL, Textron, Wyndham Worldwide, Hertz

# Equity and Equity Linked Activity, Sep 07-Aug 09

*After the equity market trough of March 2009, both equity follow-on and convertible issuance picked up, underscoring the delevering trend that we have observed.*



**All Follow-On and IPO Offerings**
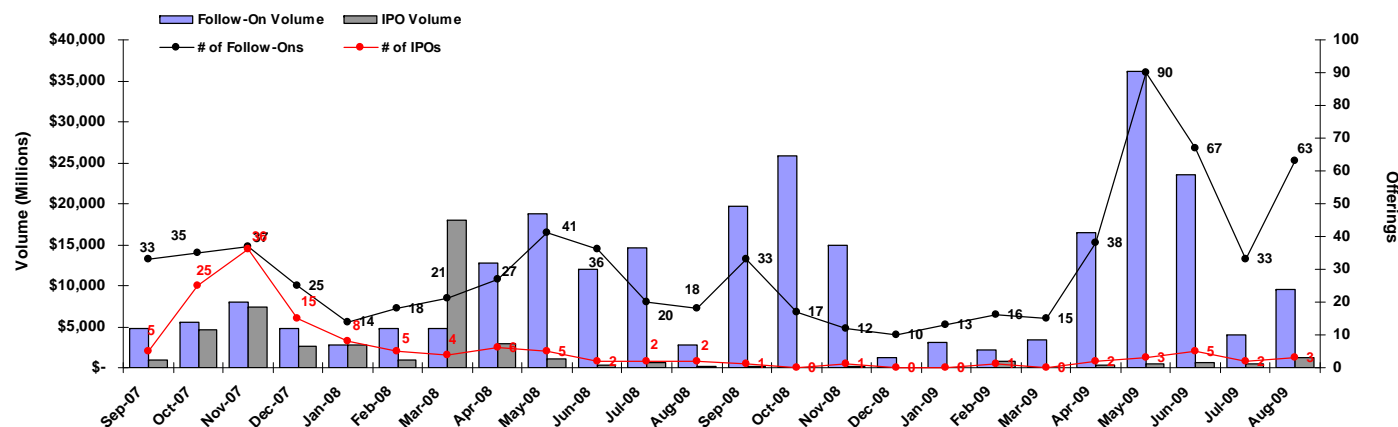


**Convertible Debt Offerings Above $50 Million**
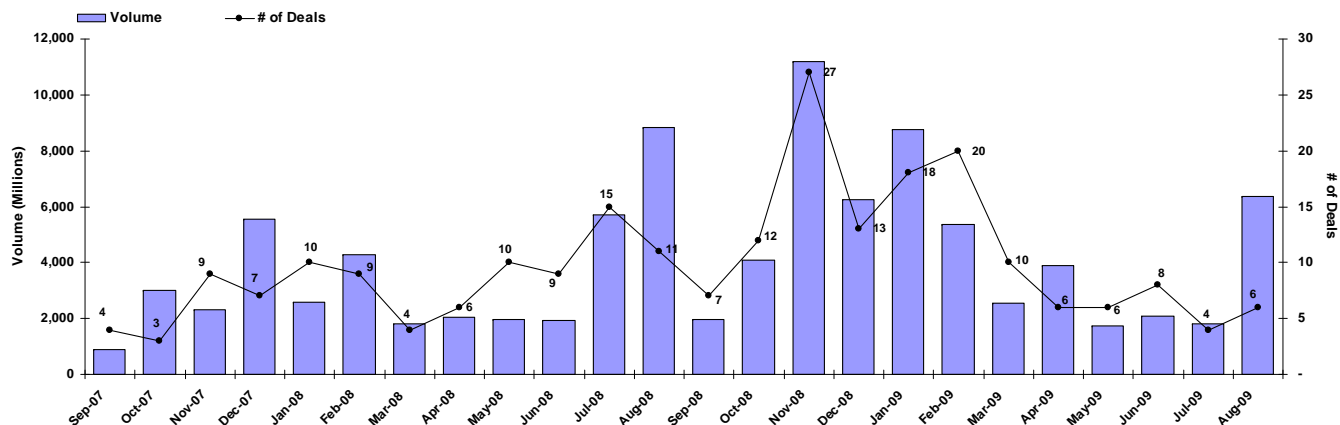
*Notes: (1) Market Data as of 09/03/09        (2) Data excludes closed-end funds and private placements*

*Source: Thomson Financial and Bloomberg*

*Debt issuance in the United States increased significantly after the market meltdown that started in the Fall of 2008. Moreover, foreign issuers were major borrowers in the U.S. market.*



**U.S. and Foreign (Yankees) Issuers**

Legend: Financials Volume ($), Industrials Volume ($), Utilities Volume($), Yankees Volume ($), Industrials % of Monthly Total

**U.S. Issuers**

Legend: Financials Volume ($), Industrials Volume ($), Utilities Volume($), Industrials % of Monthly Total
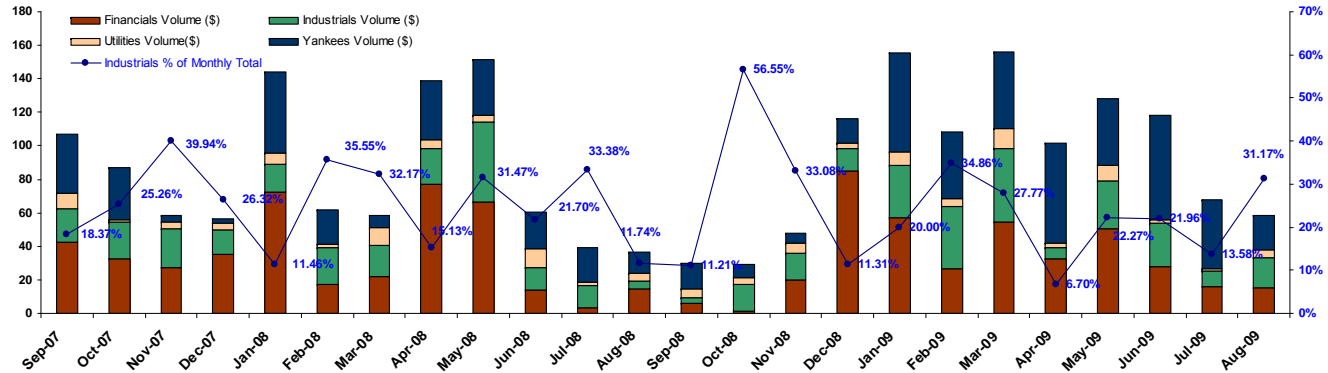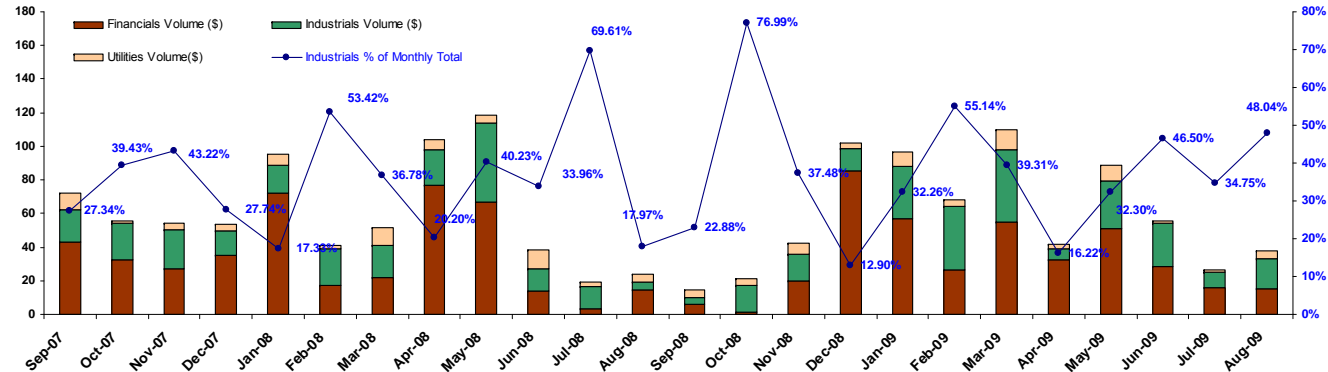
Notes: (1) Market Data as of 08/31/09    (2) Volume in billions of U.S. Dollars    Source: Bloomberg and Informal Global Markets

# Stock Price Performance Following Equity and Debt Issuances

*On average, bond offerings have minimal market-adjusted impact on stock price performance.*

*Even though, equity offerings are associated with negative stock price reaction in the short-run, the long-run response seems to be positive. Moreover, stock price reaction is uncorrelated with dilution.*

## Performance Following Equity and Fixed-Income Announcements and Issuances, Jan 09-Aug 09
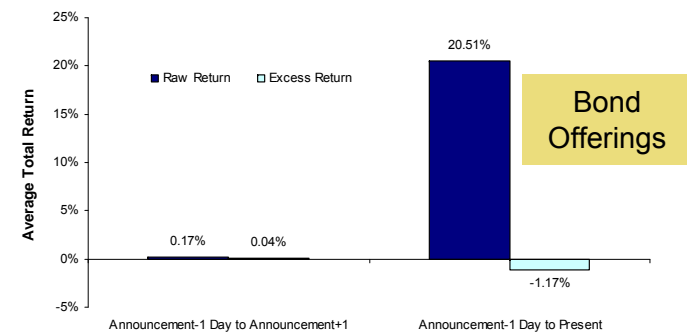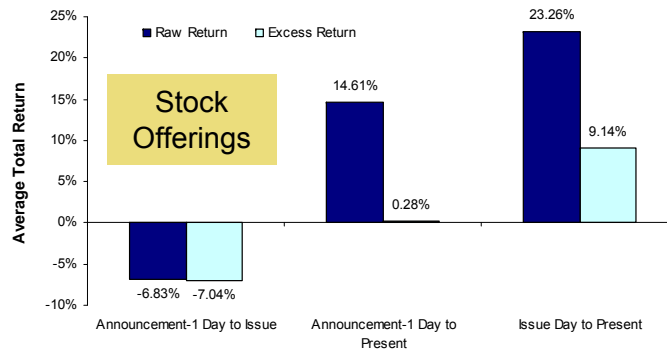


## Total Stock Return vs. Dilution, Jan 09-Aug 09



$R^2 = 0.0012$
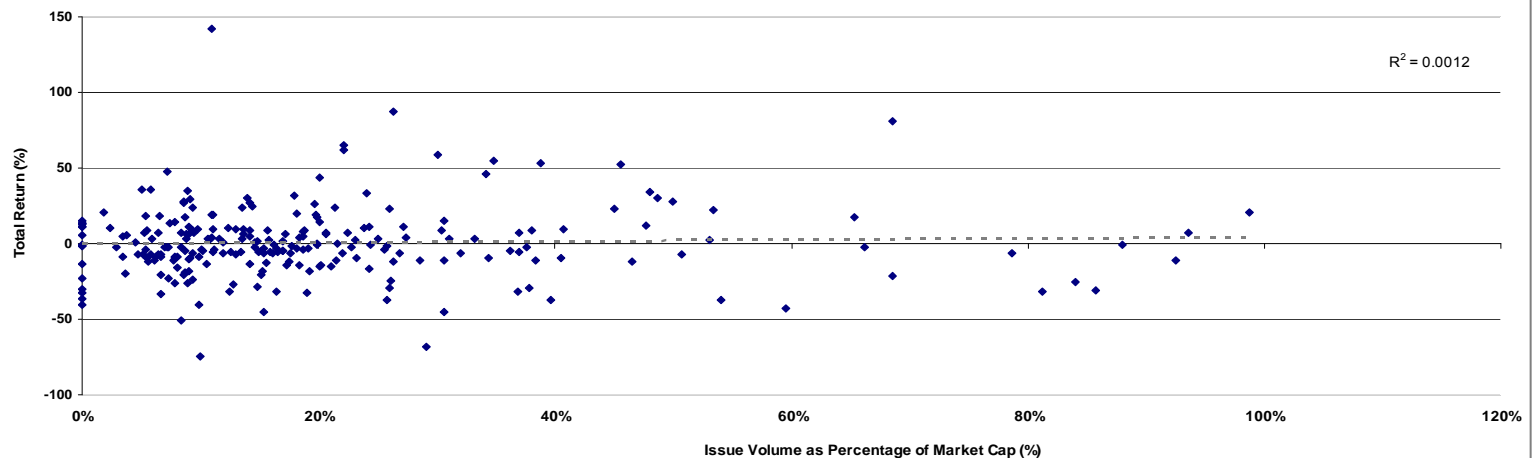
Note: stock price reaction studies based on 248 equity offerings in excess of $50 million, and 350 investment-grade non-financial debt offerings since January 1, 2009.

# Empirical Drivers of Cash Balances

➤ A regression study of the empirical drivers of cash balances (as a percentage of assets and as a percentage of sales) for S&P 500 companies (excluding financial companies) finds that:

- o Companies with higher cash flow volatility hold higher cash balances

- o Companies with higher capital expenditures and R&D commitments hold larger cash balances

- o Larger companies tend to hold proportionately less cash

## Drivers of Cash Balances

*Dependent Variable: Cash / Total Assets (%)*

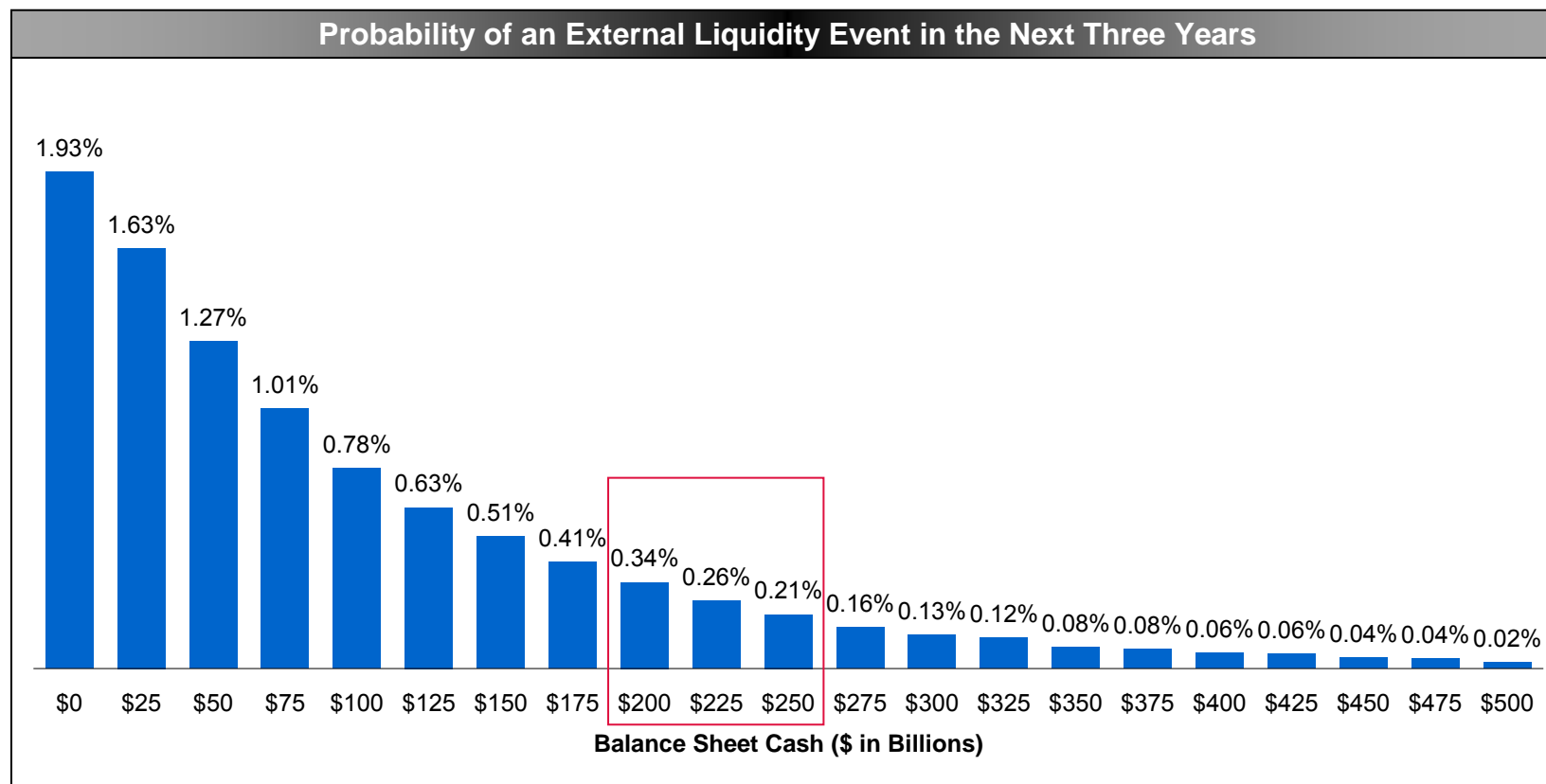| Factor | Coefficient | Standard Error | T-Stat | Statistically Significant? | DNA Input |
|---|---|---|---|---|---|
| Book Value Leverage (%) | (3.57) | 0.35 | (10.25) | Yes | 18.3% |
| (CapEx + R&D) / Sales (%) | 3.53 | 0.91 | 3.89 | Yes | 29.5% |
| Cash Flow Volatility (%) | 15.32 | 2.62 | 5.84 | Yes | 3.2% |
| Book Equity / Market Equity (%) | (3.04) | 0.40 | (7.69) | Yes | 12.0% |
| EBITDA Margin (%) | (2.10) | 0.67 | (3.15) | Yes | 26.0% |
| Total Assets ($ mm, Nat. Log Scale) | (0.13) | 0.07 | (1.88) | Close | 9.66 |
| Constant | 6.03 | 0.62 | 9.68 | Yes | 1.00 |
| **Regression Model Implied Cash / Total Assets (%)** | | | | | **22.7%** |
| **Implied Cash Balance ($ mm)** | | | | | **$3,561** |
| *Adjusted R-Squared* | *50%* | | | | |
| *Number of Observations* | *378* | | | | |

*Dependent Variable: Cash / Total Sales (%)*

| Factor | Coefficient | Standard Error | T-Stat | Statistically Significant? | DNA Input |
|---|---|---|---|---|---|
| Book Value Leverage (%) | (4.15) | 0.47 | (8.85) | Yes | 18.3% |
| (CapEx + R&D) / Sales (%) | 7.63 | 1.04 | 7.37 | Yes | 29.5% |
| Cash Flow Volatility (%) | 17.48 | 3.45 | 5.07 | Yes | 3.2% |
| Book Equity / Market Equity (%) | (4.07) | 0.57 | (7.13) | Yes | 12.0% |
| Return on Assets (%) | (9.08) | 1.34 | (6.78) | Yes | 16.8% |
| Total Sales ($ mm, Nat. Log Scale) | (0.41) | 0.09 | (4.77) | Yes | 9.22 |
| Constant | 10.07 | 0.90 | 11.13 | Yes | 1.00 |
| **Regression Model Implied Cash / Total Sales (%)** | | | | | **39.6%** |
| **Implied Cash Balance ($ mm)** | | | | | **$4,015** |
| *Adjusted R-Squared* | *54%* | | | | |
| *Number of Observations* | *378* | | | | |

Note: Analysis assumes a cash flow volatility of 3.2% for the Company, based on historical data since 1990 as per Factset.

# Empirical Drivers of Cash Balances



**Probability of an External Liquidity Event in the Next Three Years**

1.93% ($0)
1.63% ($25)
1.27% ($50)
1.01% ($75)
0.78% ($100)
0.63% ($125)
0.51% ($150)
0.41% ($175)
0.34% ($200)
0.26% ($225)
0.21% ($250)
0.16% ($275)
0.13% ($300)
0.12% ($325)
0.08% ($350)
0.08% ($375)
0.06% ($400)
0.06% ($425)
0.04% ($450)
0.04% ($475)
0.02% ($500)

**Balance Sheet Cash ($ in Billions)**

Note:    Analysis assumes a cash flow volatility of 2.9% based on close peers.  Analysis based on free cash flow projections for the Company through 2008, as per Wall Street projections.

**For example, a cash balance of $200 million to $250 million[1] would reduce the probability of requiring unforecasted external financing in the next three years to level consistent with the Company's 'A' rating.**

(1)         Committed but undrawn credit facilities may serve, at least in part, as a replacement for cash.

# Behavior of US Interest Rates, Apr 1953 - Present

*Until the early 1980s, US interest rates trended up, primarily driven by rising inflation. Since then, the trend has reversed itself, primarily by falling inflation, but also by declining real interest rates, particularly after the onset of the 2007 great contraction. Because issuing long-term is beneficial in a rising rate environment, the liability management decision is effectively a forecasting exercise.*

**Government Rates**



Legend: Recession | 20Y UST | 3M UST

**Corporate Rates (Moody's)**



Legend: Recession | AAA Long Term Rate | BAA Long Term Rate
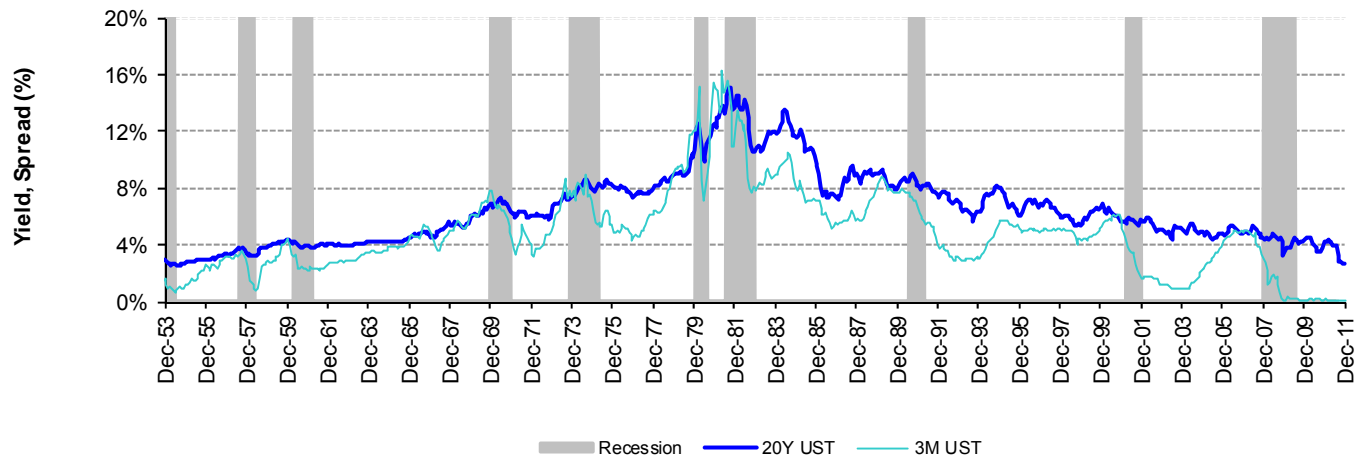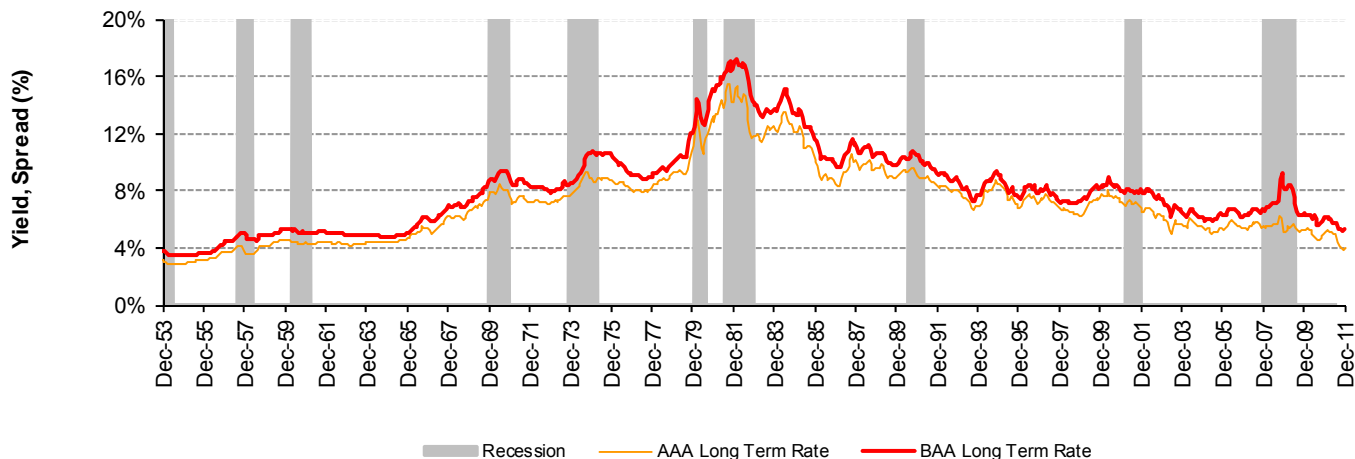
*Source: Federal Reserve.*

# The Efficient Frontier: A Corporate Treasurer's Perspective

**Liability Portfolio Efficient Frontier in a Rising Interest Rate Environment, Apr 1953 – Apr 1973, *(Using Treasury Rates)***
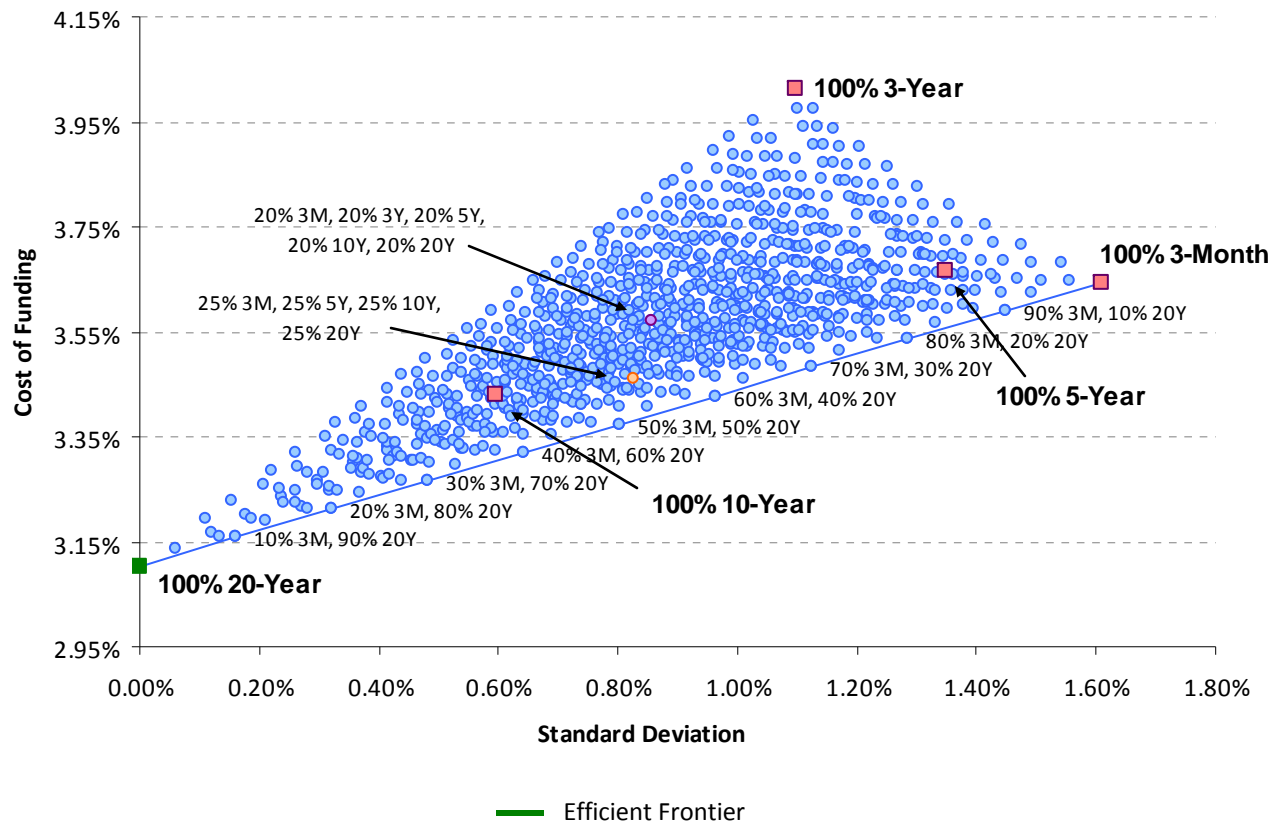


Cost of Funding

Standard Deviation

100% 3-Year
100% 3-Month
20% 3M, 20% 3Y, 20% 5Y, 20% 10Y, 20% 20Y
25% 3M, 25% 5Y, 25% 10Y, 25% 20Y
90% 3M, 10% 20Y
80% 3M, 20% 20Y
100% 5-Year
70% 3M, 30% 20Y
60% 3M, 40% 20Y
50% 3M, 50% 20Y
40% 3M, 60% 20Y
100% 10-Year
30% 3M, 70% 20Y
20% 3M, 80% 20Y
10% 3M, 90% 20Y
100% 20-Year

Efficient Frontier

*Source: Federal Reserve, calculations by Ramirez & Co.*

# The Efficient Frontier: A Corporate Treasurer's Perspective (Cont'd)

*During periods of falling interest rates as observed in the US from 1991 to 2011, the issuer faces a tradeoff between lowest funding cost volatility (achieved by issuing long-term debt) and lowest funding cost (achieved by issuing short-term debt). The efficient frontier approximates a barbell strategy of 3M and 20Y instruments. Strictly speaking, the efficient frontier contains a modest amount of 5Y in addition to the barbell.*

**Liability Portfolio Efficient Frontier in a Falling Interest Rate Environment, Oct 1991 – Oct 2011, (Using Treasury Rates)**



*Source: Federal Reserve, calculations by Ramirez & Co.*

# The Efficient Frontier: A Corporate Treasurer's Perspective (Cont'd)

*During periods of both rising and falling interest rates as observed in the US from 1953 to 2011, the issuer faces a tradeoff similar to a falling interest rate environment. As such, the efficient frontier consists of a barbell strategy of 3M and 20Y instruments (except for the 100% 20-Year point).*



Liability Portfolio Efficient Frontier in a Mixed Interest Rate Environment, Apr 1953 – Oct 2011, (Using Treasury Rates)

# Behavior of Japanese Interest Rates, Oct 1966 – Jun 2011

*Following the bursting of the real estate and stock market bubbles in the late 1980s to early 1990s, Japan experienced a prolonged period of economic "malaise" combined with a steady low interest rate environment.*

**Japan 10-Yr. Government Bond Yields, Oct 1966 – Jun 2011**



Legend: Recession | Japanese Govt Bond Yield | Central Bank Target Rate
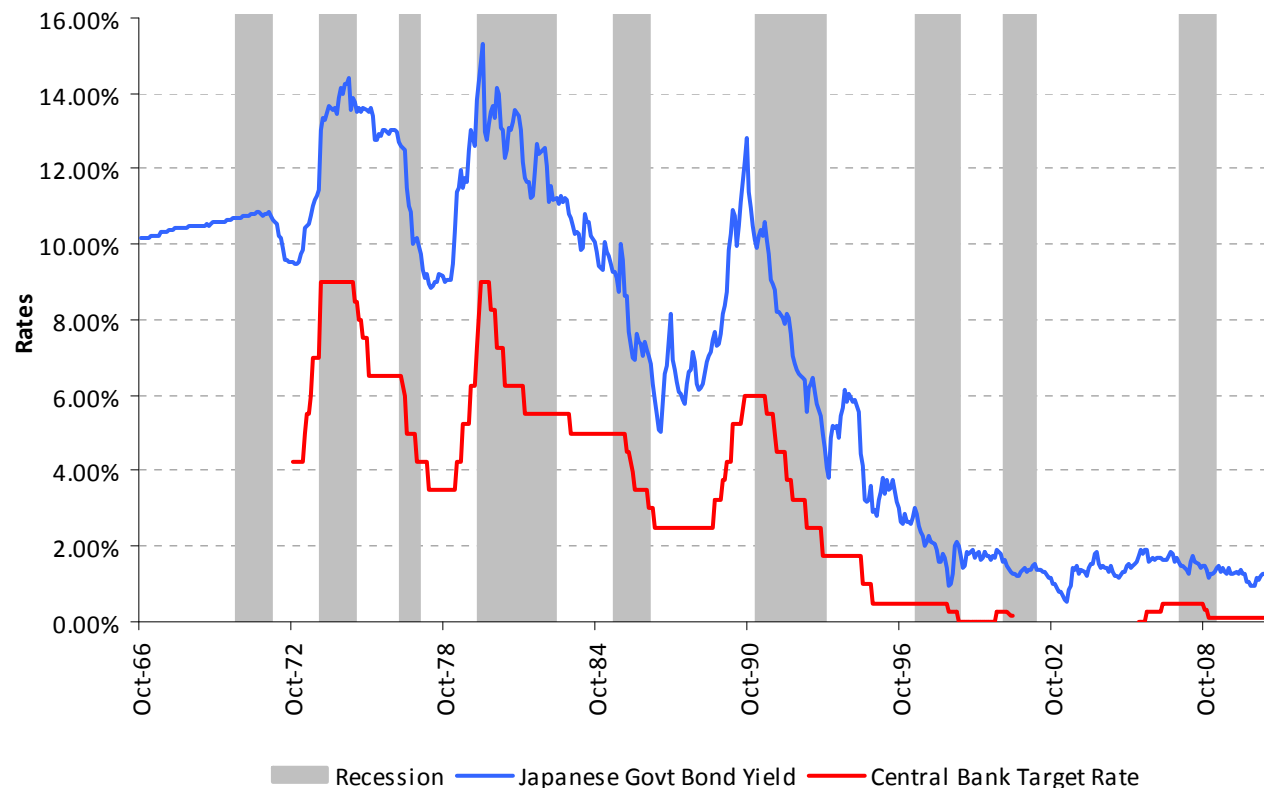
*Note: During the period of Mar-01 – Mar-06 there was no formal recommended target rate.*

*Source: Bloomberg.*

# The Funding Efficient Frontier: A Japanese Corporate Treasurer's Perspective

*During periods of stagnant interest rates as observed in Japan from 1995 to 2011, the efficient frontier consists of a barbell strategy of 3M and 20Y instruments.*

**Liability Portfolio Efficient Frontier in a Sideways Interest Rate Environment, Japan Mar 1995 – Oct 2011, *(Using Japanese Treasury Rates)***



Efficient Frontier
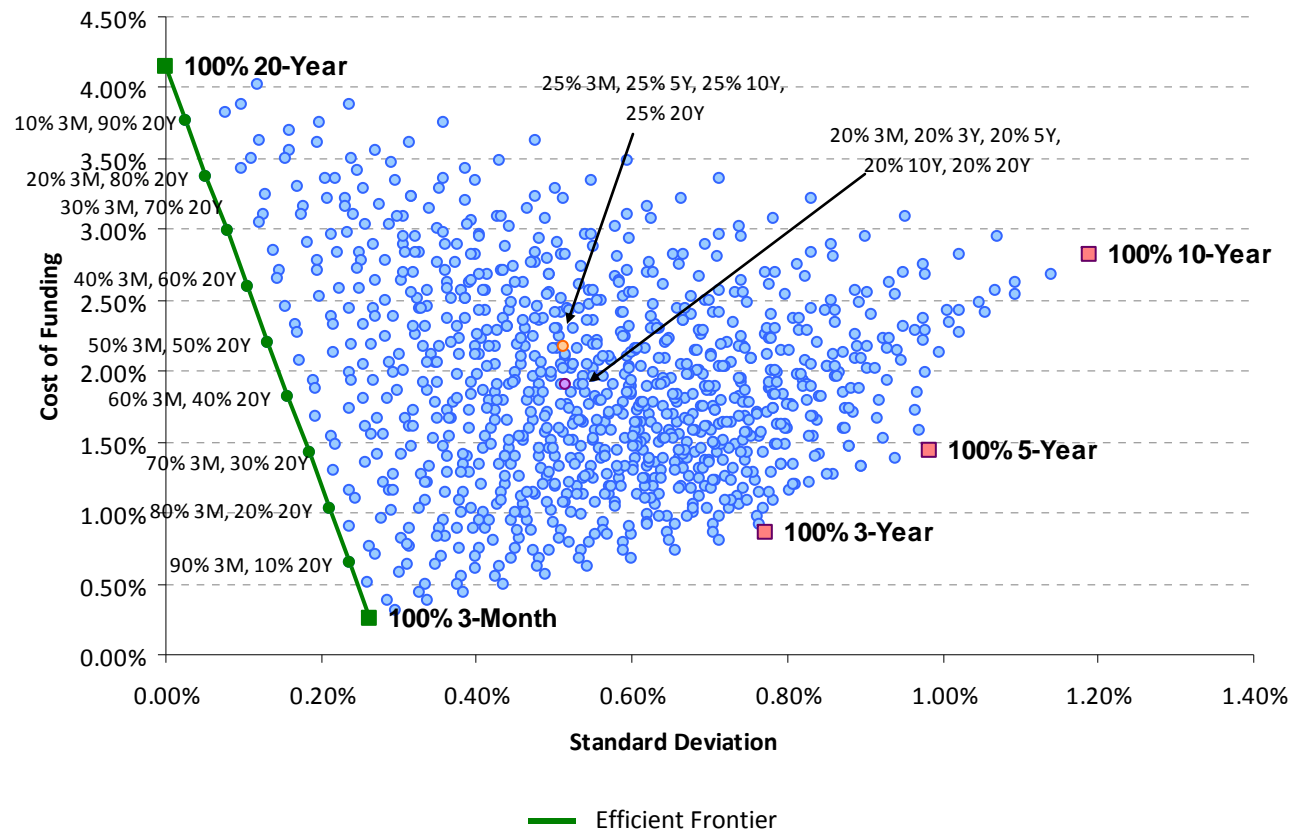
Note: Cost of funding represents historical yields on Japanese government bonds.
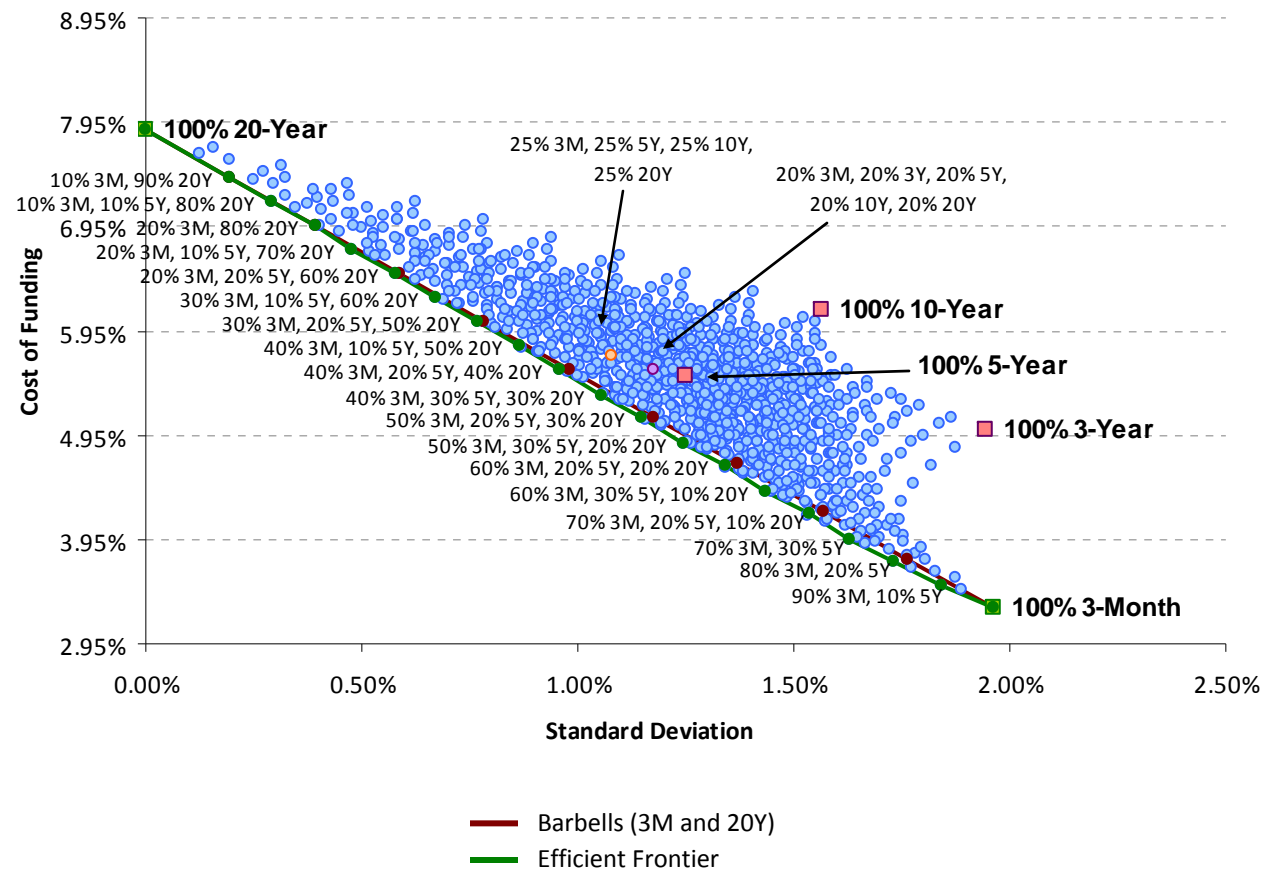
Source: Bloomberg, calculations by Ramirez & Co.

# The Efficient Frontier: A Corporate Treasurer's Perspective (Cont'd)

*Using Swap rates, the barbell strategy starts to deviate slightly from the efficient frontier. In the midrange, for example, the efficient frontier is very close to the even maturity portfolio. To be precise, the evenly distributed 3M, 5Y, and 20Y portfolio is exactly on the efficient frontier. This observation suggests that the 3M, 5Y, and 20Y instruments may be the principle instruments in determining the efficient frontier.*



Liability Portfolio Efficient Frontier, May 1994 – Oct 2011, (Using SWAP Rates)
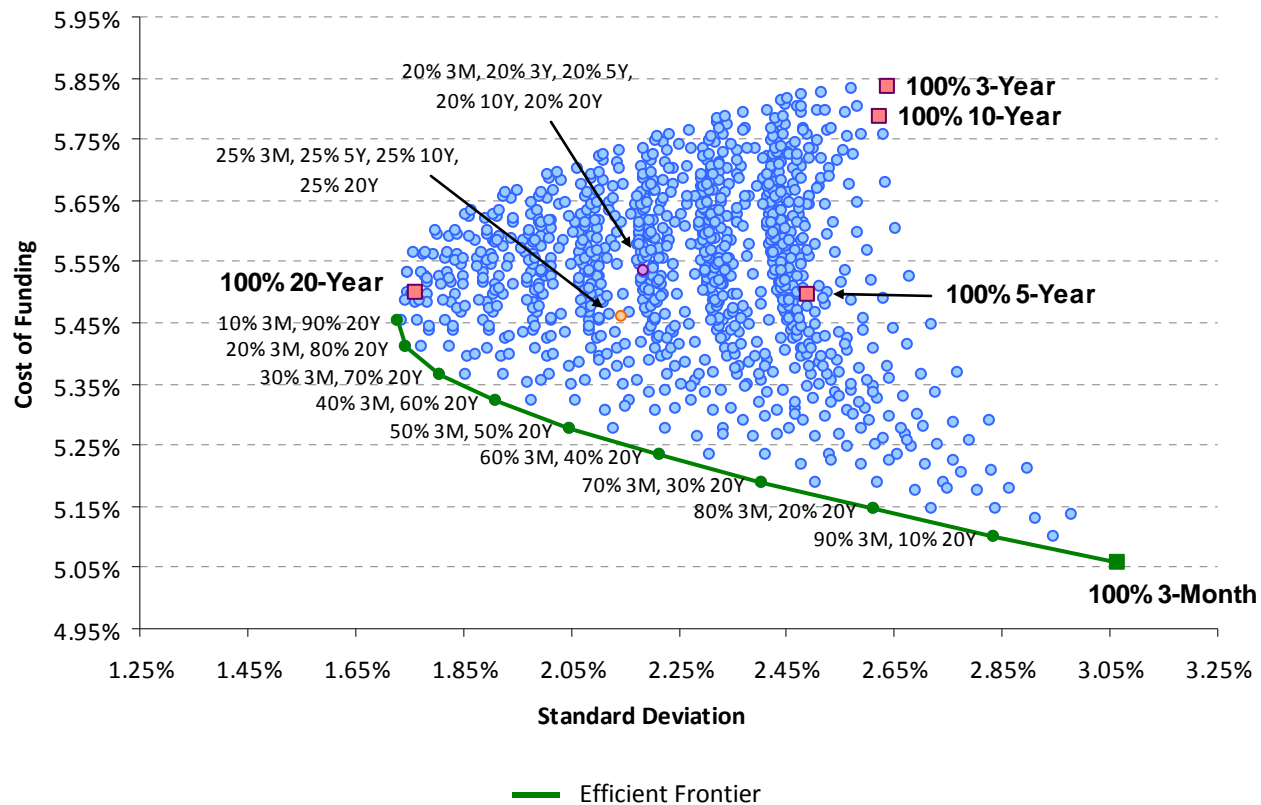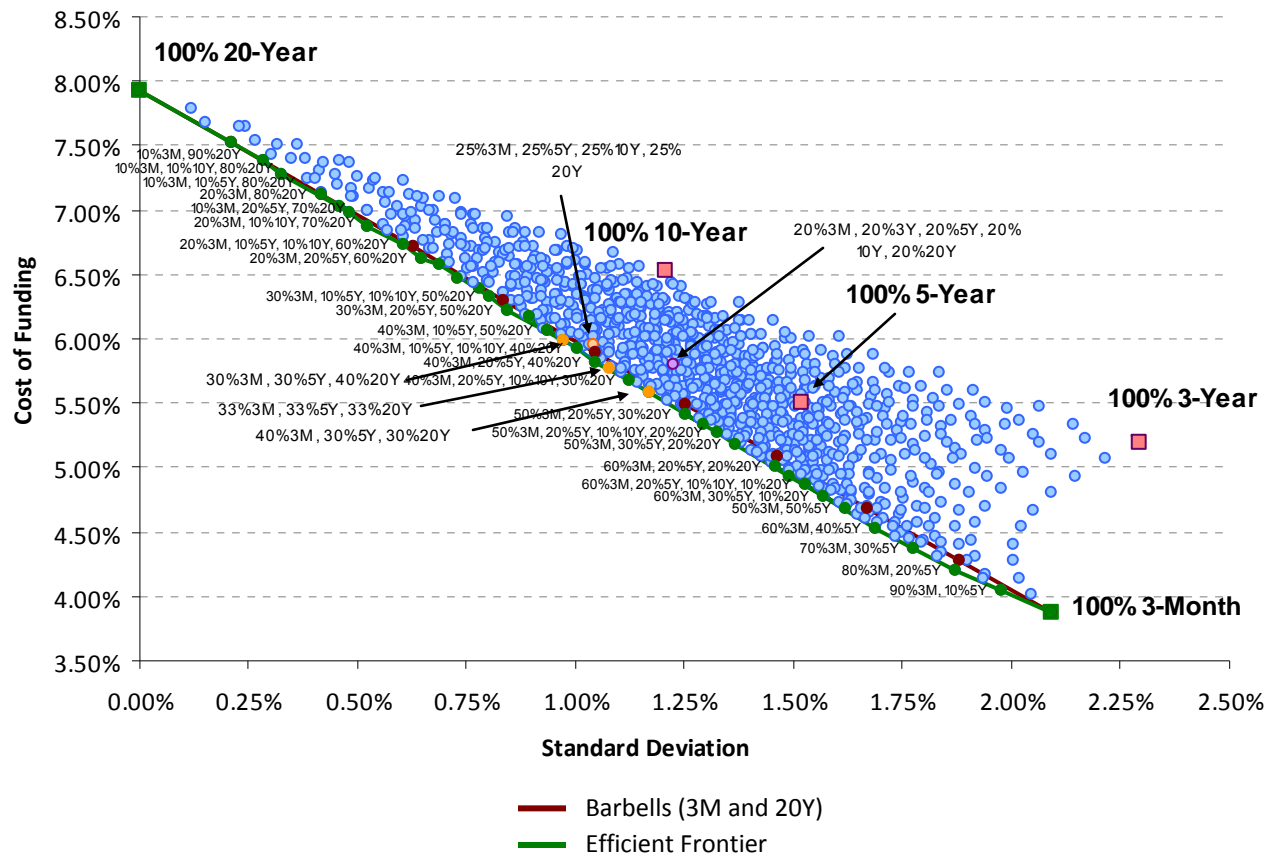
Source: Bloomberg, calculations by Ramirez & Co.

# The Efficient Frontier: A Corporate Treasurer's Perspective (Cont'd)

*Using shock-adjusted Swap rates (500 bps in September 2008 – September 2009), the barbell strategy moves further away from the efficient frontier. As in the unadjusted SWAP case, the evenly distributed 3M, 5Y, and 20Y portfolio is exactly on the efficient frontier. This observation suggests that the 3M, 5Y, and 20Y instruments may be the principle instruments in determining the efficient frontier.*

**Liability Portfolio Efficient Frontier, May 1994 – Oct 2011,**
*(Using Shock-Adjusted SWAP Rates)*
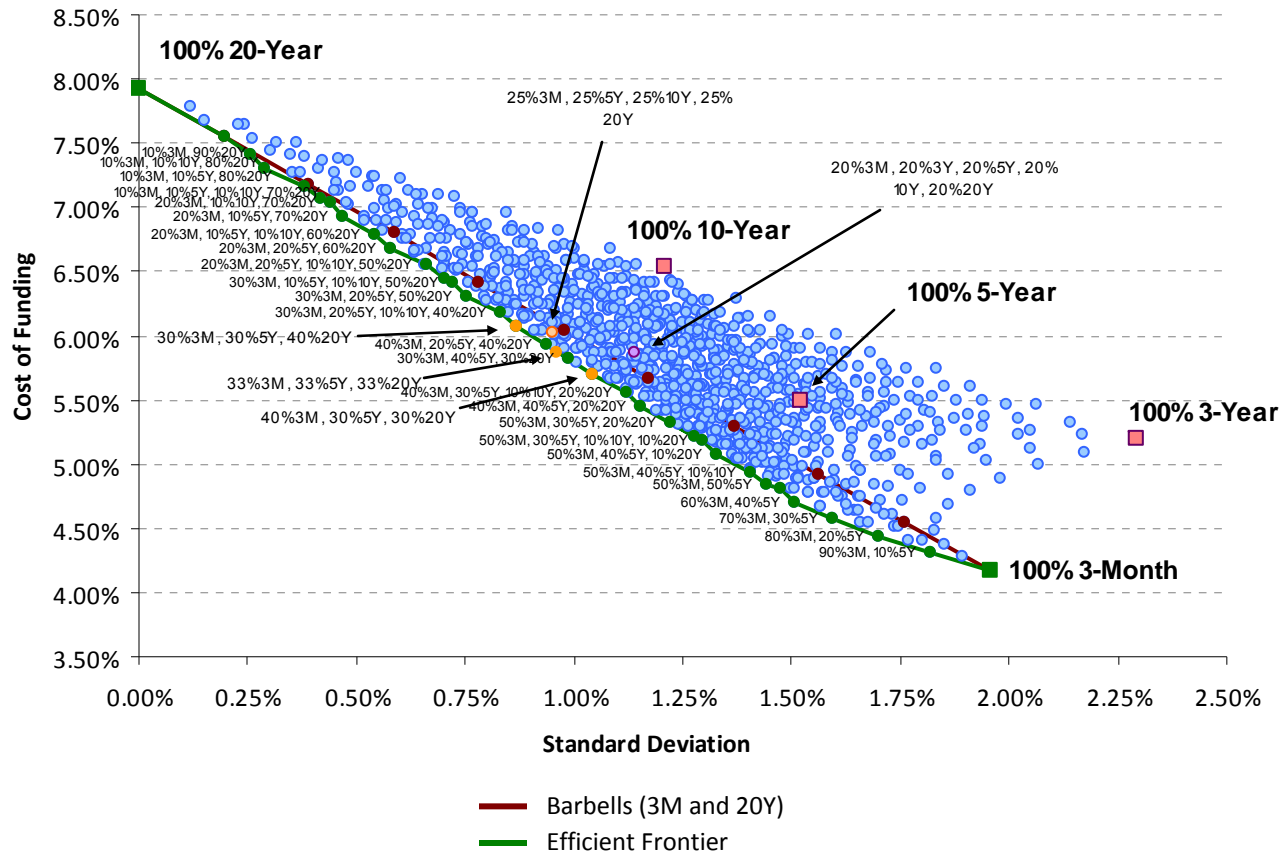


*Source: Bloomberg, calculations by Ramirez & Co.*

# Pain Tolerance and Interest Rates



**3M Libor and Fed Funds Target Rate vs. 10Y Swap**
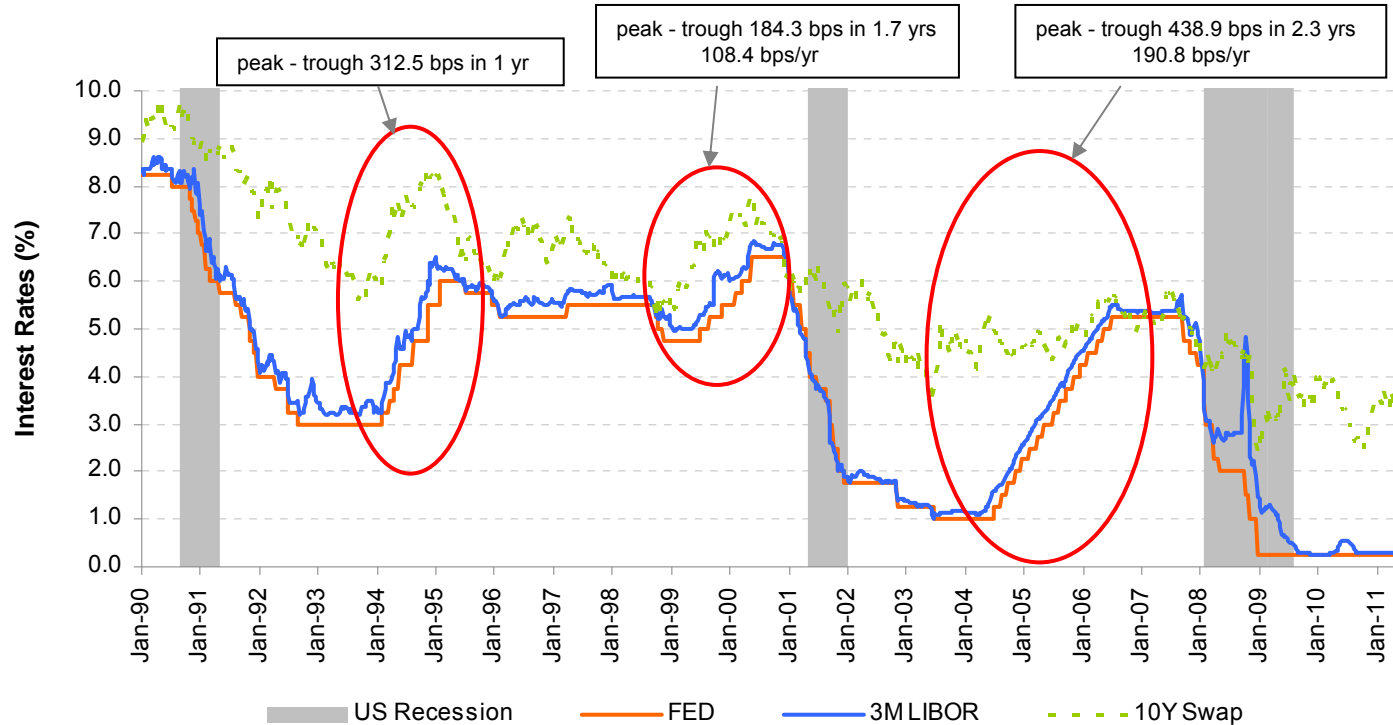
- ◆ **Short-term rates may increase rapidly as the economy recovers**

- ◆ **Following the Fed's tightening cycle in 2004, short-term rates increased approximately 400 bps in 24 months**

# Pain Tolerance and Interest Rates (continued)

## Historical Daily 3M LIBOR, 1986-2011

Today = 0.29%

Mean = 4.57%
Median = 5.22%
St. Dev. = 2.47%
Skew ness = -0.09
Kurtosis = -0.74
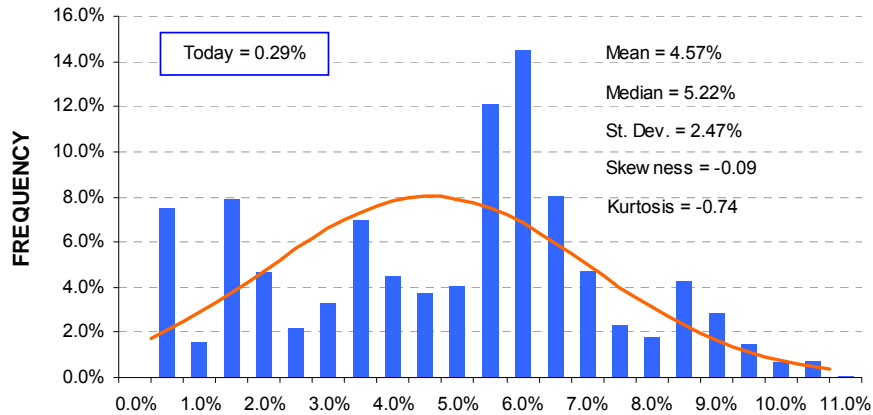
## Historical Daily Fed Funds Rate, 1986-2011

Today = 0.25%

Mean = 4.28%
Median = 4.75%
St. Dev. = 2.45%
Skew ness = -0.06
Kurtosis = -0.77
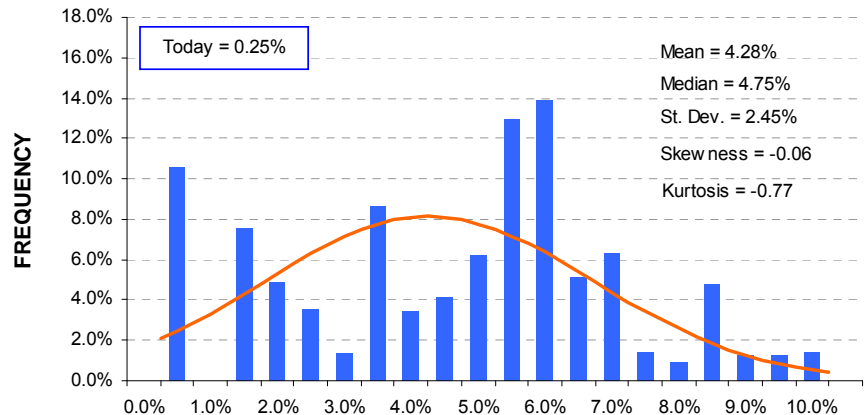
- ◆ **Currently, 3M LIBOR is at 0.29%, which is roughly two standard deviations below its historical mean**

- ◆ **Current LIBOR swap curve is very steep, especially in years two through ten**

- ◆ **The forward rates derived from the curve suggest that a one standard deviation move up is likely to occur by 2017**

*Source: Bloomberg.*

## LIBOR Swap Curve, Current

Legend:
- Market Rates
- Zero Rates
- 3M Forward Rates
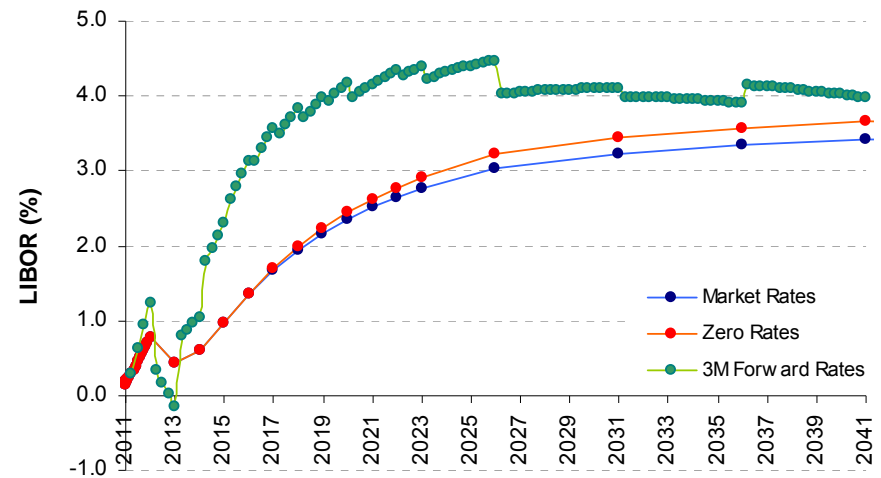
# EPS Sensitivity Under Varying Funding Scenarios

## 2011 EPS Estimate vs. % Floating Rate Debt Mix Under Varying 3-Month LIBOR Assumptions

| Debt Portfolio (% Floating) | Floating Debt ($ Mil) | Fixed Rate Debt ($ Mil) | Consensus EPS FY11 ($ per Share) | 3M LIBOR +1 Standard Deviation = 2.77% | | 3M LIBOR +2 Standard Deviations = 5.24% | |
|---|---|---|---|---|---|---|---|
| | | | | FY11E EPS ($ per Share) | % Change | FY11E EPS ($ per Share) | % Change |
| 3.24 | 416.0 | 12,412.0 | 4.12 | 4.11 | -0.24 | 4.10 | -0.49 |
| 0.00 | 0.0 | 12,828.0 | 4.10 | 4.10 | 0.00 | 4.10 | 0.00 |
| 10.00 | 1,282.8 | 11,545.2 | 4.16 | 4.13 | -0.75 | 4.09 | -1.49 |
| 20.00 | 2,565.6 | 10,262.4 | 4.22 | 4.15 | -1.47 | 4.09 | -2.94 |
| 30.00 | 3,848.4 | 8,979.6 | 4.28 | 4.18 | -2.18 | 4.09 | -4.35 |
| 40.00 | 5,131.2 | 7,696.8 | 4.34 | 4.21 | -2.86 | 4.09 | -5.72 |
| 50.00 | 6,414.0 | 6,414.0 | 4.40 | 4.24 | -3.53 | 4.09 | -7.05 |
| 60.00 | 7,696.8 | 5,131.2 | 4.45 | 4.27 | -4.18 | 4.08 | -8.35 |
| 70.00 | 8,979.6 | 3,848.4 | 4.51 | 4.30 | -4.81 | 4.08 | -9.61 |
| 80.00 | 10,262.4 | 2,565.6 | 4.57 | 4.33 | -5.42 | 4.08 | -10.84 |
| 90.00 | 11,545.2 | 1,282.8 | 4.63 | 4.36 | -6.02 | 4.08 | -12.04 |
| 100.00 | 12,828.0 | 0.0 | 4.69 | 4.38 | -6.60 | 4.07 | -13.21 |

- **Floating rate debt generally provides firms with lower cost of funding during upward-sloping yield curve environments**

- **However, issuing floating-rate debt leaves firms with added cash flow volatility**

- **With 1-Month LIBOR near its all-time lows, assuming a one standard deviation move up in LIBOR still makes floating-rate debt appear relatively attractive.**

*Note: 3-Month LIBOR standard deviation calculated based on 25-years of historical data.*
*% of floating-rate debt and floating rate debt cost of funding are as per the Company's 2010 10-K.*
*Floating interest rate spread based on the Company's average interest rate on average short-term borrowings, as per the Company's 2010 10-K.*
*2011 Consensus EPS and weighted average long-term cost of funding figures as per Bloomberg.*

*Source: Company Filings, Bloomberg.*

# Floating Rate Issuance Trends



Annual Floating Rate Debt Issuance (%) vs. Interest Rates, 1995 - 2011
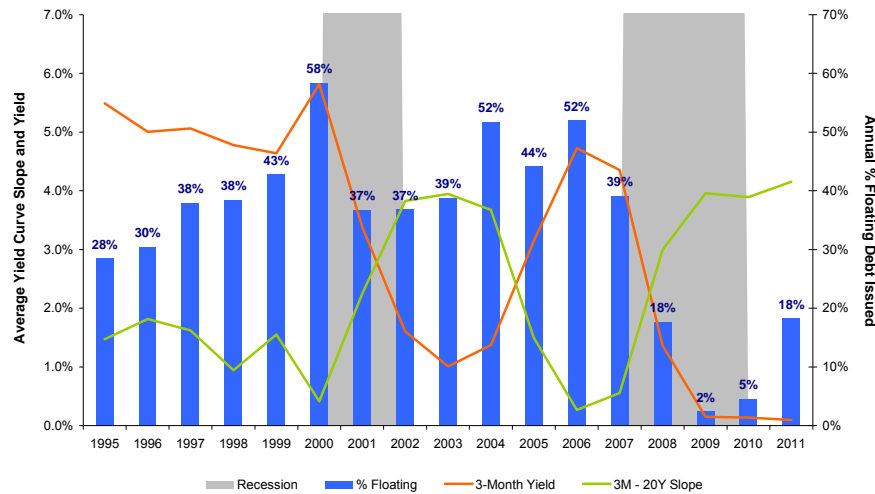


Floating Rate Debt Issuance vs. Yield Curve Slope, 1995 - 2011
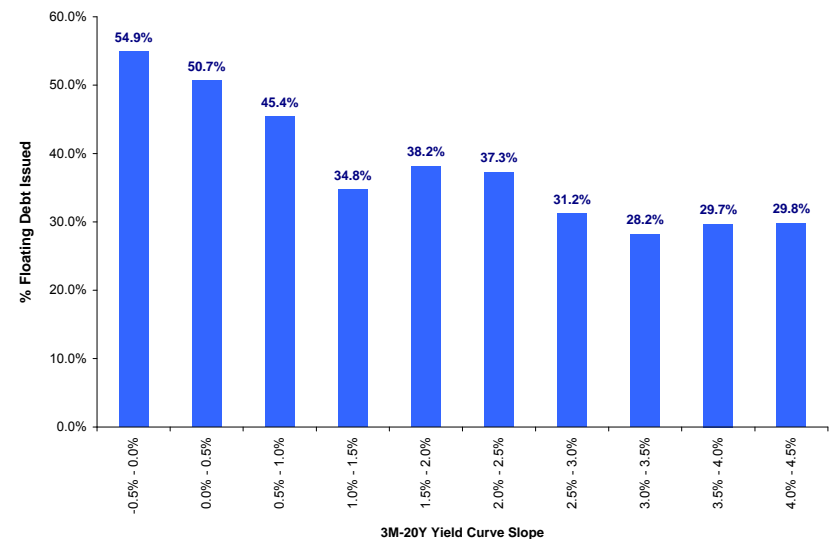
- ◆ **Looking at historical debt issuances since 1995 shows that floating rate debt issuance was relatively low in post-recessionary periods when the yield curve was steep and short term rates were low**

- ◆ **One possible explanation for this could be that firms make issuance decisions based on their expectations of future rates. Thus, issuing less floating rate debt may indicate that rates are expected to rise**

- ◆ **On the other hand, the data might be hiding an identification problem where typical floating-rate buyers such as securities lenders have reduced their portfolios. Moreover, typical floating-rate issuers, such as banks, have also reduced their portfolios.**

*Note: Only includes deals with over $100MM in proceeds.*
*Only includes investment grade issues.*

*Source: Thomson Financial, Bloomberg.*

# Floating Rate Issuance Trends (Cont'd)

## Floating Rate Debt Issuance (%) by Rating, 1995 - 2011
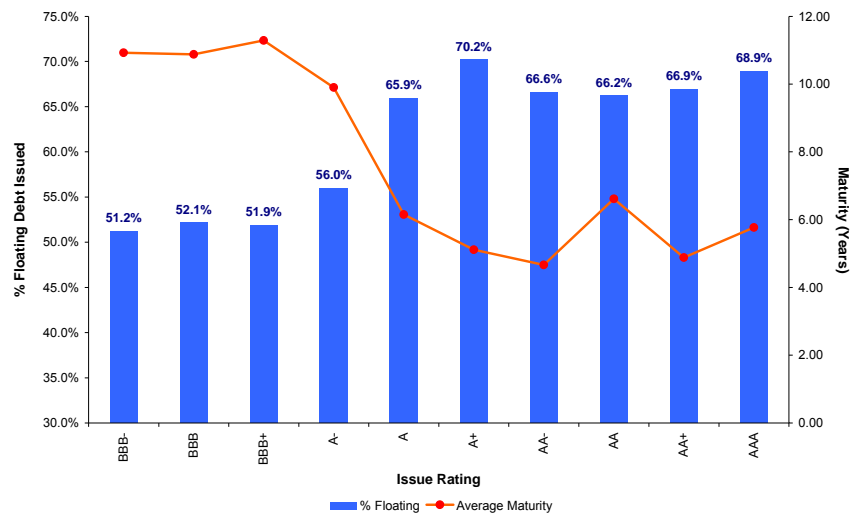


## Floating Rate Debt Issuance (%) by Industry, 1995 - 2011
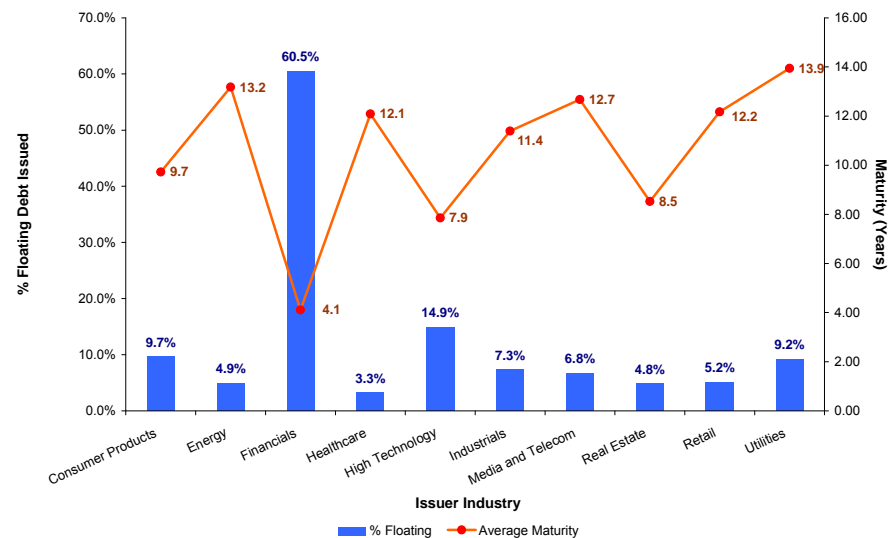


◆ **Within the investment-grade universe, higher-rated companies generally issue more floating-rate debt, as they are able to take on greater interest volatility in order to realize lower funding costs**

◆ **Companies in the utility, energy and media and telecom industries generally issue longer-term debt in order to match their assets with the maturity of their liabilities**

*Note: Only includes deals with over $100MM in proceeds.*
*Only includes investment grade issues.*

*Source: Thomson Financial, Bloomberg.*

# Debt Portfolio: Broad Universe

## Floating Debt/ Total Debt (%)

**Floating Rate Exposure By Industry**



Retail 16% | Transportation 17% | Telecom 19% | Energy 19% | Apparel 21% | Electronics 23% | Utilities 30% | Chemicals 30% | Industrials 34% | Consumer 36% | Technology 37% | Media 39% | Healthcare 41% | Pharma 54% | Metals & Mining 55%
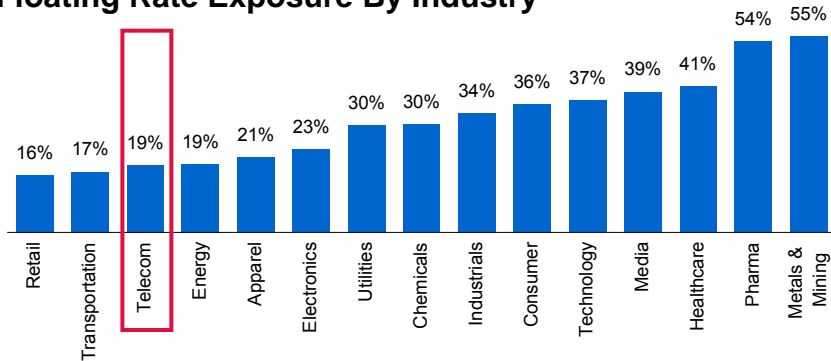
**Floating Rate Exposure By Rating**



AAA/AA+ 50% | AA 44% | AA- 40% | A+ 39% | A 31% | A- 28% | BBB+ 26% | BBB 21% | BBB- 17% | Below Investment Grade 32%
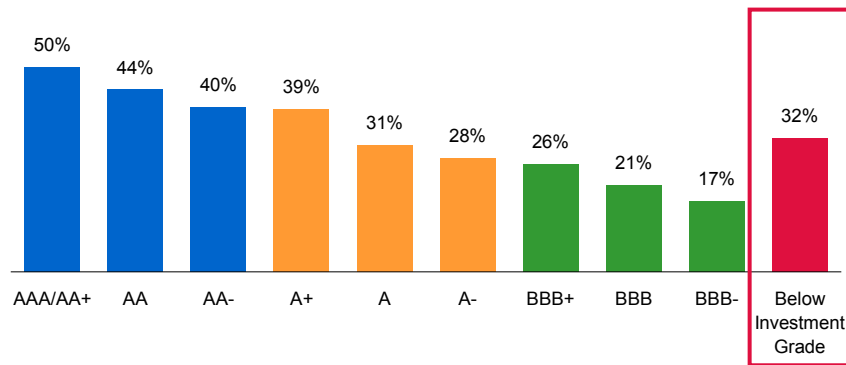
## Weighted Average Maturity (Years)

**Weighted Average Maturity By Industry**



Electronics 3.0 | Pharma 3.1 | Apparel 3.4 | Consumer 4.5 | Media 4.6 | Technology 5.0 | Chemicals 5.5 | Telecom 6.3 | Metals & Mining 6.4 | Industrials 6.5 | Healthcare 6.6 | Retail 6.8 | Utilities 7.9 | Energy 8.5 | Transportation 10.7
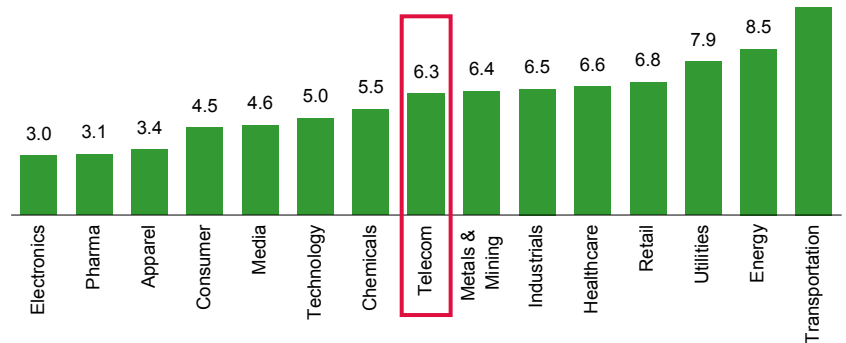
**Weighted Average Maturity By Rating**



AAA/AA+ 4.4 | AA 3.9 | AA- 5.0 | A+ 5.2 | A 7.3 | A- 7.4 | BBB+ 8.0 | BBB 7.3 | BBB- 7.0 | Below Investment Grade 5.8
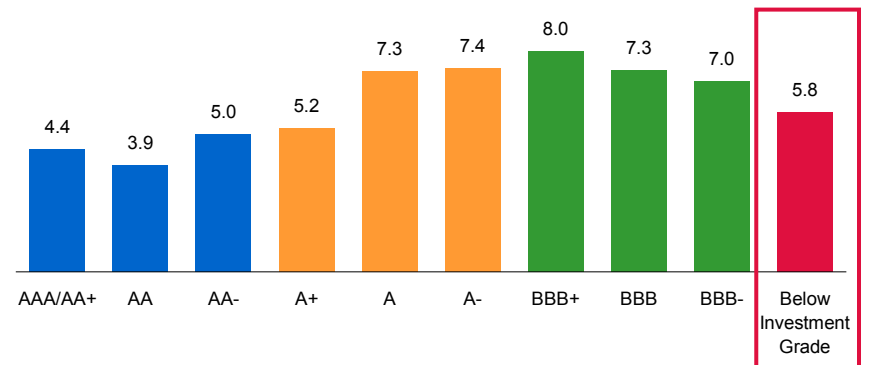
A comparative analysis by industry and by rating suggests a floating rate exposure of around 20% to 30% of total debt and a weighted average maturity of 5 to 7 years.

# Utility Peers Floating Rate Debt

## Utility Industry Peers Floating / Fixed Debt %, FY 2010
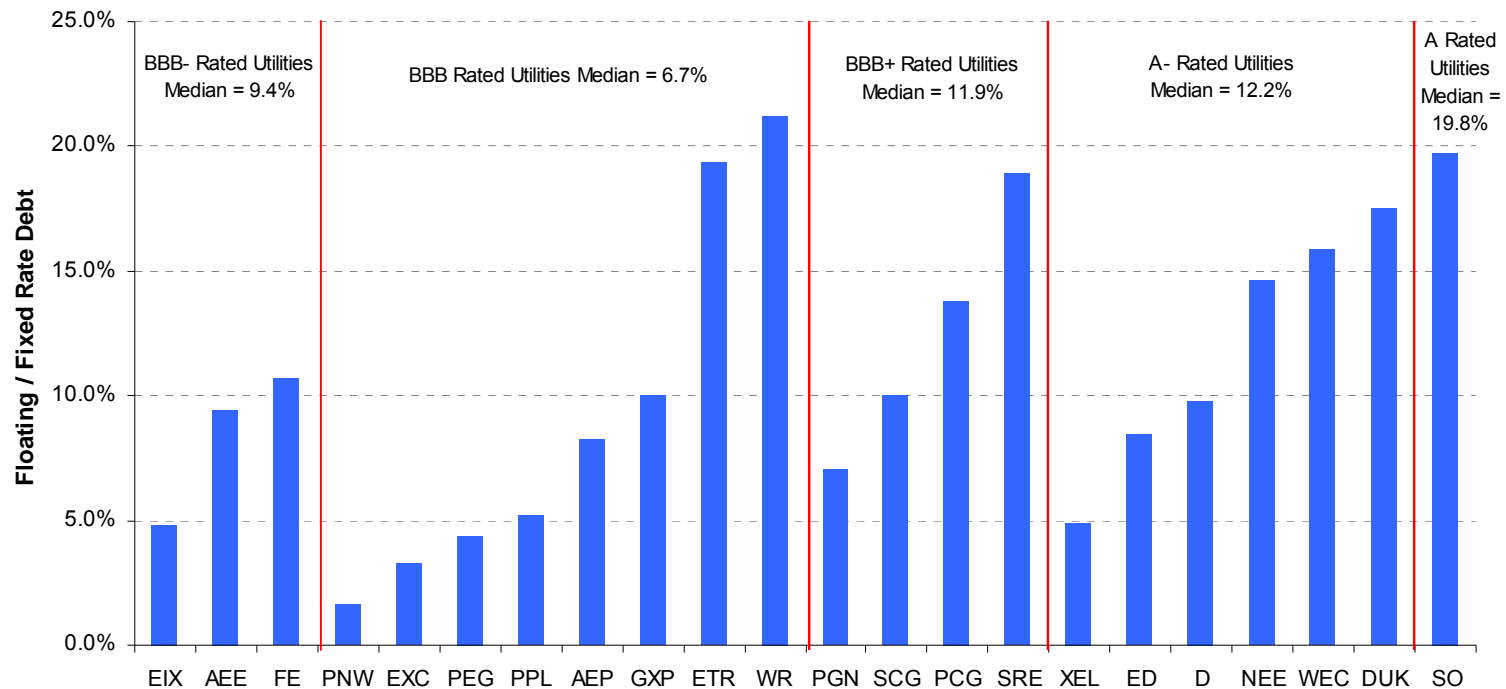


- On average, companies in the utility space allocate roughly 10% of their debt portfolio to floating-rate debt

- This industry exemplifies a "principal-agent" type behavior in that equity holders are reluctant to take on interest-rate risk, even in a very low-rate environment, when they can easily transfer the cost of longer-term debt to the customer "rate-payer."

*Note: Floating-rate debt includes short-term debt and commercial paper borrowings.*
*WR Floating-rate debt includes variable interest entity debt, without it, floating-rate debt percentage equals 11.2%.*

*Source: Thomson Financial, Bloomberg.*

# Issuing 30Y vs. 10Y Plus 20Y: Breakeven Analysis

*Currently, 10Y, 20Y and 30Y BBB+ rated utilities yield 3.57%, 4.99% and 5.07%, respectively.*

*If the 20Y rate increases to 7.08% and beyond in 10 years, a current 30Y funding would be more cost efficient.*

*This is approx. a 210 bps increase from today's 20Y level.*

## 30Y Financing vs. 10Y and Subsequent 20Y: Break-Even Rates

| | Cash Flow | Discount Rate (30Y Coupon Yield) | DCF | Cash Flow | Discount Rates (Bootstrapped) | DCF |
|---|---|---|---|---|---|---|
| 1 | $3.57 | 5.07% | $3.40 | $3.57 | 1.09% | $3.53 |
| 2 | 3.57 | 5.07% | 3.23 | 3.57 | 1.47% | 3.47 |
| 3 | 3.57 | 5.07% | 3.08 | 3.57 | 1.66% | 3.40 |
| 4 | 3.57 | 5.07% | 2.93 | 3.57 | 1.92% | 3.31 |
| 5 | 3.57 | 5.07% | 2.79 | 3.57 | 2.24% | 3.20 |
| 6 | 3.57 | 5.07% | 2.65 | 3.57 | 2.54% | 3.07 |
| 7 | 3.57 | 5.07% | 2.53 | 3.57 | 2.85% | 2.93 |
| 8 | 3.57 | 5.07% | 2.40 | 3.57 | 3.30% | 2.75 |
| 9 | 3.57 | 5.07% | 2.29 | 3.57 | 3.49% | 2.62 |
| 10 | 3.57 | 5.07% | 2.18 | 3.57 | 3.79% | 2.46 |
| 11 | 6.60 | 5.07% | 3.83 | 7.08 | 4.04% | 4.58 |
| 12 | 6.60 | 5.07% | 3.65 | 7.08 | 4.30% | 4.27 |
| 13 | 6.60 | 5.07% | 3.47 | 7.08 | 4.55% | 3.97 |
| 14 | 6.60 | 5.07% | 3.30 | 7.08 | 4.81% | 3.67 |
| 15 | 6.60 | 5.07% | 3.14 | 7.08 | 5.06% | 3.37 |
| 16 | 6.60 | 5.07% | 2.99 | 7.08 | 5.21% | 3.14 |
| 17 | 6.60 | 5.07% | 2.85 | 7.08 | 5.35% | 2.92 |
| 18 | 6.60 | 5.07% | 2.71 | 7.08 | 5.49% | 2.70 |
| 19 | 6.60 | 5.07% | 2.58 | 7.08 | 5.64% | 2.50 |
| 20 | 6.60 | 5.07% | 2.45 | 7.08 | 5.78% | 2.30 |
| 21 | 6.60 | 5.07% | 2.34 | 7.08 | 5.78% | 2.17 |
| 22 | 6.60 | 5.07% | 2.22 | 7.08 | 5.78% | 2.06 |
| 23 | 6.60 | 5.07% | 2.12 | 7.08 | 5.77% | 1.95 |
| 24 | 6.60 | 5.07% | 2.01 | 7.08 | 5.77% | 1.84 |
| 25 | 6.60 | 5.07% | 1.92 | 7.08 | 5.77% | 1.74 |
| 26 | 6.60 | 5.07% | 1.82 | 7.08 | 5.77% | 1.65 |
| 27 | 6.60 | 5.07% | 1.74 | 7.08 | 5.76% | 1.56 |
| 28 | 6.60 | 5.07% | 1.65 | 7.08 | 5.76% | 1.48 |
| 29 | 6.60 | 5.07% | 1.57 | 7.08 | 5.76% | 1.40 |
| 30 | 106.60 | 5.07% | 24.16 | 107.08 | 5.75% | 19.99 |
| | | | **$100.00** | | | **$100.00** |

Note: Based on indicative data for the utilities index, the Company's yields may be different.

Source: Bloomberg, Ramirez & Co. estimates.

# Interest Rates Scenarios: Random Walk Simulations

## Reverting to the Mean, 10Y Horizon

Probability of Rate Increase by Over 210 bps: 48.5%



— Simulated Path    — Trend 20 bps pa    — +2 StDev    — - 2 StDev

## Neutral, 10Y Horizon

Probability of Rate Increase by Over 210 bps: 17.8%



— Simulated Path    — Trend 0 bps pa    — +2 StDev    — - 2 StDev
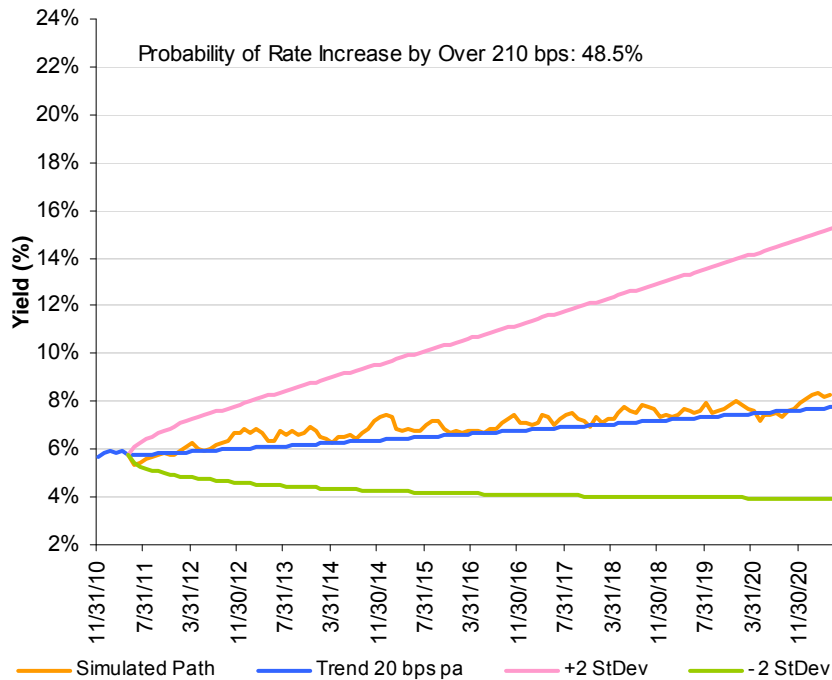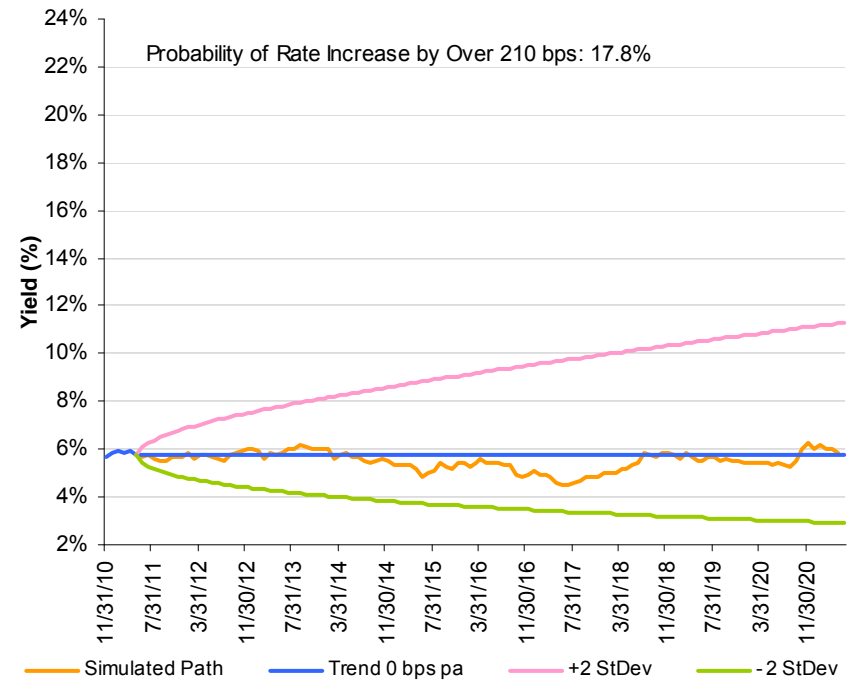
- ◆ **From 1984 to the present, corporate yields have trended down at an approximate rate of 20 bps per year. Mean-reversion of rates would suggest that the likelihood of an over 210 bps increase in long-term rates is approximately 49%**

- ◆ **With zero trend, the likelihood of an over 210 bps increase is around 18%**

*Note: Based of volatility of 3.08% per month (10.67% annualized), per ML A/BBB 15+ Utilities Index.*

*Source: Ramirez & Co estimates.*
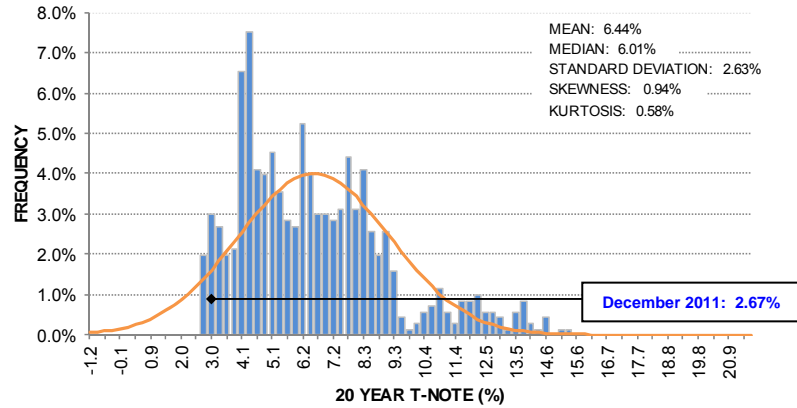
# Interest Rates Scenarios: Random Walk Simulations (Cont'd)

## High Inflation, 10Y Horizon



Probability of Rate Increase by Over 210 bps: 82.5%

Legend: Simulated Path — Trend 50 bps pa — +2 StDev — -2 StDev

- ◆ **While inflation does not seem to be an immediate threat, a number of factors suggest that it may be a future threat**

  - ⇨ *Inflated Fed balance sheet*

  - ⇨ *The decline of the dollar*

  - ⇨ *High and increasing commodity prices (e.g. gold and oil)*

  - ⇨ *Recent steepening of the Treasury curve may be the "canary in the mine"*

*Note: Based of volatility of 3.08% per month (10.67% annualized), per ML A/BBB 15+ Utilities Index.*
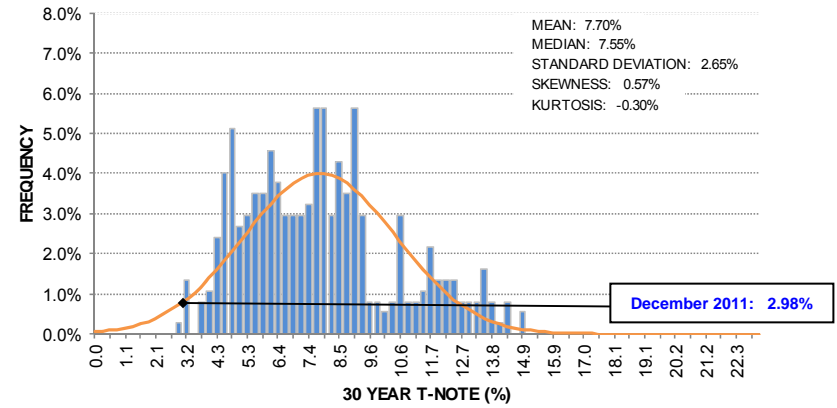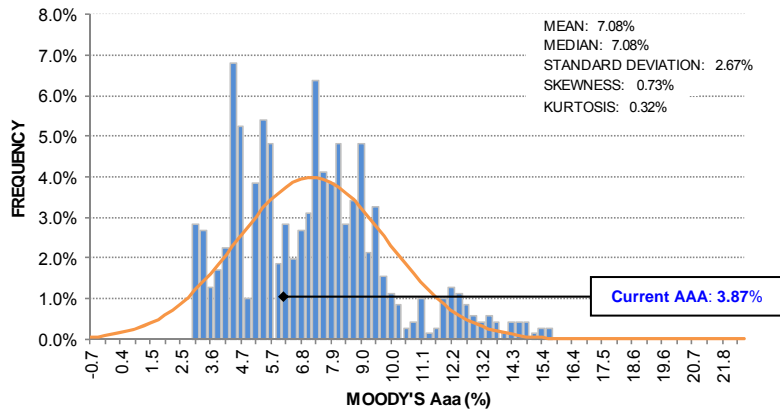
# Deconstructing Bond Yields
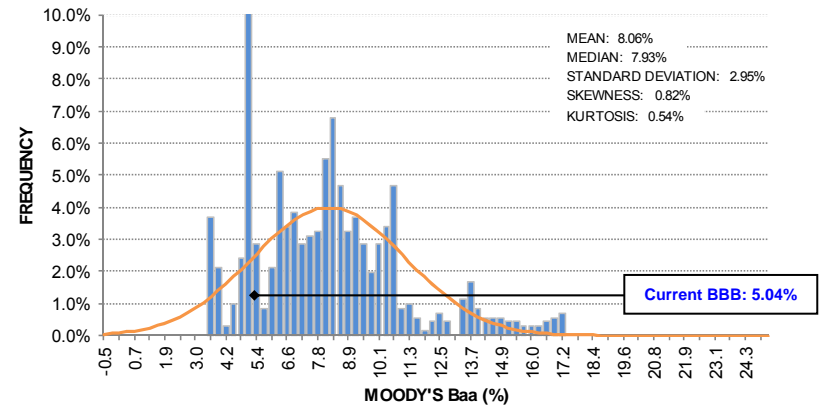


Note: AAA and BBB Yields are 15+ Years. Current AAA and BBB Yields represent Industrial 30 Years.

Source: Ramirez & Co. calculations, Federal Reserve, Bloomberg.

# Deconstructing Bond Yields (continued)



**TIPS 10 YR, Feb 1997 – Dec 2011**

MEAN: 2.42%
MEDIAN: 2.24%
STANDARD DEVIATION: 1.10%
SKEWNESS: -0.05%
KURTOSIS: -0.93%

December 2011: -0.12%

10 YEAR TIPS (%)
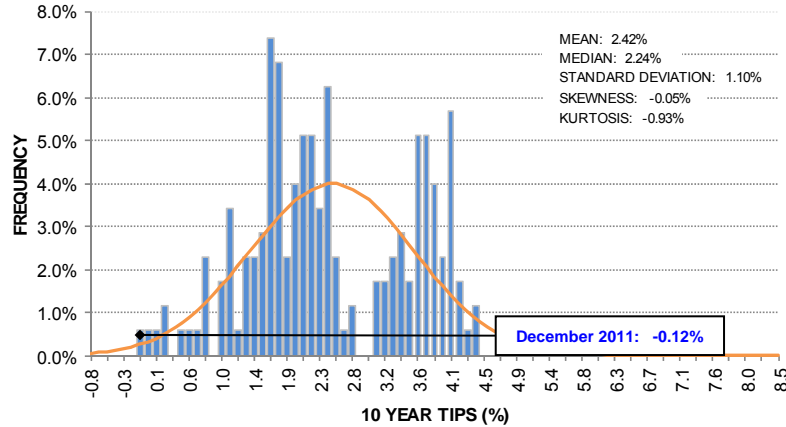


**TIPS 20 YR, Jul 2004 – Dec 2011**

MEAN: 1.97%
MEDIAN: 2.03%
STANDARD DEVIATION: 0.48%
SKEWNESS: -0.84%
KURTOSIS: 1.81%

December 2011: 0.53%

20 YEAR TIPS (%)
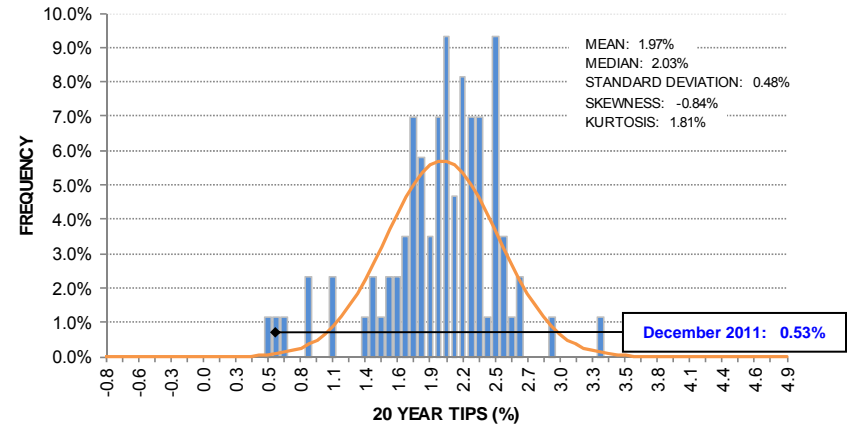


**Computed (Headline CPI Adjusted) Real Rate, Apr 1953 – Nov 2011**

MEAN: 2.69%
MEDIAN: 2.86%
STANDARD DEVIATION: 3.63%
SKEWNESS: -0.03%
KURTOSIS: 3.46%

November 2011: 2.72%

COMPUTED (Headline CPI Adj.) REAL RATES (%)
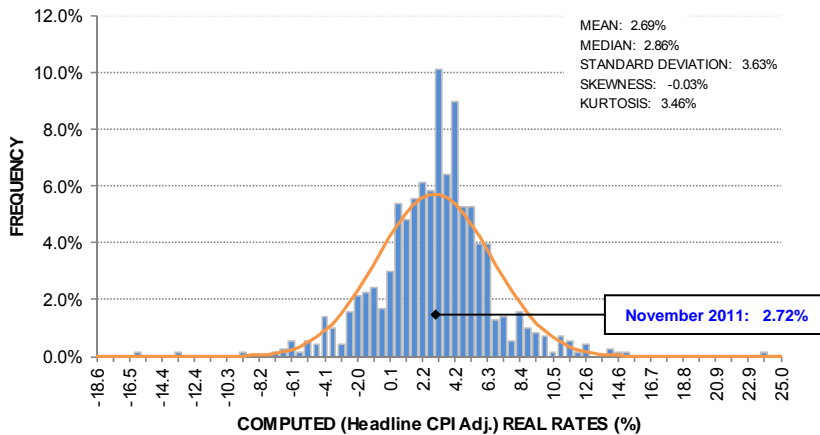


**Computed (Core CPI Adjusted) Real Rate, Feb 1957 – Nov 2011**

MEAN: 2.80%
MEDIAN: 3.24%
STANDARD DEVIATION: 2.75%
SKEWNESS: -0.29%
KURTOSIS: 2.06%

November 2011: 0.66%

COMPUTED (Core CPI Adj.) REAL RATES (%)
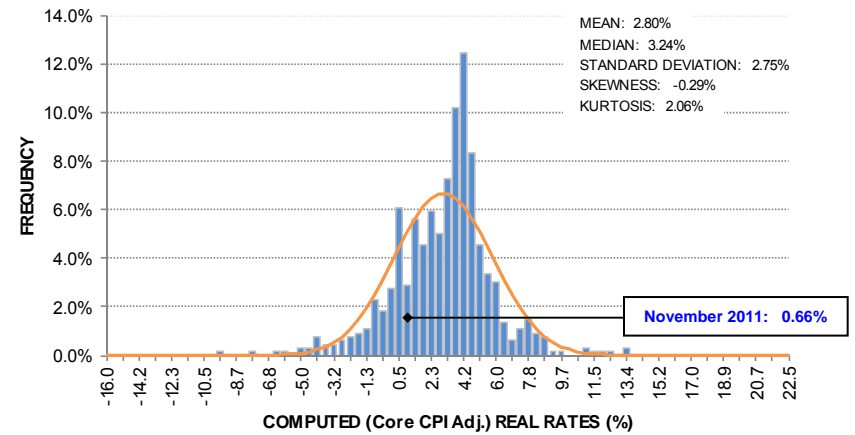
*Notes: Inflation rates are annualized, monthly, and seasonally adjusted.*
*Computed real rates equal 20 Yr Treasury Yields minus the indicated inflation.*

*Source: Ramirez & Co. calculations, Bloomberg.*

# Deconstructing Bond Yields (continued)

## US Headline CPI Inflation, Apr 1953 – Nov 2011

November 2011: 0.00%

*Headline CPI (%)*

FREQUENCY
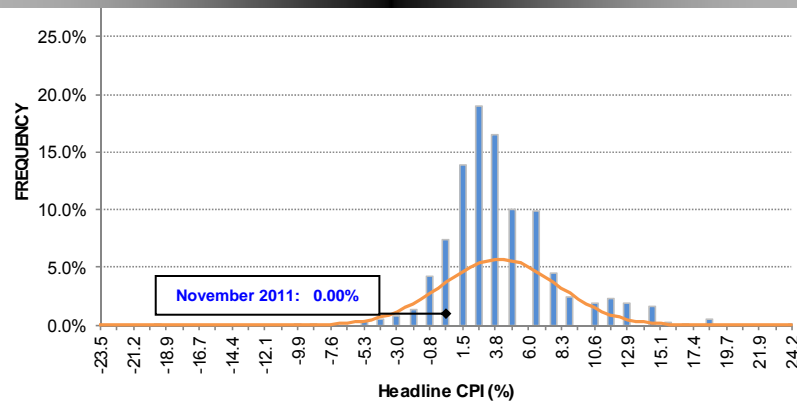
## US Core CPI Inflation, Feb 1957 – Nov 2011

November 2011: 0.66%

*CPI CORE (%)*

FREQUENCY
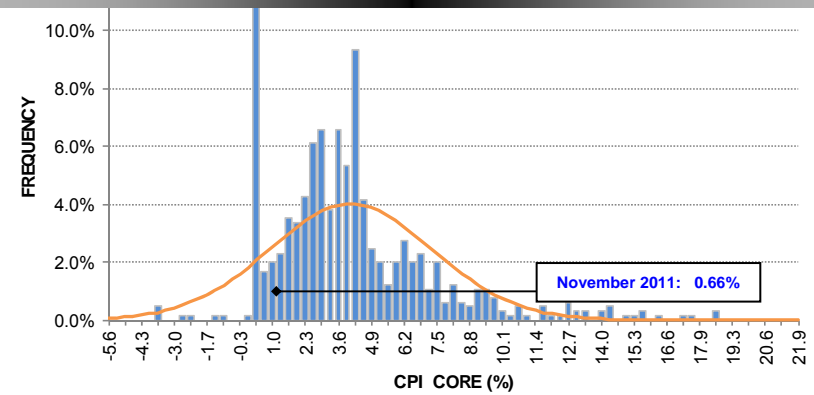
## GDP, Jun 1953 – September 2011

MEAN: 3.08%
MEDIAN: 3.10%
STANDARD DEVIATION: 3.85%
SKEWNESS: -0.25%
KURTOSIS: 1.28%

September 2011: 1.80%

*Real GDP (QoQ%)*

FREQUENCY

*Notes: Inflation rates are annualized, monthly, and seasonally adjusted.*

# Deconstructing Bond Yields (continued)
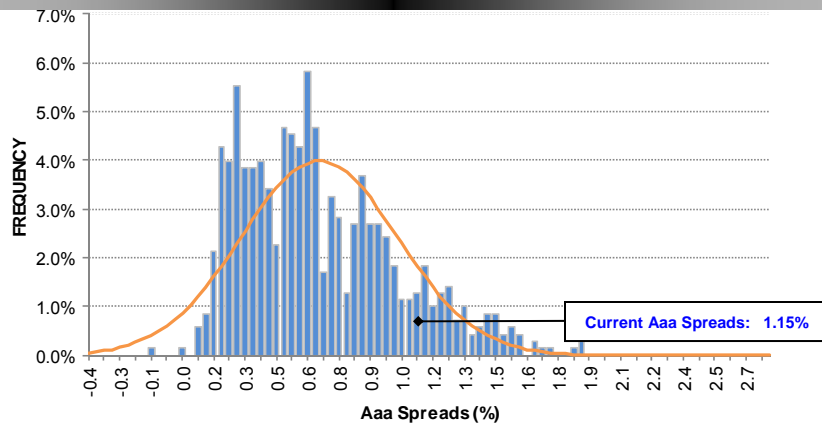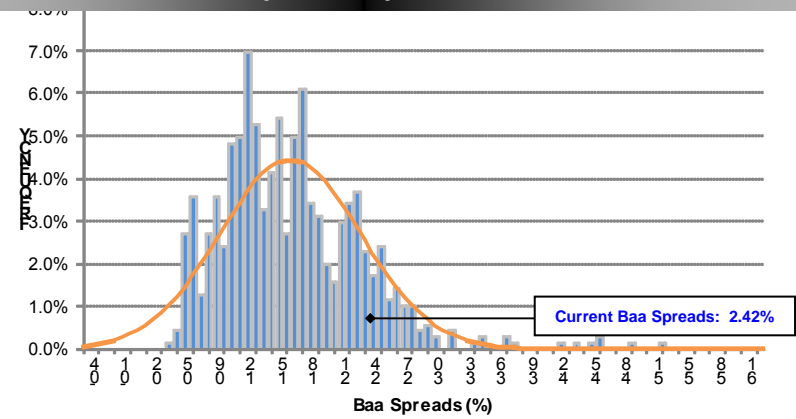


Note: Current spreads are for 20 years.

# Mining the Data: A Wall Street Game
## 5Y vs. 20Y Bonds, Apr 53 – Jul 10
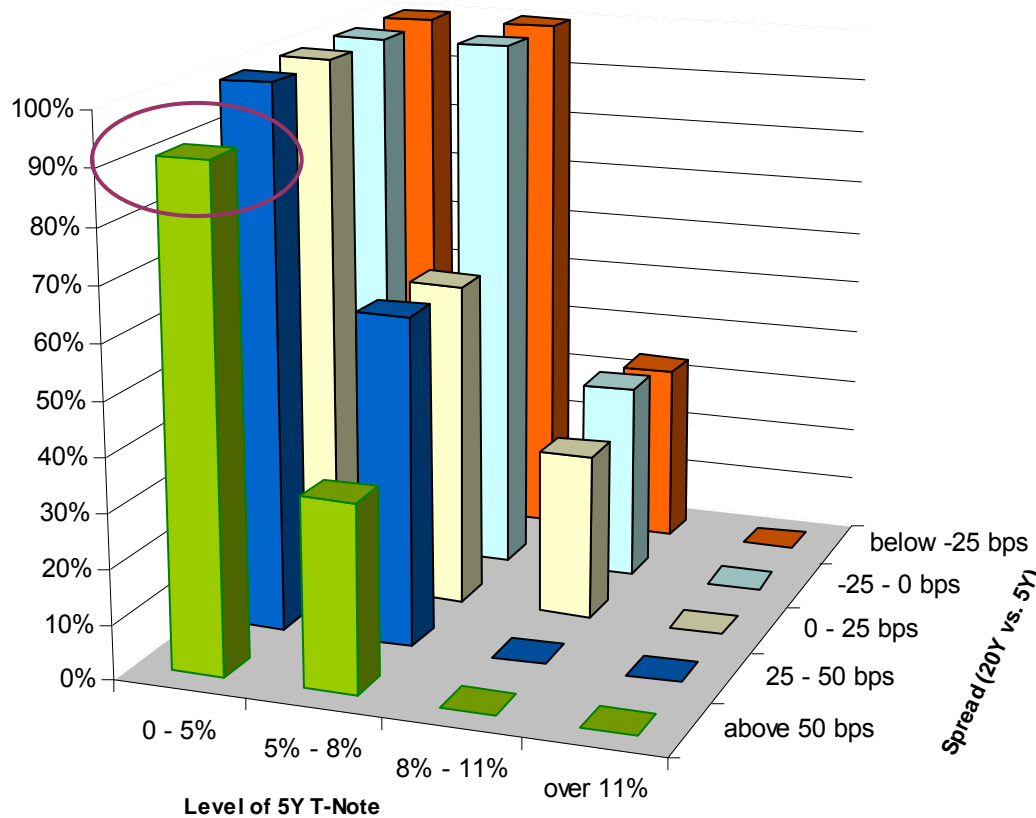
**Number of Occurrences (on a monthly basis):**

| Spread | 5Y T-Note | | | |
|---|---|---|---|---|
| | 0 - 5% | 5% - 8% | 8% - 11% | over 11% |
| below -25 bps | 14 | 31 | 3 | 18 |
| -25 - 0 bps | 31 | 29 | 22 | 10 |
| 0 - 25 bps | 65 | 20 | 23 | 5 |
| 25 - 50 bps | 32 | 43 | 16 | 11 |
| above 50 bps | 23 | 81 | 26 | 5 |

**Percentage of 20-Year Win:**

| Spread | 5Y T-Note | | | |
|---|---|---|---|---|
| | 0 - 5% | 5% - 8% | 8% - 11% | over 11% |
| below -25 bps | 100% | 100% | 33% | 0% |
| -25 - 0 bps | 100% | 100% | 36% | 0% |
| 0 - 25 bps | 100% | 60% | 30% | 0% |
| 25 - 50 bps | 100% | 60% | 0% | 0% |
| above 50 bps | 91% | 35% | 0% | 0% |

**Average Annual Advantage of 20-Year Debt (bps):**

| Spread | 5Y T-Note | | | |
|---|---|---|---|---|
| | 0 - 5% | 5% - 8% | 8% - 11% | over 11% |
| below -25 bps | 190 | 281 | 33 | -452 |
| -25 - 0 bps | 197 | 247 | -103 | -468 |
| 0 - 25 bps | 223 | 55 | -114 | -534 |
| 25 - 50 bps | 154 | 21 | -297 | -452 |
| above 50 bps | 125 | -109 | -323 | -386 |

- **The level of 5-year T-Notes and the slope of the yield curve between 5-year and 20-year maturities explain 71% of the variation in relative cost advantage of 5-year vs. 20-year funding**
- **From a historical perspective, 20-year maturities have won most of the time when the combination of level and slope was similar to today's**

# Issuing 50 to 100-Year Bonds

➤In 2010-2011, investment-grade borrowers such as the California Institute of Technology (Caltech), Norfolk Southern Corporation, Rabobank Netherlands, United Mexican States (UMS), the Massachusetts Institute of Technology (MIT), and the University of Southern California issued 100-year bonds with no call provisions.

➤And, The Tennessee Valley Authority (TVA) issued a 50-year bond with no call provisions.  Also in the same period, Goldman Sachs twice issued 50-year bonds with attractively-priced 5-year call provisions, as the retail market traditionally under prices bond call options. Similar to Goldman Sachs, Telephone and Data Systems Inc, and its subsidiary United States Cellular Corp issued retail-targeted 49 NC-5's with attractively priced call provisions.

➤The confluence of record-low 30-year Treasury yields and relatively tight corporate spreads are among the factors driving the issuance of bonds with 50 to 100-year maturities.

➤The market for 50- and 100-year bonds (ultra-long, or super-long bonds) was invigorated in 1992 and 1993 by the: first-of-its-kind deal-of-the-year TVA 50 NC-20 (50-year non-call 20), Texaco 50 NC-20, Boeing 50 NC-L (non-call life), Walt Disney 100 NC-30, and Coca Cola 100 NC-L bonds.

➤Typically, asset-liability managers such as insurance companies buy ultra-long bonds to match the duration of their assets and liabilities. The duration and, thus, the quarterly mark-to-market sensitivity of such bonds are only marginally higher than 30-year bonds.

➤Asset managers may also buy ultra-long bonds to mitigate the negative convexity of their mortgage portfolios.

# Select 50 to 100 Yr. Bond Issuance in the US, Apr 1992 – Nov 2011

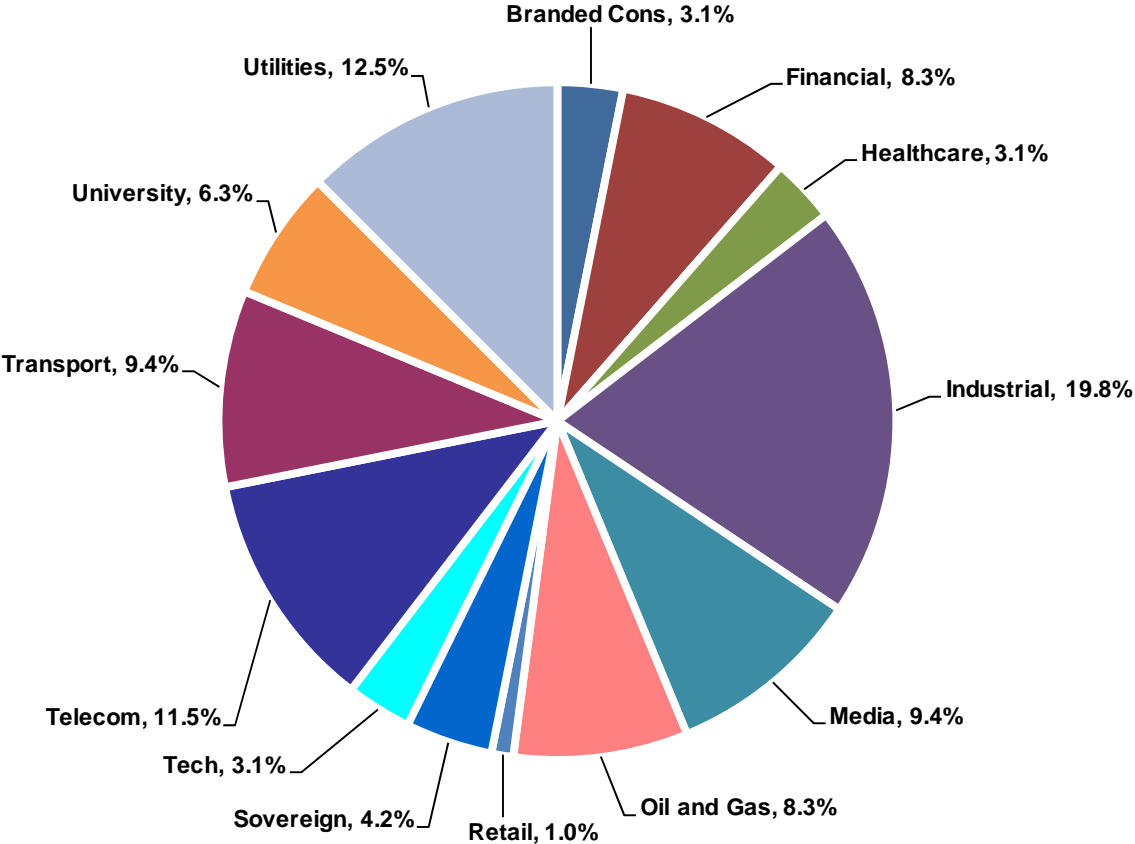| Effective Date | Principal Amount ($ Mln) | Issuer | Rating | Coupon | Structure | New Issue Spread (bp) | Comments |
|---|---|---|---|---|---|---|---|
| 04/09/92 | 1,000 | Tennessee Valley Authority | Aaa/AAA | 8.250 % | 50 NC-20 | +58 | |
| 03/04/93 | 200 | Texaco Inc | A1/A+ | 7.500 | 50 NC-20 | +89 | |
| 04/06/93 | 175 | Boeing Co | A1/AA | 7.875 | 50 NC-L | +100 | |
| 05/19/93 | 250 | Consolidated Rail Corp | A2/A | 7.875 | 50 NC-L | +87 | |
| 06/10/93 | 200 | Ford Motor Co | A2/A | 7.750 | 50 NC-L | +98 | |
| 07/09/93 | 300 | Pacific Bell(Pacific Telesis) | Aa3/AA- | 7.375 | 50 NC-20 | +77 | |
| 07/21/93 | 300 | Walt Disney Co | Aa3/AA- | 7.550 | 100 NC-30 | +95 | |
| 07/21/93 | 750 | Tennessee Valley Authority | Aaa/AAA | 7.250 | 50 NC-10 | +83 | |
| 07/22/93 | 150 | Coca-Cola Co | Aa3/AA | 7.375 | 100 NC-L | +80 | |
| 10/12/93 | 125 | Boeing Co | A1/AA | 6.875 | 50 NC-L | +84 | Re-open |
| 11/09/93 | 250 | US WEST Communications Inc | Aa3/AA- | 7.125 | 50 NC-20 | +85 | |
| 12/08/93 | 500 | Tennessee Valley Authority | Aaa/AAA | 6.875 | 50 NC-10 | +80 | |
| 06/14/94 | 850 | Tennessee Valley Authority | Aaa/AAA | 7.850 | 50 NC-5 | +87 | |
| 07/18/95 | 500 | Tennessee Valley Authority | Aaa/AAA | 6.235 | 50 NC-15 | +14 | Par Put 6 |
| 10/25/95 | 150 | IBM | A1/A | 7.000 | 50 NC-L | +75 | |
| 11/20/95 | 200 | Columbia/HCA Healthcare Corp | A3/BBB+ | 7.500 | 100 NC-L | +116 | |
| 11/29/95 | 600 | News America Holdings Inc | Baa3/BBB | 7.750 | 50 NC-L | +155 | |
| 11/29/95 | 150 | News America Holdings Inc | Baa3/BBB | 7.900 | 100 NC-L | +165 | |
| 12/05/95 | 125 | Johnson Controls Inc | A2/A- | 6.950 | 50 NC-L | +85 | |
| 12/05/95 | 100 | Wisconsin Electric Power Co | Aa3/AA | 6.875 | 100 NC-L | +92 | |
| 12/06/95 | 126 | BellSouth Telecommunications | Aaa/AAA | 7.000 | 100 NC-L | +70 | |
| 01/23/96 | 100 | Peoples Republic of China | A3/BBB | 9.000 | 100 NC-L | +299 | |
| 04/02/96 | 125 | Yale University | Aaa/AAA | 7.375 | 100 NC-30 | +70 | |
| 08/06/96 | 300 | Dresser Industries Inc | A1/A | 7.600 | 100 NC-L | +86 | |
| 10/02/96 | 200 | Union Carbide Corp | Baa2/BBB | 7.750 | 100 NC-L | +97 | |
| 10/11/96 | 100 | News America Holdings Inc | Baa3/BBB | 8.250 | 100 NC-L | +146 | |
| 10/30/96 | 500 | Ford Motor Co | A1/A+ | 7.400 | 50 NC-L | +77 | |
| 10/31/96 | 75 | MIT | Aaa/AAA | 7.250 | 100 NC-L | +60 | |
| 10/31/96 | 150 | Union Pacific Resources Group | A3/A | 7.500 | 100 NC-L | +84 | |
| 10/31/96 | 150 | Apache Corp | Baa1/BBB | 7.625 | 100 NC-L | +95 | |
| 11/07/96 | 148 | Times Mirror Co | A1/A+ | 7.250 | 100 NC-L | +74 | |
| 11/07/96 | 100 | Anadarko Petroleum Corp | A3/BBB+ | 7.250 | 100 NC-L | +79 | |
| 12/03/96 | 200 | Citizens Utilities Co | Aa3/AA+ | 7.050 | 50 NC-L | +68 | |
| 12/03/96 | 850 | IBM | A1/A | 7.125 | 100 NC-L | +80 | |
| 12/12/96 | 150 | Crown Cork & Seal Co | Baa1/BBB+ | 7.500 | 100 NC-L | +100 | |
| 01/08/97 | 100 | Tosco Corp | Baa2/BBB- | 7.900 | 50 NC-L | +103 | |
| 01/09/97 | 100 | Reliance Industries Ltd | Baa3/BB+ | 10.250 | 100 NC-L | +354 | |
| 01/16/97 | 500 | US WEST Communications Inc | Baa1/BBB+ | 7.950 | 100 NC-L | +120 | |
| 01/17/97 | 200 | Endesa | Baa1/A- | 8.125 | 100 NC-L | +127 | |
| 02/04/97 | 150 | Mead Corp | A3/A- | 7.550 | 50 NC-L | +80 | |
| 02/06/97 | 500 | Chrysler Corp | A3/A | 8.125 | 100 NC-L | +82 | |
| 02/20/97 | 500 | JC Penney Co | A2/A | 7.625 | 100 NC-L | +95 | |
| 02/26/97 | 300 | Caterpillar Inc | A2/A | 7.375 | 100 NC-50 | +75 | |
| 04/03/97 | 100 | Amgen Inc | A2/A | 8.125 | 100 NC-L | +105 | |
| 05/08/97 | 500 | Ford Motor Co | A1/A+ | 7.700 | 100 NC-L | +85 | |
| 05/14/97 | 350 | Norfolk Southern Corp | Baa1/BBB+ | 7.900 | 100 NC-L | +97 | |
| 06/19/97 | 100 | Bangko Sentral Pilipinas | Ba2/BB | 8.600 | 100 NC-L | +198 | |
| 06/24/97 | 100 | Boston University | A3/BBB+ | 7.625 | 100 NC-30 | +95 | |
| 07/07/97 | 250 | Federal Express Corp | Baa2/BBB | 7.600 | 100 NC-L | +103 | |
| 07/15/97 | 500 | Chrysler Corp | A3/AA- | 7.400 | 100 NC-90 | +82 | |
| 07/22/97 | 500 | BellSouth Corp | Aa1/AAA | 7.120 | 100 NC-L | +60 | |
| 07/24/97 | 200 | Burlington Northern Santa Fe | Baa2/BBB | 7.250 | 100 NC-L | +85 | |
| 07/28/97 | 175 | SunAmerica Inc | Baa1/A | 5.600 | 100 NC-L | +103 | |
| 07/31/97 | 150 | Harcourt General Inc | Baa1/BBB+ | 7.300 | 100 NC-L | +101 | |
| 08/01/97 | 100 | Noble Affiliates Inc | Baa2/BBB | 7.250 | 100 NC-L | +100 | |
| 08/07/97 | 300 | Bristol-Myers Squibb Co | Aaa/AAA | 6.875 | 100 NC-L | +44 | |
| 08/08/97 | 150 | Apache Corp | Baa1/BBB+ | 7.375 | 50 NC-L | +88 | |
| 09/30/97 | 100 | Embotelladora Andina SA | Baa1/BBB+ | 7.875 | 100 NC-L | +145 | |
| 10/06/97 | 250 | Safra Republic Holdings | NR/AA- | 7.125 | 1000 NC-L | +93 | |
| 10/07/97 | 300 | Motorola Inc | Aa3/AA | 5.220 | 100 NC-L | +65 | |
| 10/08/97 | 100 | Ultramar Diamond Shamrock Corp | Baa3/BBB | 7.450 | 100 NC-L | +110 | |
| 12/04/97 | 194 | Alabama Power | NR/A+ | 7.125 | 50 NC-5 | +110 | 25 |
| 12/10/97 | 250 | Archer-Daniels-Midland Co | Aa3/AA- | 6.950 | 100 NC-L | +84 | |
| 01/21/98 | 200 | Rockwell International Corp | A1/AA- | 5.200 | 100 NC-L | +105 | |
| 02/26/98 | 165 | Cummins Engine Co Inc | Baa1/BBB+ | 5.650 | 100 NC-L | +155 | |
| 03/04/98 | 150 | KN Energy Inc | Baa2/BBB- | 7.450 | 100 NC-L | +145 | |
| 04/01/98 | 200 | AMBAC Inc | Aa2/AA | 7.080 | 100 NC-5 | +115 | 25 |
| 04/17/98 | 190 | Alabama Power | A2/A | 7.000 | 50 NC-5 | +115 | 25 |
| 05/13/98 | 250 | Coca-Cola Enterprises Inc | A3/A+ | 7.000 | 100 NC-L | +105 | |
| 06/22/01 | 325 | Viacom Inc | A3/A | 7.250 | 50 NC-5 | +168 | $25 |
| 09/28/01 | 600 | General Motors Corp | A3/A | 7.375 | 50 NC-5 | +195 | $25 |
| 10/10/01 | 200 | AMBAC Inc | Aa2/AA | 7.000 | 50 NC-5 | +164 | $25 |
| 02/07/02 | 800 | General Motors Corp | A2/A | 7.250 | 50 NC-5 | +184 | $25 |
| 03/19/03 | 175 | AMBAC Financial Group Inc | Aa2/AA | 5.875 | 100 NC-5 | +99 | |
| 03/07/05 | 300 | Norfolk Southern Corp | Baa1/BBB+ | 6.000 | 100 NC-L | +137 | |
| 03/29/06 | 1,000 | Tennessee Valley Authority | Aaa/AAA | 5.375 | 50 NC-L | +59 | |
| 09/14/06 | 1,000 | Comcast Corp | Baa2/BBB+ | 7.000 | 49 NC-5 | +208 | $25 |
| 12/06/06 | 750 | Viacom Inc | Baa3/BBB | 6.850 | 49 NC-5 | +225 | $25 |
| 02/06/07 | 1,150 | AT&T Inc | A2/A | 6.375 | 49 NC-5 | +151 | $25 |
| 03/20/07 | 700 | CBS Corp | Baa3/BBB | 6.750 | 49 NC-5 | +204 | $25 |
| 05/03/07 | 550 | Comcast Corp | Baa2/BBB+ | 6.625 | 49 NC-5 | +179 | $25 |
| 08/23/10 | 250 | Norfolk Southern Corp | Baa1/BBB+ | 6.000 | 95 NC-L | +229 | Re-open |
| 09/14/10 | 350 | Rabobank Netherlands | Aaa/AAA | 5.800 | 100 NC-L | +201 | |
| 09/16/10 | 1,000 | Tennessee Valley Authority | Aaa/AAA | 4.625 | 50 NC-L | +77 | |
| 10/05/10 | 1,000 | United Mexican States | Baa1/BBB | 5.750 | 100 NC-L | +235 | |
| 11/02/10 | 1,325 | Goldman Sachs Group, Inc. | A1/A | 6.125 | 50 NC-5 | +220 | $25 |
| 11/16/10 | 200 | Telephone & Data Systems Inc | Baa2/BBB- | 6.875 | 49 NC-5 | +253 | $25 |
| 03/21/11 | 300 | Telephone & Data Systems Inc | Baa2/BBB- | 7.000 | 49 NC-5 | +255 | $25 |
| 05/09/11 | 300 | United States Cellular Corp | Baa2/BBB- | 6.950 | 49 NC-5 | +264 | $25 |
| 05/11/11 | 750 | Massachusetts Inst. Of Tech. | Aaa/AAA | 5.600 | 100 NC-L | +130 | |
| 05/18/11 | 400 | Norfolk Southern Corp | Baa1/BBB+ | 6.000 | 100 NC-L | +175 | |
| 08/10/11 | 1,000 | United Mexican States | Baa1/BBB | 5.750 | 99 NC-L | +242 | Re-open |
| 08/17/11 | 300 | University of Southern California | Aa1/AA | 5.250 | 100 NC-L | +174 | |
| 10/26/11 | 575 | Goldman Sachs Group, Inc. | A1/A | 6.500 | 50 NC-5 | +332 | $25 |
| 11/14/11 | 100 | Norfolk Southern Corp. | Baa1/BBB+ | 6.000 | 100 NC-L | +230 | Re-open |
| 11/29/11 | 350 | California Institute of Technology | Aa1/NR | 4.700 | 100 NC-L | +180 | |

*Source: Bloomberg, Thomson Financial.*

# 50 to 100-Yr Issuance by Industry, Apr 1992 – Nov 2011



Branded Cons, 3.1%

Financial, 8.3%

Healthcare, 3.1%

Utilities, 12.5%

University, 6.3%

Industrial, 19.8%

Transport, 9.4%

Media, 9.4%

Telecom, 11.5%

Oil and Gas, 8.3%

Tech, 3.1%

Retail, 1.0%

Sovereign, 4.2%

# Issuing Super-Long Bonds and Macroeconomics

*The issuance of super-long bonds is correlated with the expected path of interest rate movements over the long-term*

➢The nominal interest rate consists of three building blocks:
  o The real rate of interest (may be measured by observing yields on Treasury Inflation Protected Securities – TIPS – or by subtracting the inflation rate from nominal yields).
  o Inflationary expectations.
  o Credit spreads.
➢All of the above three building blocks are either at, or significantly below their historical means or medians.
  o The 30-year TIPS-measured real interest rate is less than 1%, or more than two standard deviations to the left of the mean or median.
  o The current US Core CPI inflation is close to a historically low level, though increasing.
  o Current Baa spreads are very close to their historical mean or median.
➢Theoretically, long-term real rates approximate the long-term growth rate of GDP. This observation is consistent with M. Allais's, E.S. Phelps's, P. Samuelson, and R. Solow's writings which state that consumption per person is maximized when the interest rate is equal to the growth rate of GDP (see Phelps 1966).
➢Most economists would agree that in the long term, inflation follows the path of monetary aggregates (Base Money, M1, or M2).
  o Though US base money has markedly increased since the onset of the crisis, M1 and M2 have not followed suit.
  o Nonetheless, if the Fed cannot drain the excess liquidity that it has created once the economy improves, US inflation is likely to pick up in the medium to long term. Moreover as Niall Ferguson ably argues, economic imbalances such as the ones the US is currently facing are frequently resolved through higher levels of inflation designed by the policy authorities.
➢Credit spreads are highly correlated with GDP growth in that better GDP performance depresses credit spreads, and conversely as default rates are highly correlated with economic performance.

In summary, all of the above points suggest that interest rates are far more likely to go up than down over the medium to long term.

# Change in Long-Term Rates vs. 50 to 100-Yr. Issuance ($ Mln.) Apr 1992 – Nov 2011



Legend:
- Recession
- Avg. 20Y Rate (YoY)
- Total Proceeds
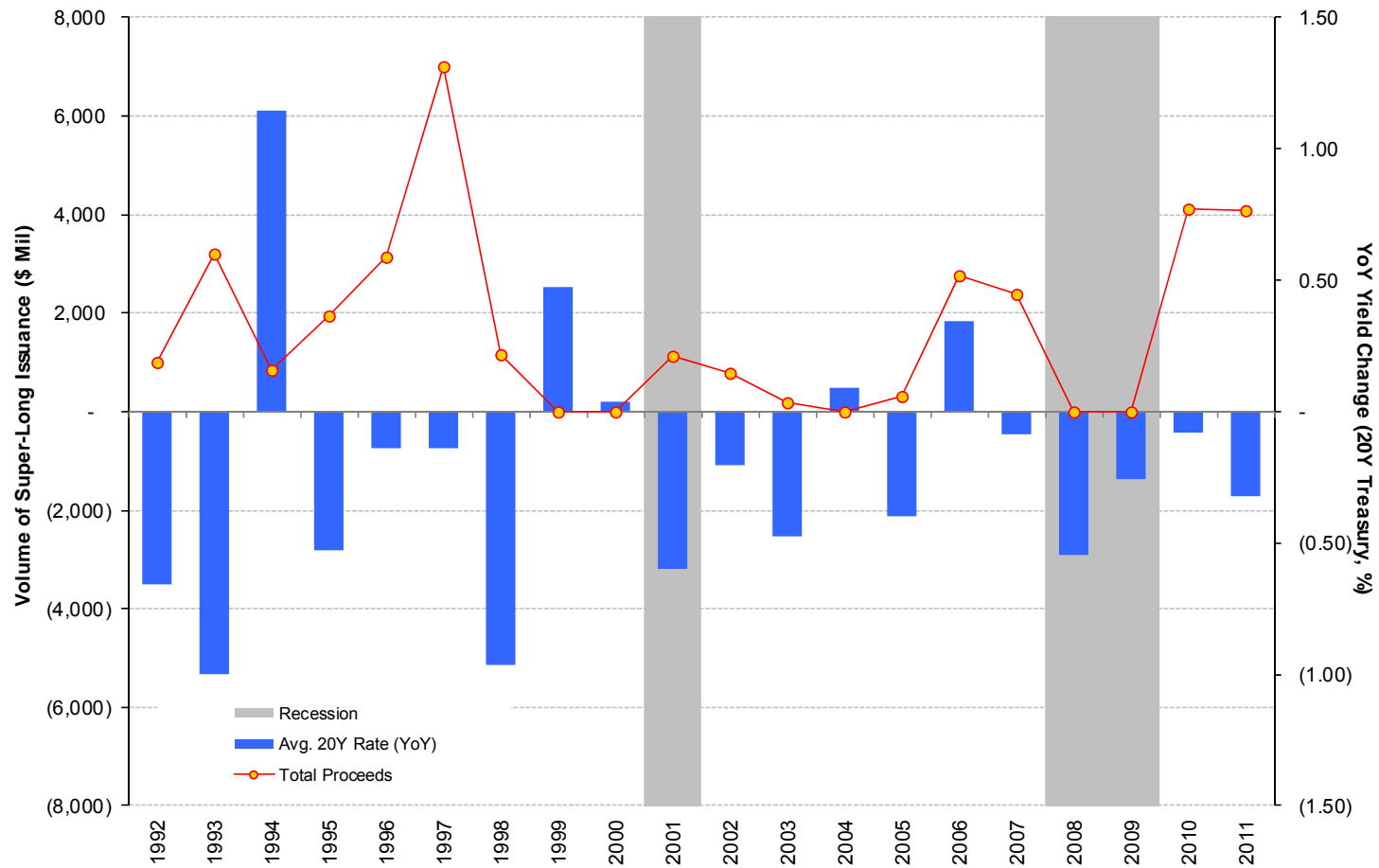
*Source: Federal Reserve, Thomson Financial.*

# Reasons as to Why a Borrower Would Issue a Super-Long Bond:

➢ To match assets and liabilities. Borrowers who have long-term assets such as brand names, oil reserves, railroad networks, and research and development expenses to be amortized over long horizons may be inclined to issue super-long bonds as an economic hedge. Indeed, two of the 100-year bond issuers in 1993 were very-well recognized brand-household names such as Coca Cola and Disney. In addition to the railroad bonds cited in the introduction, railroads such as Topeka and Santa Fe, and Chicago and Eastern Illinois issued 100-year bonds in the 19th century to finance land leases that lasted 100 years or more. Moreover, financial institutions may view ultra-long bonds as "cheap equity." Indeed, in October 1997, Safra Republic Holdings issued 1,000 NC-L bonds, at a new issue spread of 93 bps.

➢ To reduce rollover risk. If an issuer's borrowing horizon is greater than 30 years, then the risk/return tradeoff of issuing super-long bonds may look attractive.

   o For example, let's assume that BBB-rated industrials can issue 10-Year, 20-Year, and 30-Year paper at respectively 4.07%, 4.84%, and 5.03%. If the 20-Year rate increases to 6.26% and beyond in 10 years, a current 30-Year funding would be more cost efficient. This is approximately a 143 bps increase from today's 20-Year level. Depending on one's view of the behavior of interest rates, we can calculate the probability of such a move. If we assume that the natural logarithm of interest rates follow a random walk model with drift, the drift term and the volatility of interest rates determine this probability. We calculate a volatility of 10.7% per year based on the standard error of the autoregression of the logarithm of the long-term Merrill Lynch utility yield index. So, for a volatility of 10.7% per year:

      ▪ A zero bps per year drift term implies a 22% probability of breaching the breakeven rate (this assumes that the best forecast of future yield curves is the current yield curve).
      ▪ A 15 bps per year drift term implies a 51% probability of breaching the breakeven rate (roughly, this assumes that future yield curves will revert to their historical means).
      ▪ And, a drift term of 50 bps per annum implies an 88% probability of breaching the breakeven rate (this assumes that modest inflation takes over in the future).

# Modified Duration vs. Time; 100-, 50-, and 30-Yr. Noncallable Bonds
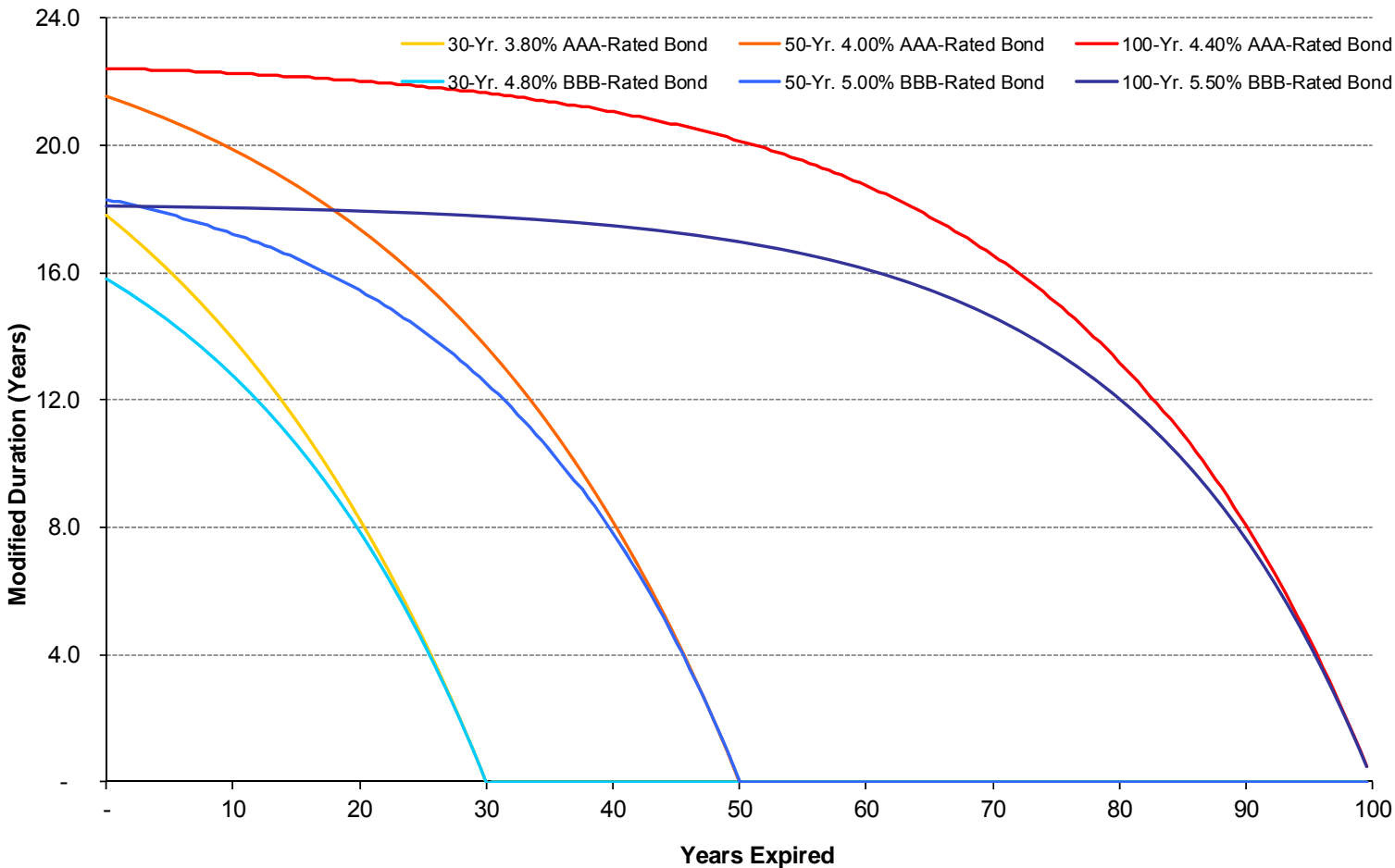


Notes: Calculations assume that coupon equals yield to maturity.

# Reasons as to Why a Borrower Would Issue a Super-Long Bond:

- o We apply a similar type analysis to UMS's 30 (at 4.86%) versus 100-year (at 5.56%) funding. We find the following breakevens:

  - To benchmark our analysis, and to approximate a breakeven rate, we first use the coupon curves and find that the 70-year rate 30 years out needs to breach 5.86%. We first use this approximation because constructing a zero coupon curve when data are limited requires several assumptions that may be less than ideal.
  - To reach a more precise estimate, we use an imputed zero coupon UMS curve, and find that the 70-year coupon rate 30 years out needs to breach 6.40% for the current 100Y UMS to be the cheaper alternative. We can argue that this is an approximately 155 bps point move of the yield curve 30 years out.

- ▪ Therefore, if the decision to move from a ten-year financing horizon to a 30-year horizon is rational, then the decision to move from a 30-year to a 50-year horizon may also be rational. Stated differently, both examples suggest about a 140-160 bps parallel shift of the yield curve in the forward funding point.

  ➢To vote a borrower's views. If a borrower believes that long-Treasury yields, corporate-bond spreads and inflation rates have bottomed out, then issuing super-long bonds is a reasonable strategy

# The Convexity of Super-Long Bonds

➢Some commentators have suggested that super-long bonds offer investors a form of "relatively cheap positive convexity" to offset the negative convexity of mortgage backed securities (MBS). Though a thorough analysis of this insight is beyond the scope of this paper, we can intuitively illustrate a few points:

➢Let us remember that:

- o As interest rates go up, the price of an MBS goes down more than a bullet bond as mortgagors extend the maturity of their payments.
- o As interest rates go down, the price of an MBS goes up by less than a bullet as mortgagors shorten the maturity of their payments.
- o The above two points imply that compared to a bullet of identical duration, an MBS's duration increases as interest rates go up and decreases as interest rates go down.
- o This mathematical relationship, intuitively demonstrated above, is called negative convexity.

➢Indeed, the duration and convexity of 5.50% 100Y bond, as calculated by Bloomberg and us, are: respectively 18.102Y and 6.427. When we construct a hypothetical 30Y bond with a coupon of 3.668%, this bond has an identical duration to the above 100Y (i.e. 18.102Y), but a lower convexity of 4.471. We examine this relationship in the following pages, where we illustrate the price change versus changes in interest rates of a 30Y and a 100Y bond with identical initial durations.

➢As we illustrate, the duration of a super-long bond decreases (increases) as interest rates go up (down). And this relationship, known as positive convexity, mitigates the interest rate sensitivity of a negative convexity portfolio such as one consisting of mortgages or related assets. A full mathematical treatment of this question is beyond the scope of this paper.

# Characteristics of Super-Long Bonds

*Convexity of a 30Y vs. 100Y of Equal Initial Duration*
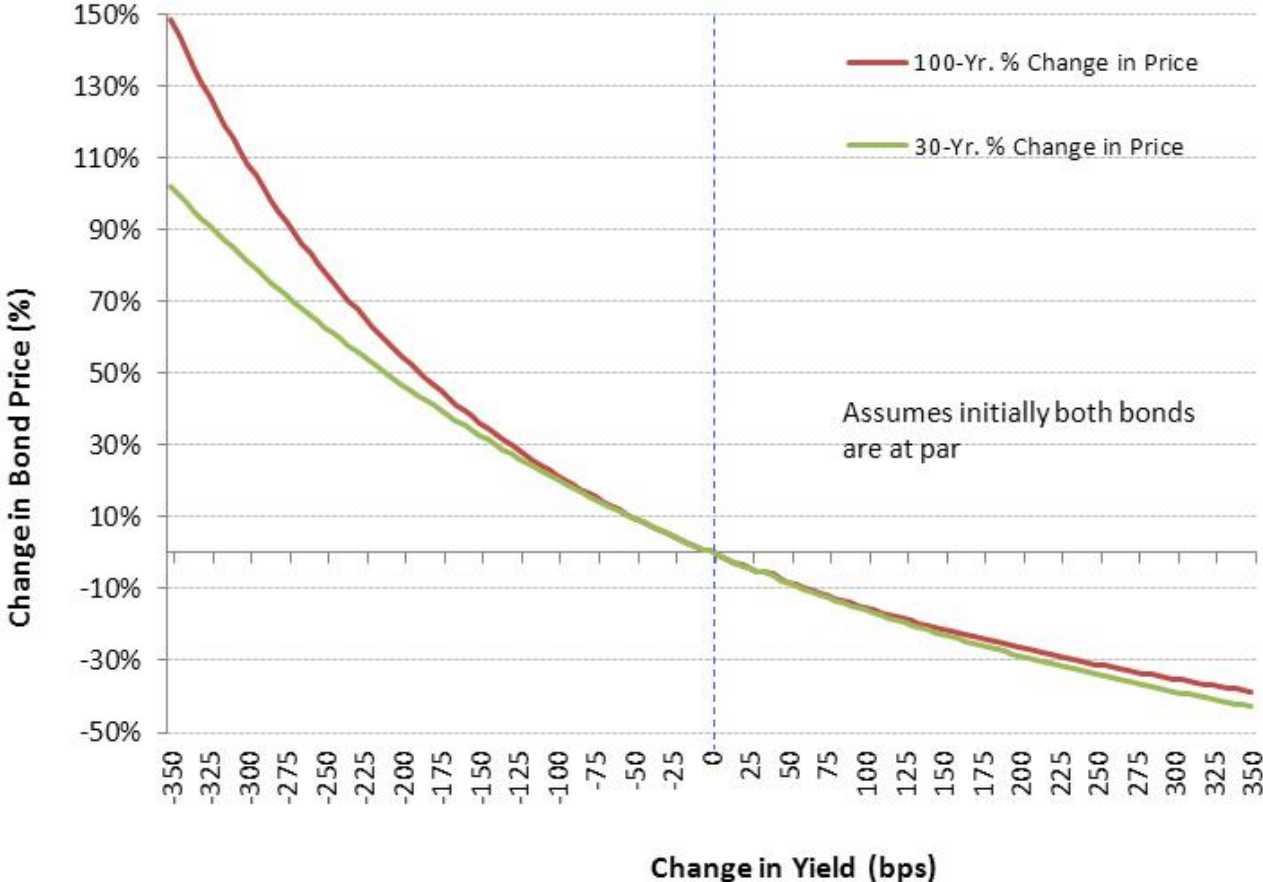
# To Hedge or Not to Hedge

### The Modigliani Miller World

- In the perfect capital markets world (no transaction costs and taxes, no information asymmetry, unrestricted access to borrowing, costless bankruptcy) there are no benefits to hedging

### Costs of Financial Distress

- "The primary goal of risk management is to eliminate the probability of costly lower-tail outcomes – those that would cause financial distress or make a company unable to carry out its investment strategy." (Stulz, 1996)

### Underinvestment

- Volatility is costly because value creating projects may be rejected if internal funds are relatively scarce in some states of nature. Hedging allows a firm to shift internal funds into states where they would otherwise be scarce

### Taxes

- If the function that maps income into tax liability is convex (i.e. a progressive tax schedule), then companies can reduce expected tax liabilities by hedging to reduce income volatility

### Managerial Compensation

- If the variability of managerial compensation is related to the volatility of corporate income or cash flows, then corporate volatility can be costly and hedging can improve managerial welfare

### Selected Papers

- The use of foreign currency derivatives increases total firm value by as much as 4.87%, on average (Allayannis and Weston, 2001, The use of foreign currency derivatives and firm market value, *Review of Financial Studies* 14, 243-276)

- Firms hedge to increase debt capacity, with increased tax benefits averaging 1.1 percent of firm value. (Graham and Rogers, 2002, Do firms hedge in response to tax incentives? *Journal of Finance* 57, 815-839)

- Firms issue foreign currency debt to hedge their exposure in the underlying currency or in highly correlated currencies. Firms choose currencies where information asymmetry between domestic and foreign investors is low. (Simi Kedia & Abon Mozumdar, 200, "Foreign Currency Denominated Debt: An Empirical Examination," *Journal of Business*, University of Chicago Press, vol. 76(4), pages 521-546, October)

- The magnitude of the derivatives positions held by most firms is economically small in relation to their entity-level risk exposures. This is potentially consistent with firms using derivatives to "fine tune" their overall risk-management program that likely includes other means of hedging (Guay and Kothari, 2003, How much do firms hedge with derivatives, *Journal of Financial Economics* 70, 423-461

- A firm is more likely to begin hedging new exposure if many of its competitors are already hedged (Nain, 2005, The Strategic Motives for Corporate Risk Management, University of Michigan Working Paper)

- For a typical sample firm, pass-through to customers and operational hedging each reduce exposure by 10% to 15%. Financial hedging with foreign debt, and to a lesser extent FX derivatives, decreases exposure by about 40%. (Bartram, Brown and Minton, 2009, Resolving the Exposure Puzzle: The Many Facets of Exchange Rate Exposure, *Journal of Financial Economics*, Vol. 95 (2), February 2010, 148-173)

# Objective Function



| | | |
|---|---|---|
| **Offset EBIT with Interest** | **Debt Proportionate to Assets** | **Debt Proportionate to EBITDA** |
| Minimize EPS Volatility | Hedge Debt/Assets Ratio | Hedge Debt/EBITDA Ratio |

**Offset EBIT with Interest** — legend: USD EBIT, EUR EBIT, USD Debt, EUR Debt, PBT
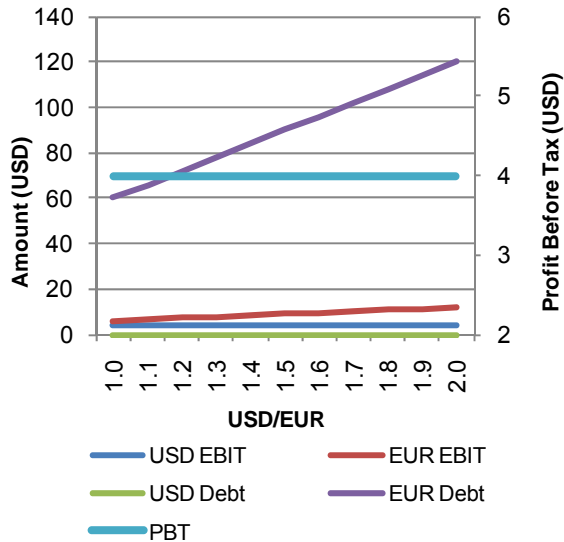
Assumptions:
Initial USD/EUR:  1:1
Initial USD EBIT:  $4
Initial EUR EBIT:  $6
Initial Debt @10%:  $60
Euro Denominated Debt:  100%

**Debt Proportionate to Assets** — legend: USD Assets, EUR Assets, USD Debt, EUR Debt, Debt/Assets
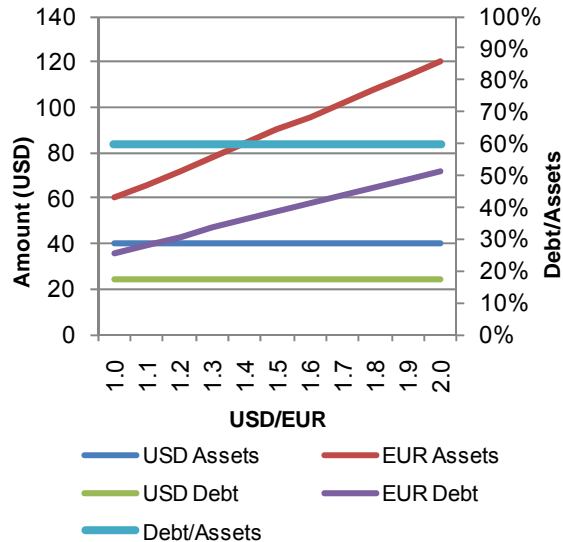
Assumptions:
Initial USD/EUR:  1:1
Initial Assets:  $100
Initial Debt:  $60
Euro Denominated Debt and Assets:  60%

**Debt Proportionate to EBITDA** — legend: USD EBITDA, EUR EBITDA, USD Debt, EUR Debt, Debt/EBITDA
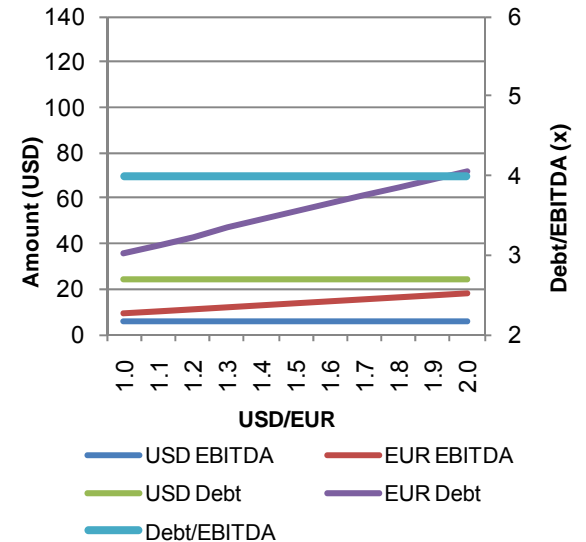
Assumptions:
Initial USD/EUR:  1:1
Initial EBITDA:  $15
Initial Debt:  $60
Euro Denominated Debt and EBITDA:  60%

- ◆ **A focus on earnings would typically lead to a higher proportion of debt in foreign currencies (to the extent foreign operations are money making)**

# Pepsi & Peers Geographic Income, Assets & Debt Distribution (Cont'd)
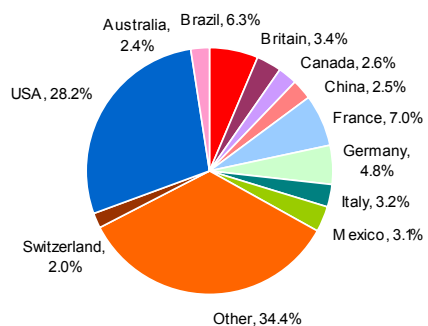


Revenue (% Total) | Operating Income (% Total) | Assets (% Total) | Debt (% Total)

**Nestlé**

Revenue (% Total): USA, 28.2%; Switzerland, 2.0%; Australia, 2.4%; Brazil, 6.3%; Britain, 3.4%; Canada, 2.6%; China, 2.5%; France, 7.0%; Germany, 4.8%; Italy, 3.2%; Mexico, 3.1%; Other, 34.4%

Operating Income (% Total): USA, 30.3%; Switzerland, 1.6%; Australia, 2.7%; Brazil, 6.8%; Britain, 2.8%; Canada, 2.8%; China, 2.8%; France, 5.7%; Germany, 4.0%; Italy, 2.7%; Mexico, 3.3%; Other, 34.6%

Assets (% Total): USA, 29.6%; Switzerland, 4.4%; Australia, 1.8%; Brazil, 2.2%; Britain, 1.6%; Canada, 0.8%; China, 1.0%; France, 3.1%; Germany, 2.5%; Italy, 1.7%; Mexico, 1.1%; Other, 50.1%

Debt (% Total): CHF, 74.3%; USD, 14.7%; AUD, 8.7%; NOK, 2.3%

**Campbell's**

Revenue (% Total): United States, 70.8%; Australia/Asia Pacific, 12.7%; Eurozone, 7.8%; Other, 8.6%

Operating Income (% Total): United States, 79.0%; Australia/Asia Pacific, 10.6%; Eurozone, 2.6%; Other, 7.9%

Assets (% Total): United States, 50.6%; Australia/Asia Pacific, 25.9%; Europe, 16.7%; Other, 6.8%

Debt (% Total): USD, 100.0%

*Source: Company Financials, Bloomberg.*

# Recent Shareholder Payout Trends

*As the credit crisis unfolded, stock buybacks decreased significantly, with dividends being reduced later, although to a lesser extent.*

*This trend has recently reversed itself.*

**Quarterly Payout**



Source: Standard & Poor's.

**LTM Yields**



Source: Standard's & Poor's.
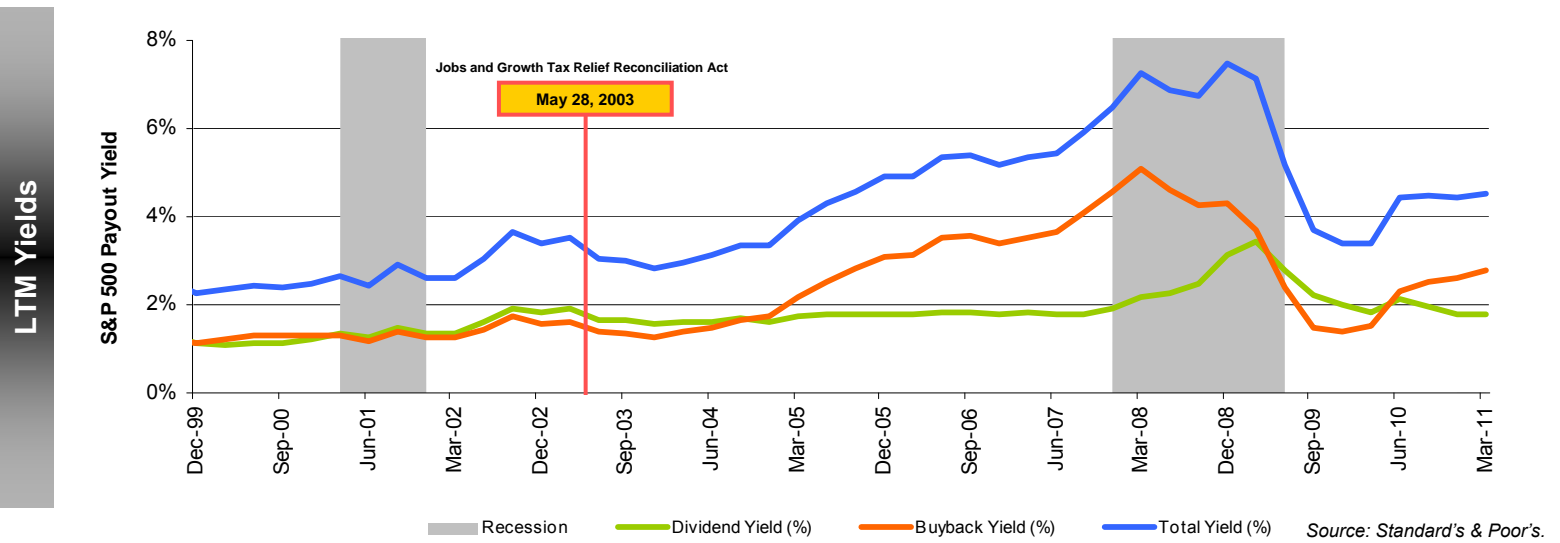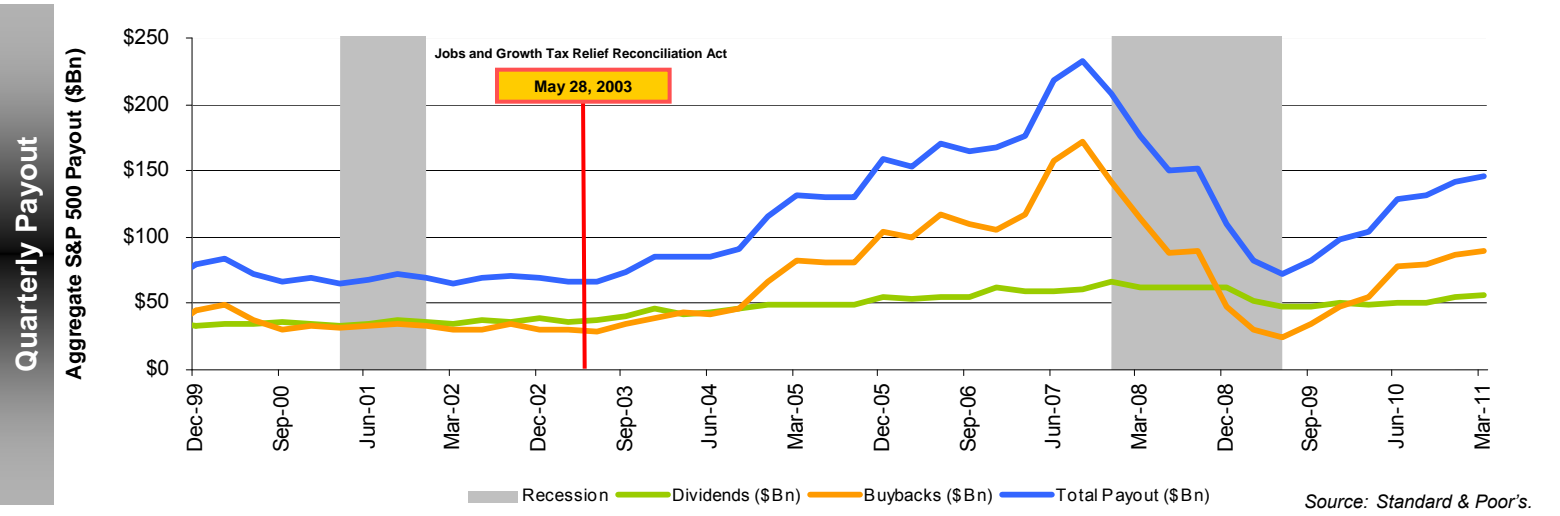
# Peer Payout and Liquidity

## Payout and Liquidity, August 2011

| Name | Moody's Sr. Unsecured Rating | S&P LT Issuer Rating | Stock Price ($) 08/29/2011 | Cash / Revenue (%) | Estimated NTM P/E (x) | Estimated Payout Ratio (%) | Indicated Dividend Yield (%) | LTM Share Buyback Yield (%) | 90-Day ADTV / Total Shares in Float |
|---|---|---|---|---|---|---|---|---|---|
| THE COCA-COLA CO | Aa3 | A+ | 69.73 | 33.23% | 16.79 | 45.03% | 2.68% | 2.69% | 0.44% |
| DR PEPPER SNAPPLE GROUP INC | Baa1 | BBB | 37.84 | 9.51% | 13.07 | 44.05% | 3.37% | 0.00% | 0.96% |
| GENERAL MILLS INC | Baa1 | BBB+ | 37.55 | 4.16% | 14.51 | 46.89% | 3.23% | 4.77% | 0.76% |
| THE HERSHEY CO | A2 | A | 57.92 | 13.35% | 19.19 | 45.50% | 2.37% | 2.36% | 0.83% |
| HJ HEINZ CO | Baa2 | BBB+ | 52.19 | 15.79% | 15.14 | 55.41% | 3.66% | 0.93% | 0.80% |
| KELLOGG CO | A3 | BBB+ | 54.16 | 3.55% | 14.67 | 46.76% | 3.19% | 6.67% | 1.15% |
| KRAFT FOODS INC | Baa2 | BBB | 34.57 | 4.35% | 14.09 | 47.11% | 3.34% | 0.00% | 0.66% |
| PEPSICO INC | Aa3 | A | 64.16 | 5.36% | 13.59 | 43.37% | 3.19% | 2.37% | 0.58% |
| **Mean** | | | | **11.16%** | **15.13** | **46.76%** | **3.13%** | **2.47%** | **0.77%** |
| **Median** | | | | **7.43%** | **14.59** | **46.13%** | **3.21%** | **2.36%** | **0.78%** |

## Dow Industrials



■ Dividend Yield (%)   ■ Share Buybacks (%)
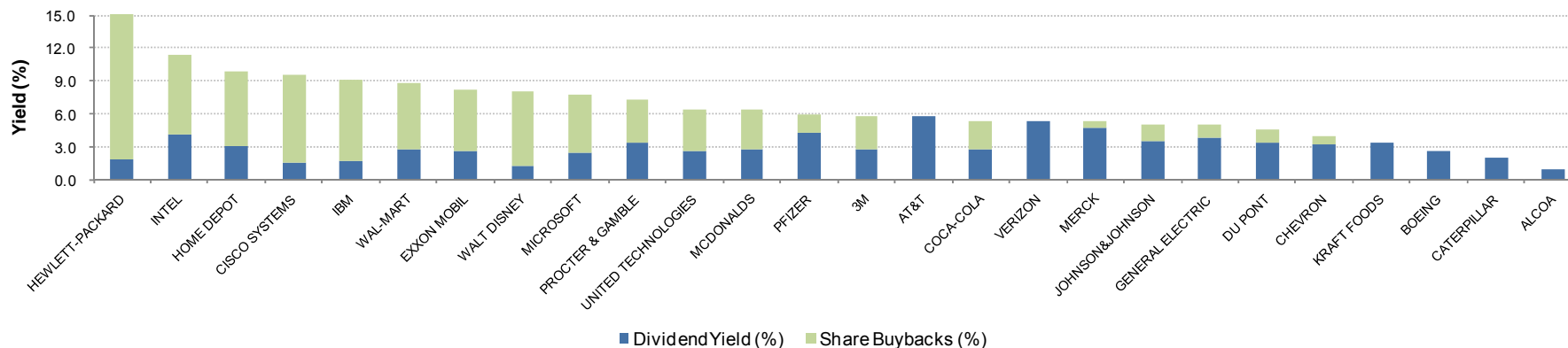
*Source: Bloomberg, calculations by Ramirez & Co.*

# Analyzing Share Buybacks by IRR and NPV Valuation

- **Illustratively, for an investor with a 5-year horizon, the decision to invest in a company would be a function of the purchase price, future dividends and the exit price. The IRR of the respective cash flows should be compared to target's cost of equity**

- **For example, assuming that earnings grow at 6.00% and the exit P/E is 11.0x, the stock would be close to fairly valued at the current stock price**

- **The company's current cost of equity is 8.08%**

## IRR - Varying EPS Growth and Forward P/E

|  | *Forward P/E Multiple in 5 Years (x)* | | | | |
|---|---|---|---|---|---|
| | *9.0x* | *10.0x* | *11.0x* | *12.0x* | *13.0x* |
| **9.0%** | 6.8% | 8.8% | 10.6% | 12.3% | 13.9% |
| **8.0%** | 6.0% | 8.0% | 9.8% | 11.5% | 13.1% |
| **7.0%** | 5.3% | 7.2% | 9.0% | 10.7% | 12.3% |
| **6.0%** | 4.5% | 6.4% | 8.2% | 9.9% | 11.4% |
| **5.0%** | 3.7% | 5.6% | 7.4% | 9.1% | 10.6% |

*5Y EPS Gr. (%)*

## Share NPV - Varying EPS Growth and Forward P/E

|  | *Forward P/E Multiple in 5 Years (x)* | | | | |
|---|---|---|---|---|---|
| | *9.0x* | *10.0x* | *11.0x* | *12.0x* | *13.0x* |
| **9.0%** | 39.96 | 43.43 | 46.89 | 50.36 | 53.82 |
| **8.0%** | 38.67 | 42.01 | 45.35 | 48.69 | 52.03 |
| **7.0%** | 37.42 | 40.64 | 43.85 | 47.07 | 50.29 |
| **6.0%** | 36.20 | 39.29 | 42.39 | 45.49 | 48.59 |
| **5.0%** | 35.01 | 37.99 | 40.97 | 43.96 | 46.94 |

*5Y EPS Gr. (%)*

## EV - Varying EPS Growth and Forward P/E

|  | *Forward P/E Multiple in 5 Years (x)* | | | | |
|---|---|---|---|---|---|
| | *9.0x* | *10.0x* | *11.0x* | *12.0x* | *13.0x* |
| **9.0%** | 29,007.3 | 30,386.3 | 31,765.3 | 33,144.2 | 34,523.2 |
| **8.0%** | 28,494.1 | 29,823.1 | 31,152.2 | 32,481.3 | 33,810.3 |
| **7.0%** | 27,994.3 | 29,274.8 | 30,555.4 | 31,835.9 | 33,116.4 |
| **6.0%** | 27,507.8 | 28,741.1 | 29,974.4 | 31,207.7 | 32,441.1 |
| **5.0%** | 27,034.3 | 28,221.7 | 29,409.1 | 30,596.6 | 31,784.0 |

*5Y EPS Gr. (%)*

Assumptions:
(1) The stock gets bought today and then resold in 5 years
(2) Forward EPS (Next 12 Months) of $3.62
(3) Forward DPS (Next 12 Months) of $1.87
(4) Share Purchase Price of $42.18
(5) Risk-Free rate of 4.25% and Market Risk Premium of 7.69%
(6) Company's Cost of Equity of 7.59% (based on 5-yr weekly beta of 0.50)

*Source for Model Assumptions: Wall Street Research and Bloomberg.*

# Cost of Equity: Current Utilities Industry Betas

*Typically, industry betas are statistically the same, yet exhibit minor differences among subsectors.*

*As expected, regulated subsectors have the lowest betas while unregulated subsectors have the highest betas.*



Simple CAPM S&P 500 Beta, Apr 09 – Dec 11
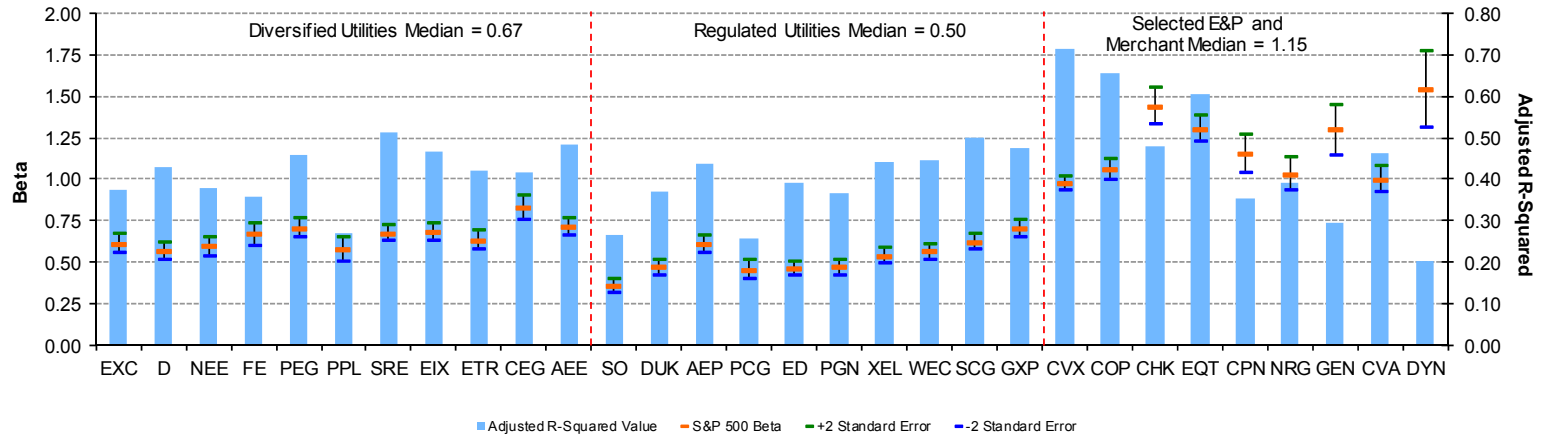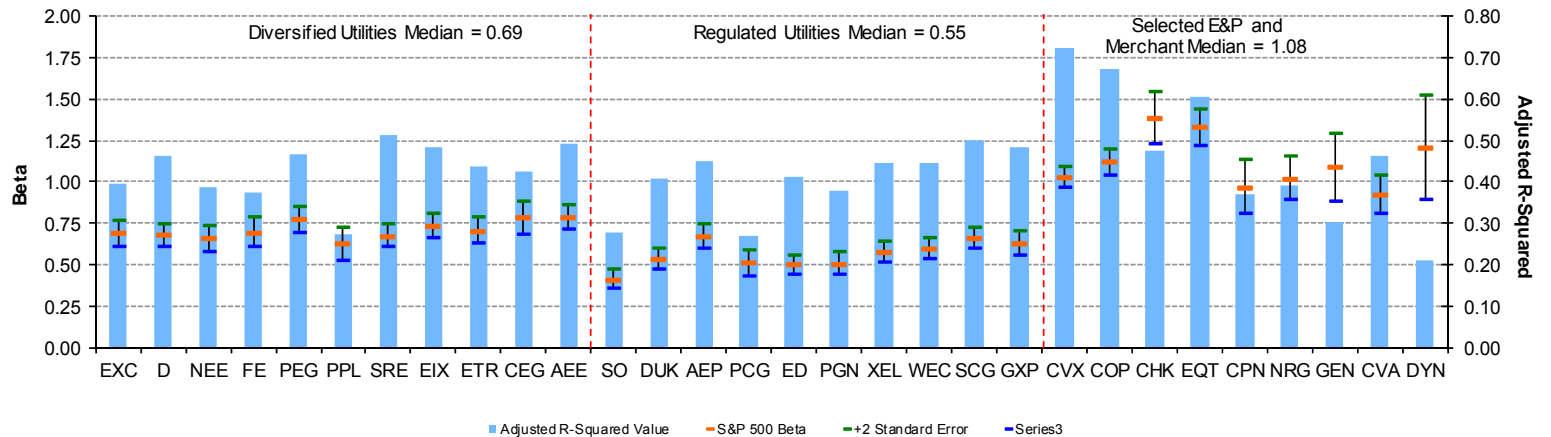
Diversified Utilities Median = 0.67    Regulated Utilities Median = 0.50    Selected E&P and Merchant Median = 1.15

Adjusted R-Squared Value    S&P 500 Beta    +2 Standard Error    -2 Standard Error



Extended CAPM S&P 500 Beta, Apr 09 – Dec 11

Diversified Utilities Median = 0.69    Regulated Utilities Median = 0.55    Selected E&P and Merchant Median = 1.08

Adjusted R-Squared Value    S&P 500 Beta    +2 Standard Error    Series3

Note: d log Stock Price = $\beta_0 + \beta_1$ * (d log S&P 500) + $\beta_2$ * (d log Russell 1000 Value – d log Russell 1000 Growth) + $\beta_3$ * (d log Russell 2000 – d log S&P 500) + $\beta_4$ * (Autoregression) + $\beta_5$ * (Moving Average) + $\varepsilon$

*Source: Bloomberg, Calculations by Ramirez & Co.*

# Cost of Equity: Current Utilities Industry Betas (Cont'd)

*Large-cap utilities exhibit negative small-cap coefficients.*

## Extended CAPM Value Beta (Russell 1000 Value – Russell 1000 Growth), Apr 09 – Dec 11



Diversified Utilities Median = 0.14  Regulated Utilities Median = 0.07  Selected E&P and Merchant Median = 0.24

Legend: ■ Book to Price Ratio  — Value Beta  — +2 Standard Error  — -2 Standard Error

## Extended CAPM Small Cap Beta (Russell 2000 – S&P 500), Apr 09 – Dec 11



Diversified Utilities Median = -0.24  Regulated Utilities Median = -0.18  Selected E&P and Merchant Median = 0.02

Legend: ■ Market Cap ($, Bln)  — Small Cap Beta  — +2 Standard Error  — -2 Standard Error

Note: d log Stock Price = $\beta_0 + \beta_1 *$ (d log S&P 500) $+ \beta_2 *$ (d log Russell 1000 Value – d log Russell 1000 Growth) $+ \beta_3 *$ (d log Russell 2000 – d log S&P 500) $+ \beta_4 *$ (Autoregression) $+ \beta_5 *$ (Moving Average) $+ \varepsilon$
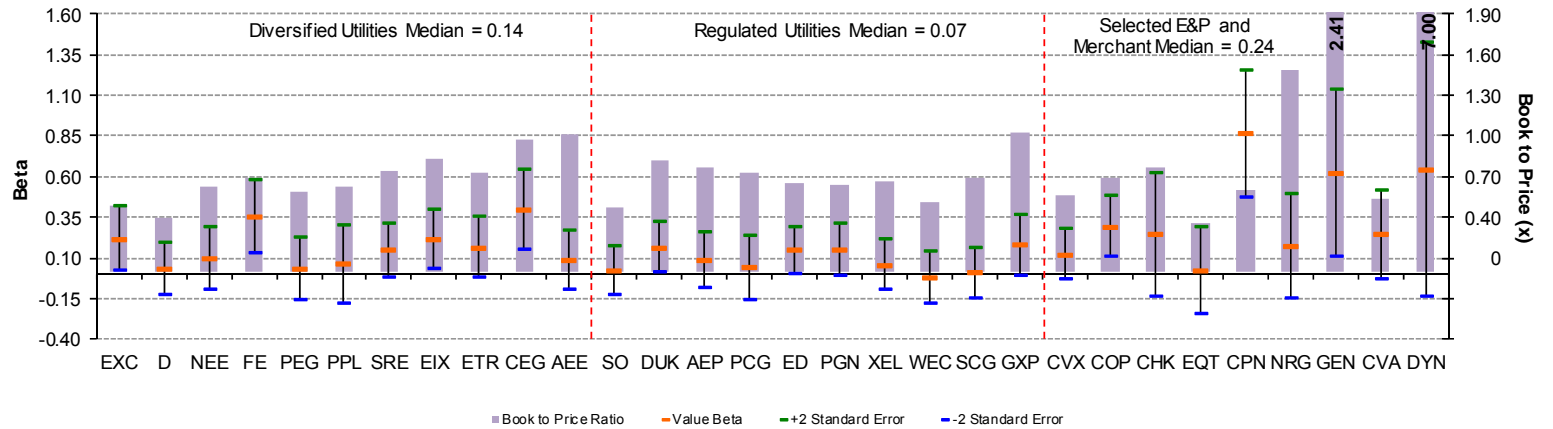
*Source: Bloomberg, Calculations by Ramirez & Co.*

# Cost of Equity: Current Utilities Industry Betas (Cont'd)

*Most momentum coefficients are statistically very close to zero.*

## Extended CAPM Autoregression Beta, Apr 09 – Dec 11

Diversified Utilities Median = 0.13    Regulated Utilities Median = 0.21    Selected E&P and Merchant Median = 0.42

Beta axis: 4.00, 3.00, 2.00, 1.00, 0.00, -1.00, -2.00, -3.00, -4.00

X-axis: EXC D NEE FE PEG PPL SRE EIX ETR CEG AEE SO DUK AEP PCG ED PGN XEL WEC SCG GXP CVX COP CHK EQT CPN NRG GEN CVA DYN

Legend: — Autoregression Beta    — +2 Standard Error    — -2 Standard Error

## Extended CAPM Moving Average Beta, Apr 09 – Dec 11

Diversified Utilities Median = -0.12    Regulated Utilities Median = -0.26    Selected E&P and Merchant Median = -0.46

Beta axis: 4.00, 3.00, 2.00, 1.00, 0.00, -1.00, -2.00, -3.00, -4.00

X-axis: EXC D NEE FE PEG PPL SRE EIX ETR CEG AEE SO DUK AEP PCG ED PGN XEL WEC SCG GXP CVX COP CHK EQT CPN NRG GEN CVA DYN

Legend: — Moving Average Beta    — +2 Standard Error    — -2 Standard Error

Note: d log Stock Price = $\beta_0 + \beta_1 *$ (d log S&P 500) + $\beta_2 *$ (d log Russell 1000 Value – d log Russell 1000 Growth) + $\beta_3 *$ (d log Russell 2000 – d log S&P 500) + $\beta_4 *$ (Autoregression) + $\beta_5 *$ (Moving Average) + $\varepsilon$

*Source: Bloomberg, Calculations by Ramirez & Co.*

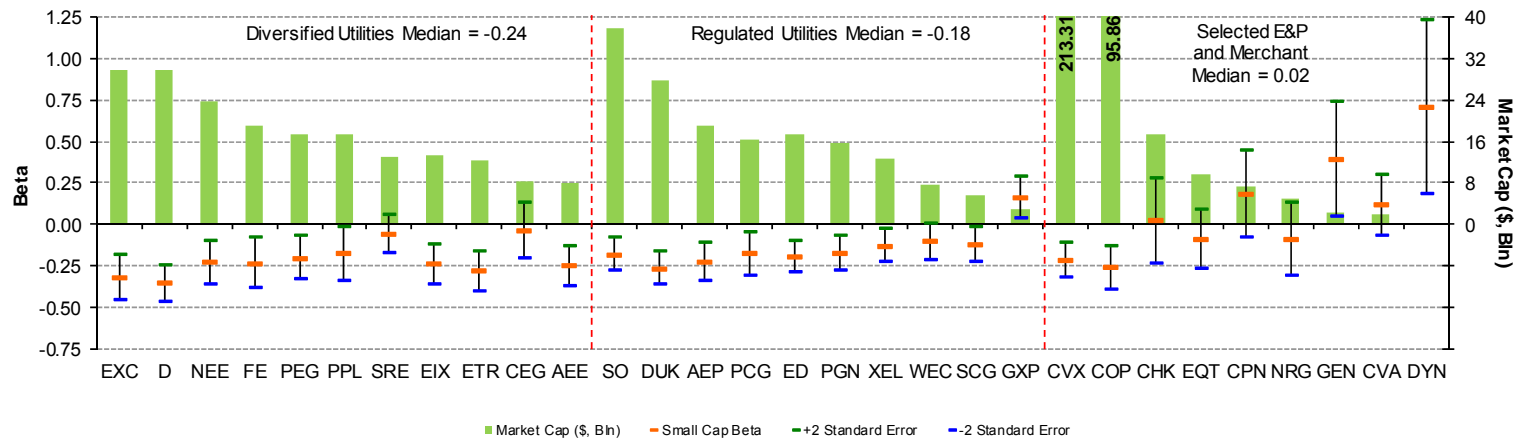# Cost of Equity: Current Technology Industry Betas

*The extended CAPM model seems to have slightly higher adjusted R-squareds.*
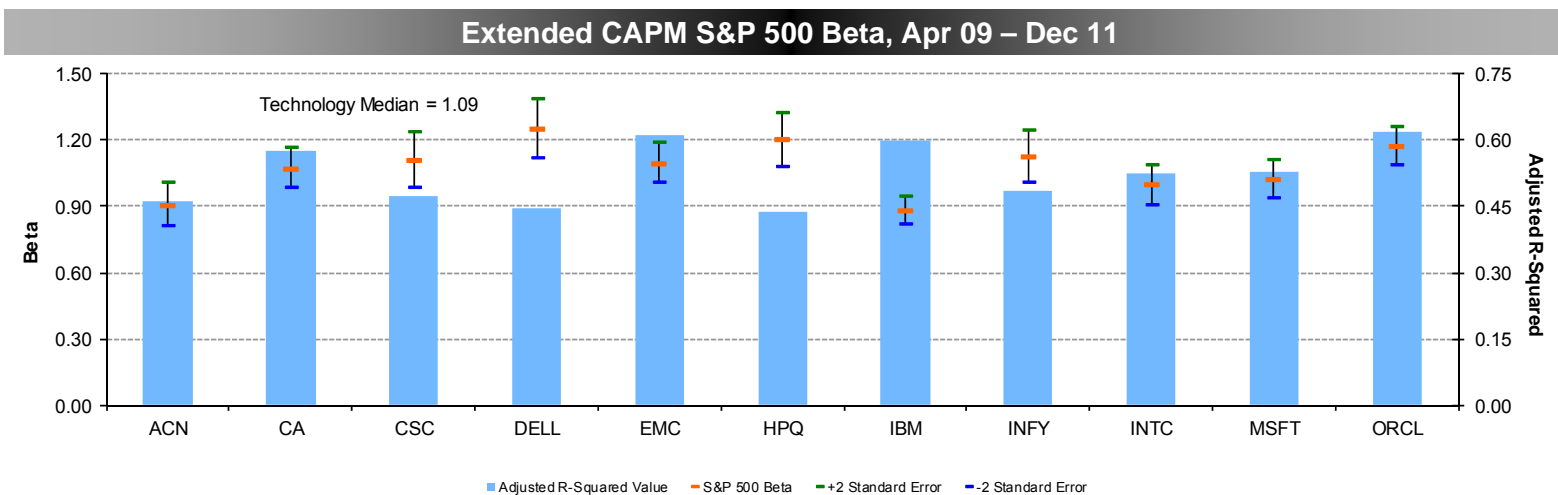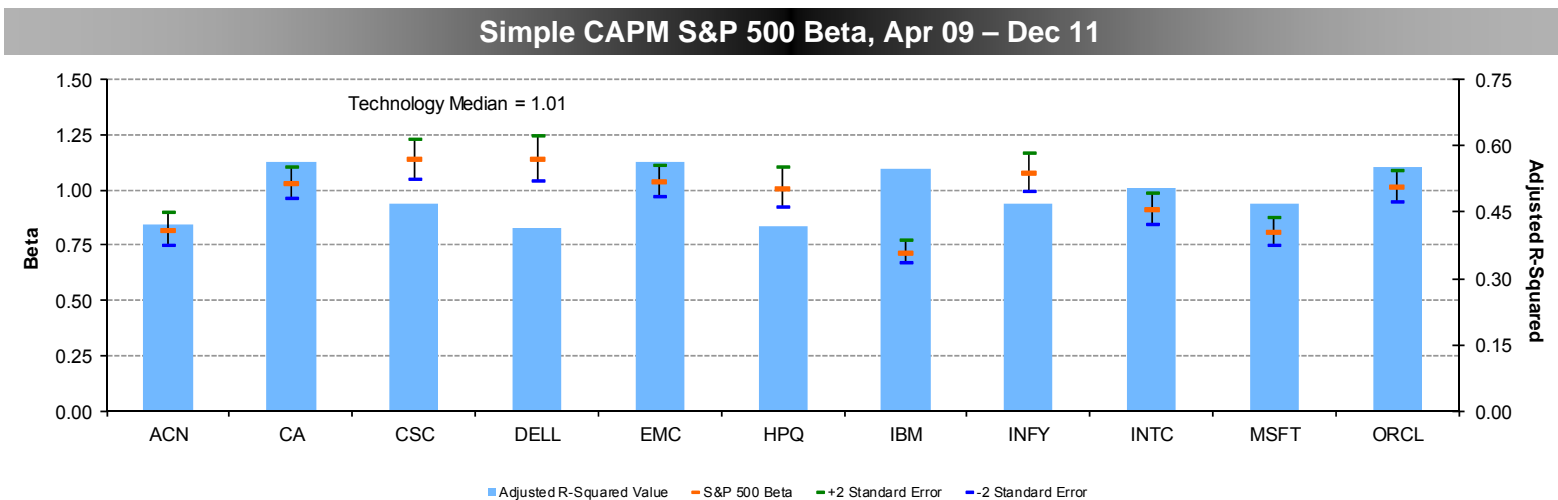


**Simple CAPM S&P 500 Beta, Apr 09 – Dec 11**

Technology Median = 1.01

■ Adjusted R-Squared Value    ― S&P 500 Beta    ― +2 Standard Error    ― -2 Standard Error



**Extended CAPM S&P 500 Beta, Apr 09 – Dec 11**

Technology Median = 1.09

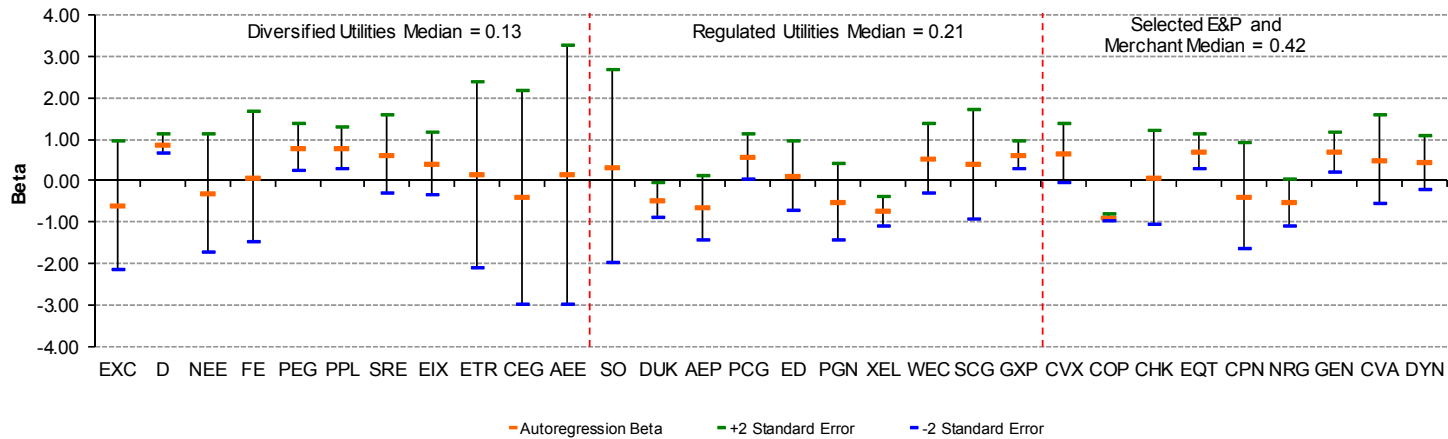■ Adjusted R-Squared Value    ― S&P 500 Beta    ― +2 Standard Error    ― -2 Standard Error

Note: d log Stock Price = $\beta_0 + \beta_1 * (d\ log\ S\&P\ 500) + \beta_2 * (d\ log\ Russell\ 1000\ Value - d\ log\ Russell\ 1000\ Growth) + \beta_3 * (d\ log\ Russell\ 2000 - d\ log\ S\&P\ 500) + \beta_4 * (Autoregression) + \beta_5 * (Moving\ Average) + \varepsilon$

*Source: Bloomberg, Calculations by Ramirez & Co.*

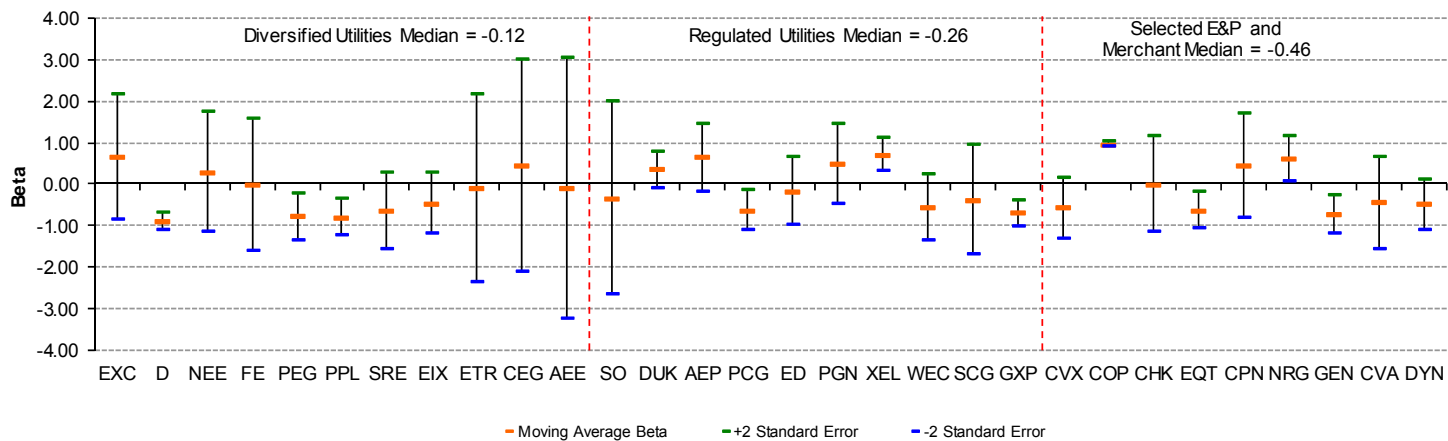# Cost of Equity: Current Technology Industry Betas (Cont'd)

*As expected, most technology companies trade like growth companies.*

*Moreover, IBM and Microsoft exhibit negative small-cap coefficients.*



**Extended CAPM Value Beta (Russell 1000 Value – Russell 1000 Growth), Apr 09 – Dec 11**

Technology Median = -0.77

Legend: Book to Price Ratio · Value Beta · +2 Standard Error · -2 Standard Error

**Extended CAPM Small Cap Beta (Russell 2000 – S&P 500), Apr 09 – Dec 11**

Technology Median = 0.06

Legend: Market Cap ($, Bln) · Small Cap Beta · +2 Standard Error · -2 Standard Error

Note: d log Stock Price = $\beta_0$ + $\beta_1$ * (d log S&P 500) + $\beta_2$ * (d log Russell 1000 Value – d log Russell 1000 Growth) + $\beta_3$ * (d log Russell 2000 – d log S&P 500) + $\beta_4$ * (Autoregression) + $\beta_5$ * (Moving Average) + $\varepsilon$
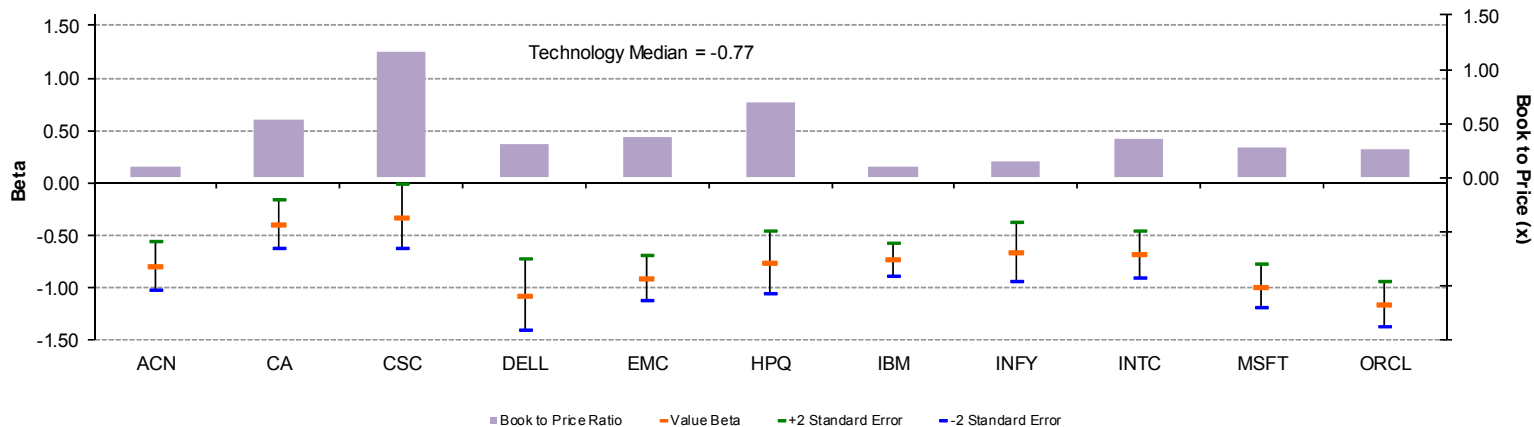
*Source: Bloomberg, Calculations by Ramirez & Co.*

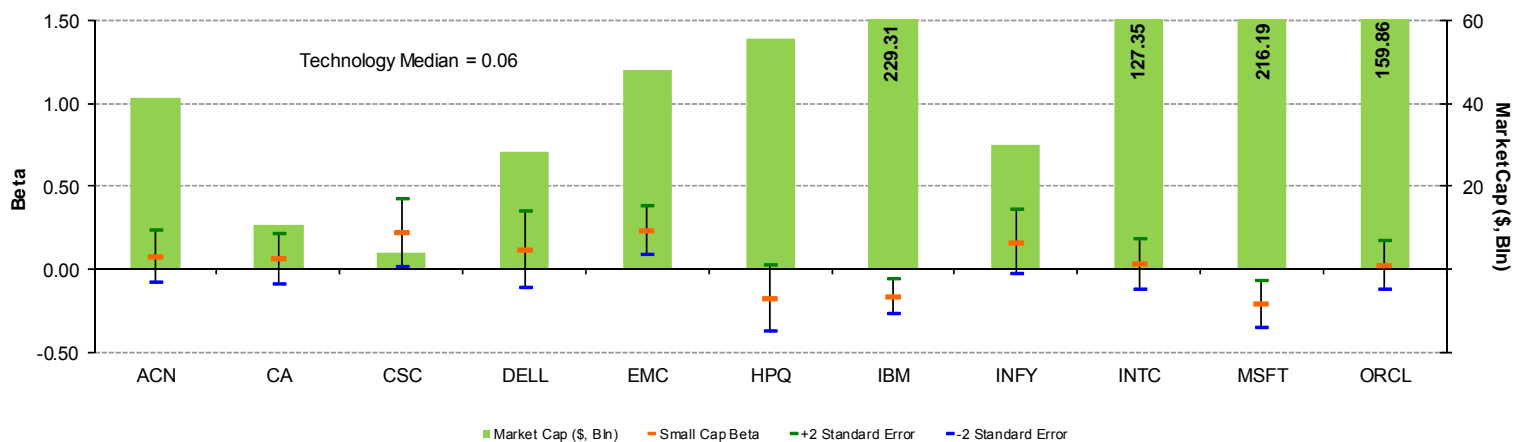# Cost of Equity: Current Technology Industry Betas (Cont'd)

*We find no evidence of momentum in large-cap technology stocks.*



**Extended CAPM Autoregression Beta, Apr 09 – Dec 11**

Technology Median = 0.19

Beta axis: 4.50, 3.00, 1.50, 0.00, -1.50, -3.00, -4.50

ACN, CA, CSC, DELL, EMC, HPQ, IBM, INFY, INTC, MSFT, ORCL

Autoregression Beta — +2 Standard Error — -2 Standard Error

**Extended CAPM Moving Average Beta, Apr 09 – Dec 11**

Technology Median = -0.28

Beta axis: 4.50, 3.00, 1.50, 0.00, -1.50, -3.00, -4.50

ACN, CA, CSC, DELL, EMC, HPQ, IBM, INFY, INTC, MSFT, ORCL

Moving Average Beta — +2 Standard Error — -2 Standard Error

Note: d log Stock Price = $\beta_0 + \beta_1$ * (d log S&P 500) + $\beta_2$ * (d log Russell 1000 Value – d log Russell 1000 Growth) + $\beta_3$ * (d log Russell 2000 – d log S&P 500) + $\beta_4$ * (Autoregression) + $\beta_5$ * (Moving Average) + $\varepsilon$

*Source: Bloomberg, Calculations by Ramirez & Co.*

# Cost of Equity: Current Media Industry Betas

*Statistically, the extended CAPM model does not seem to add much to the simple CAPM model.*



Simple CAPM S&P 500 Beta, Apr 09 – Dec 11

Media Median = 1.09

Adjusted R-Squared Value   S&P 500 Beta   +2 Standard Error   -2 Standard Error

Extended CAPM S&P 500 Beta, Apr 09 – Dec 11

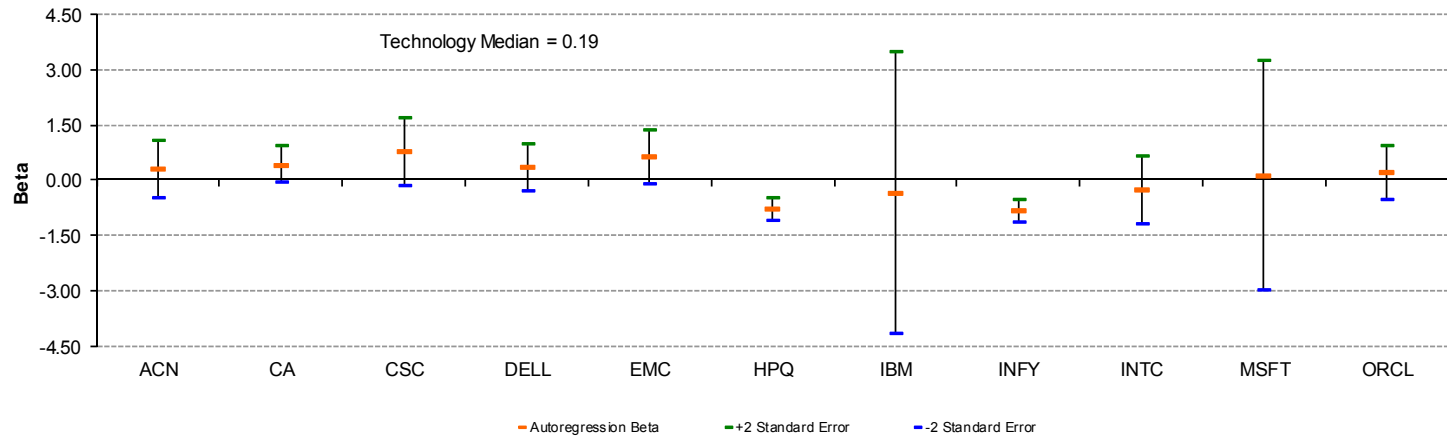Media Median = 1.08

Adjusted R-Squared Value   S&P 500 Beta   +2 Standard Error   Series3

Note: d log Stock Price = $\beta_0 + \beta_1 * (d \log S\&P\ 500) + \beta_2 * (d \log Russell\ 1000\ Value - d \log Russell\ 1000\ Growth) + \beta_3 * (d \log Russell\ 2000 - d \log S\&P\ 500) + \beta_4 * (Autoregression) + \beta_5 * (Moving\ Average) + \varepsilon$

# Cost of Equity: Current Media Industry Betas (Cont'd)

*We find virtually no evidence of value-growth, or small-large cap type behaviors in this set of media stocks.*



**Extended CAPM Value Beta (Russell 1000 Value – Russell 1000 Growth), Apr 09 – Dec 11**

Media Median = 0.09

Legend: Book to Price Ratio — Value Beta — +2 Standard Error — -2 Standard Error



**Extended CAPM Small Cap Beta (Russell 2000 – S&P 500), Apr 09 – Dec 11**

Media Median = 0.08

Legend: Market Cap ($, Bln) — Small Cap Beta — +2 Standard Error — -2 Standard Error

Note: d log Stock Price = $\beta_0 + \beta_1 * (d\log S\&P\ 500) + \beta_2 * (d\log Russell\ 1000\ Value - d\log Russell\ 1000\ Growth) + \beta_3 * (d\log Russell\ 2000 - d\log S\&P\ 500) + \beta_4 * (Autoregression) + \beta_5 * (Moving\ Average) + \varepsilon$
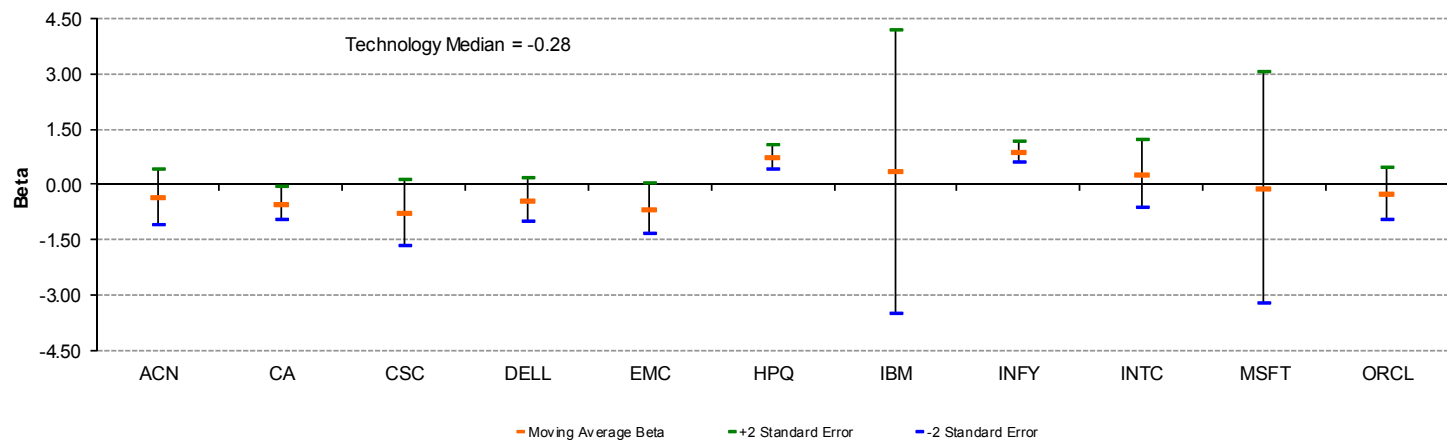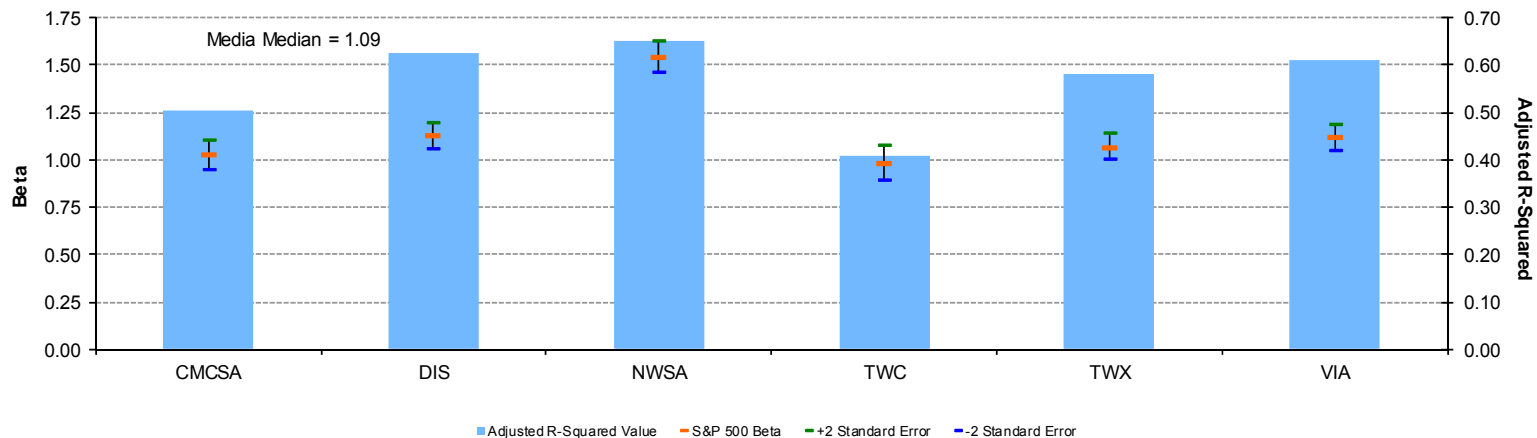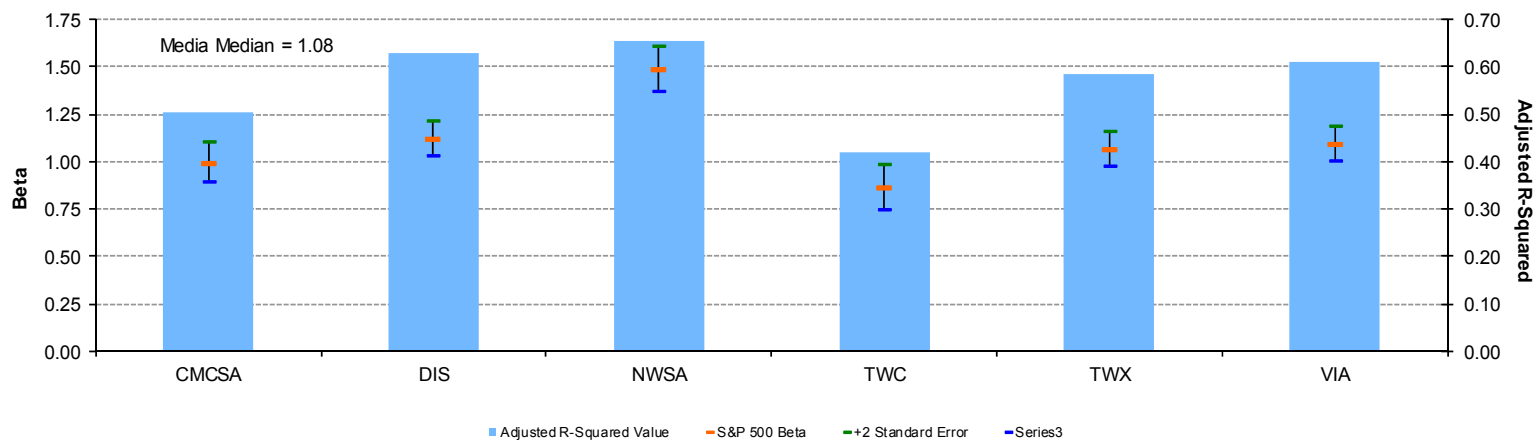
*Source: Bloomberg, Calculations by Ramirez & Co.*

# Cost of Equity: Current Media Industry Betas (Cont'd)

*We find some evidence of momentum-type behavior in this set of media stocks.*

*This observation warrants further research.*

**Extended CAPM Autoregression Beta, Apr 09 – Dec 11**

Media Median = 0.67

Beta

| 2.00 |
| 1.50 |
| 1.00 |
| 0.50 |
| 0.00 |
| -0.50 |
| -1.00 |
| -1.50 |
| -2.00 |

CMCSA    DIS    NWSA    TWC    TWX    VIA

■ Autoregression Beta    ■ +2 Standard Error    ■ -2 Standard Error

**Extended CAPM Moving Average Beta, Apr 09 – Dec 11**

Media Median = -0.68

Beta

| 2.00 |
| 1.50 |
| 1.00 |
| 0.50 |
| 0.00 |
| -0.50 |
| -1.00 |
| -1.50 |
| -2.00 |

CMCSA    DIS    NWSA    TWC    TWX    VIA

■ Moving Average Beta    ■ +2 Standard Error    ■ -2 Standard Error
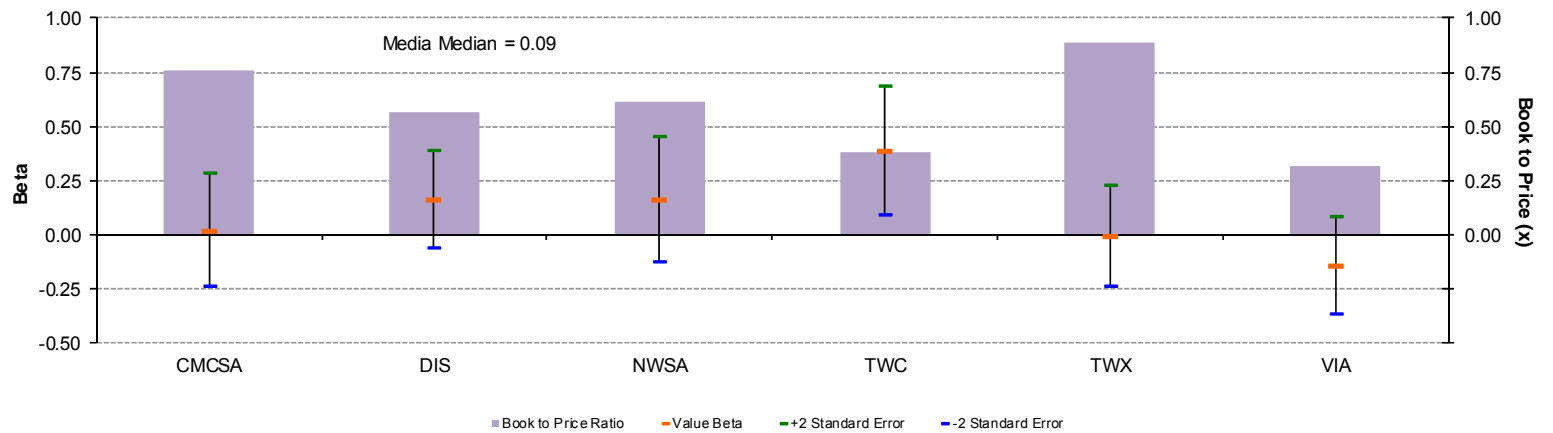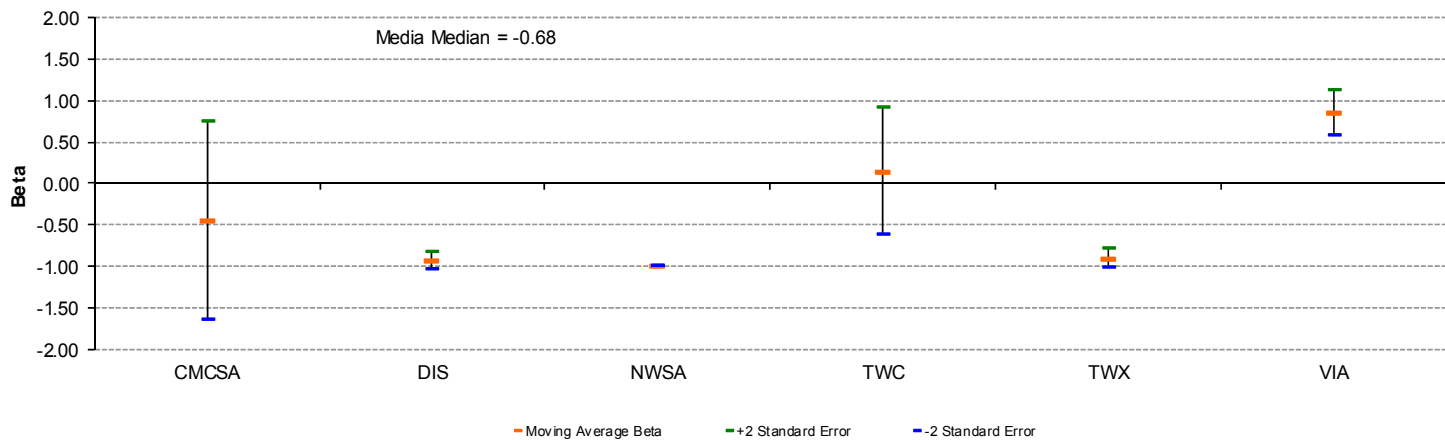
Note: d log Stock Price = $\beta_0 + \beta_1 * (d \log S\&P\ 500) + \beta_2 * (d \log Russell\ 1000\ Value - d \log Russell\ 1000\ Growth)$
$+ \beta_3 * (d \log Russell\ 2000 - d \log S\&P\ 500) + \beta_4 * (Autoregression) + \beta_5 * (Moving\ Average) + \varepsilon$
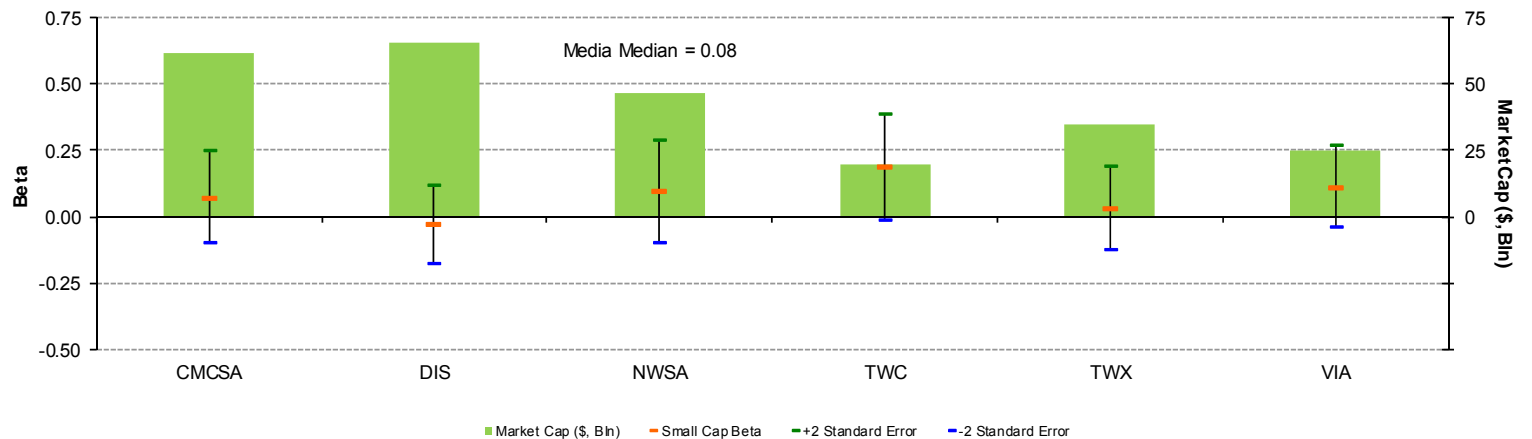
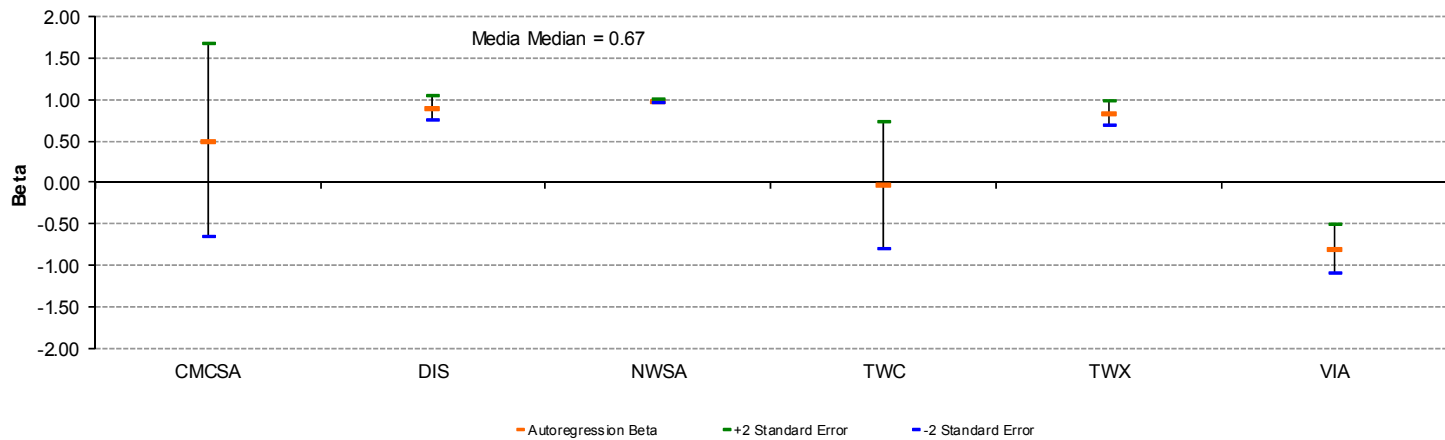*Source: Bloomberg, Calculations by Ramirez & Co.*

# Cost of Equity: Leverage vs. Beta



**2-Yr. Daily Betas, Jul 09 – Jul 11**

$y = 0.65x + 0.35$
$R^2 = 0.19$
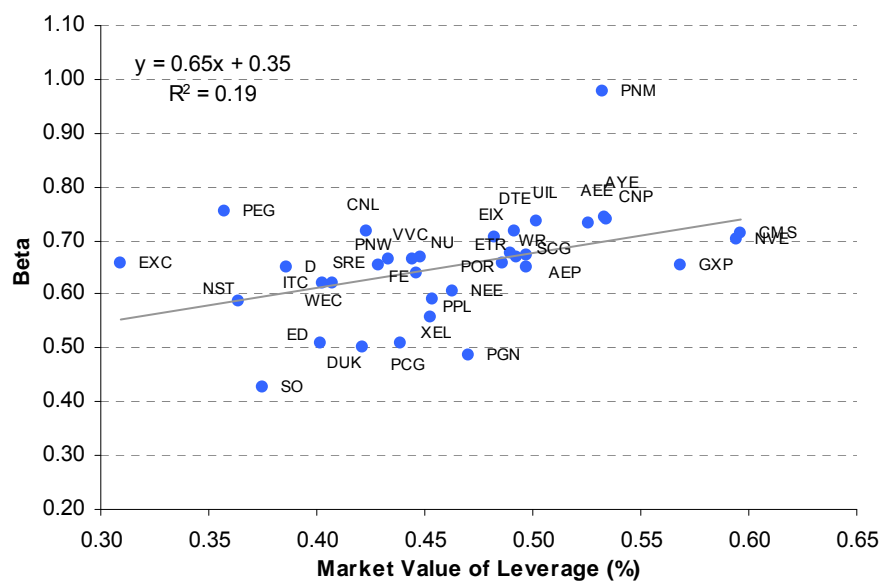
**5-Yr. Weekly Betas, Jul 06 – Jul 11**

$y = 0.97x + 0.26$
$R^2 = 0.18$
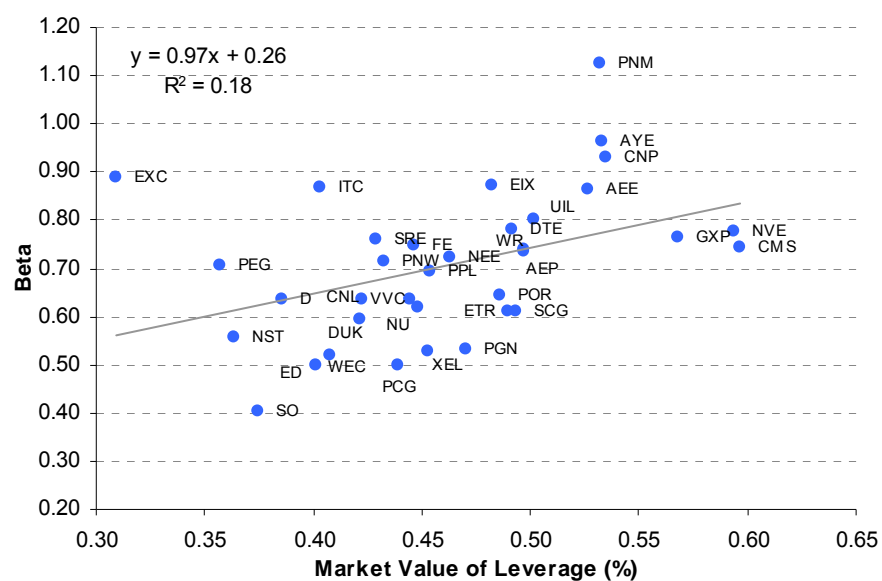
- **Using MVL as a measure of leverage shows that there is some correlation between levered beta and leverage in the utility space**

- **If MVL increases by 10%, Beta increases by approximately 6-10 bps**

- **The range of betas observed in the utility sector is relatively narrow, suggesting that companies optimize their capital structure based on equity beta, which is determined by the industry**

- **Results shown previously indicate that the percentage of unregulated business is also a significant determinant of the company's beta**

*Source: Bloomberg.*

# Cost of Equity: Unlevered Betas

## 2-Yr. Daily Unlevered Betas, Jul 09 – Jul 11

$y = -0.21x + 0.51$
$R^2 = 0.06$

Unlevered Beta (y-axis, 0.20 to 0.60)

Market Value of Leverage (%) (x-axis, 0.30 to 0.65)

Data points: PEG, PNM, EXC, CNL, UIL, DTE, D, PNW, NU, EIX, AYE, ITC, SRE, VVO, WR, AEE, CNP, NST, FE, POR, ETR, WEC, SCG, PPL, NEE, AEP, CMS, XEL, ED, NVE, DUK, PCG, GXP, SO, PGN
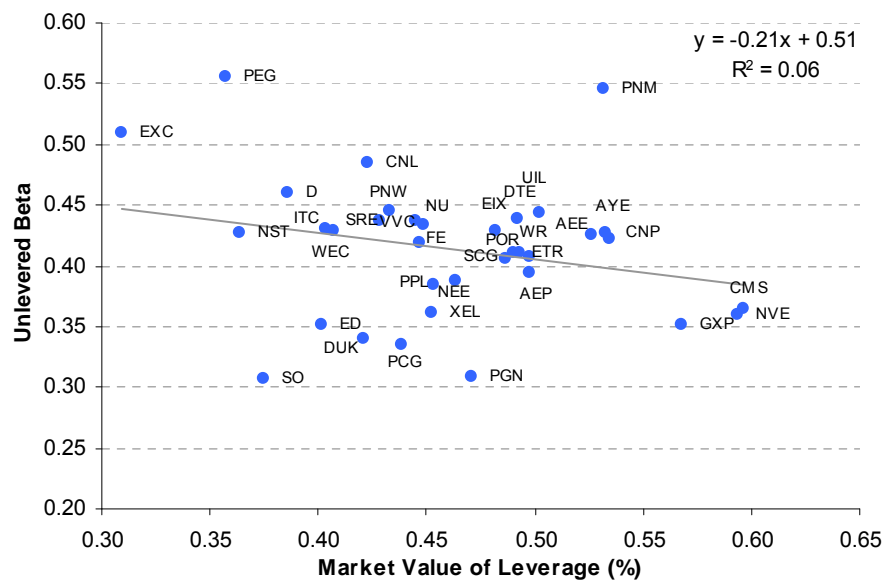
## 5-Yr. Weekly Unlevered Betas, Jul 06 – Jul 11

$y = -0.09x + 0.49$
$R^2 = 0.00$

Unlevered Beta (y-axis, 0.20 to 0.80)

Market Value of Leverage (%) (x-axis, 0.30 to 0.65)

Data points: EXC, PNM, ITC, AYE, CNP, PEG, SRE, EIX, UIL, AEE, PNW, FE, DTE, NEE, WR, D, CNL, VVO, AEP, GXP, NST, POR, NVE, DUK, NU, ETR, SCG, CMS, ED, WEC, XEL, PGN, PCG, SO
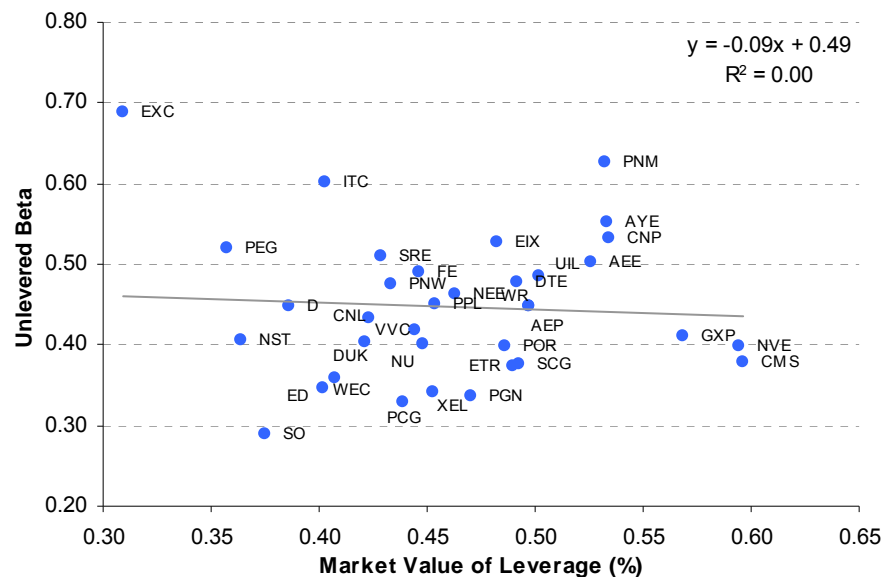
- ◆ **Unlevering 2-Yr. Utility sector Betas produces a negative coefficient, which suggests that calculating unlevered Beta slightly overestimates the expected effect of leverage on Beta**

- ◆ **Unlevering 5-Yr. Beta produces coefficient of roughly zero**

*Source: Bloomberg.*

# Cost of Equity: Equity Market Risk Premium

## S&P 500 P/Es and 30-Yr. TIPS Rate, Sep 07 – Jan 12



Legend: Trailing P/E, Current Year P/E, Next Year P/E, Median Trailing P/E, Median Current Year P/E, Median Next Year P/E, 30Y TIPS

## Equity Market Risk Premium Sensitivity

| P/E=12 | Real Rate | | | | |
| --- | --- | --- | --- | --- | --- |
| | 2.0% | 2.5% | 3.0% | 3.5% | 4.0% |
| Real Growth 3.0% | 9.3% | 8.8% | 8.3% | 7.8% | 7.3% |
| 3.5% | 9.8% | 9.3% | 8.8% | 8.3% | 7.8% |
| 4.0% | 10.3% | 9.8% | 9.3% | 8.8% | 8.3% |
| 4.5% | 10.8% | 10.3% | 9.8% | 9.3% | 8.8% |
| 5.0% | 11.3% | 10.8% | 10.3% | 9.8% | 9.3% |

| P/E=14 | Real Rate | | | | |
| --- | --- | --- | --- | --- | --- |
| | 2.0% | 2.5% | 3.0% | 3.5% | 4.0% |
| Real Growth 3.0% | 8.1% | 7.6% | 7.1% | 6.6% | 6.1% |
| 3.5% | 8.6% | 8.1% | 7.6% | 7.1% | 6.6% |
| 4.0% | 9.1% | 8.6% | 8.1% | 7.6% | 7.1% |
| 4.5% | 9.6% | 9.1% | 8.6% | 8.1% | 7.6% |
| 5.0% | 10.1% | 9.6% | 9.1% | 8.6% | 8.1% |

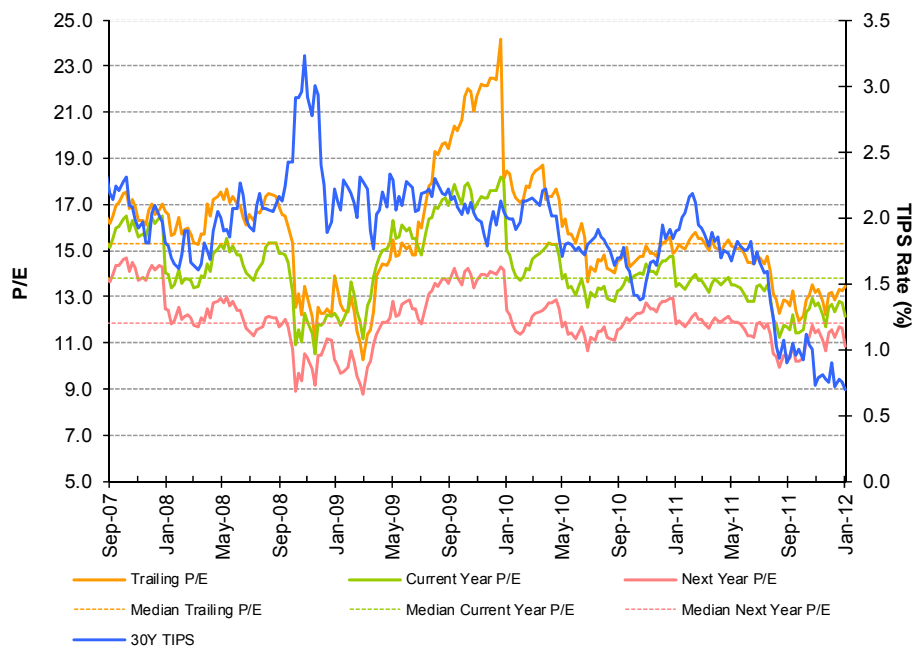| P/E=16 | Real Rate | | | | |
| --- | --- | --- | --- | --- | --- |
| | 2.0% | 2.5% | 3.0% | 3.5% | 4.0% |
| Real Growth 3.0% | 7.3% | 6.8% | 6.3% | 5.8% | 5.3% |
| 3.5% | 7.8% | 7.3% | 6.8% | 6.3% | 5.8% |
| 4.0% | 8.3% | 7.8% | 7.3% | 6.8% | 6.3% |
| 4.5% | 8.8% | 8.3% | 7.8% | 7.3% | 6.8% |
| 5.0% | 9.3% | 8.8% | 8.3% | 7.8% | 7.3% |

- Currently, equity market risk premium is high from a historical perspective due to low P/E and low real rate of interest

- $(P/E) = (1)/(k_e - g)$ ➜ $EMRP = (E/P) + g - r_f$

- That is the Equity Market Risk Premium (EMRP) equals the earnings yield plus the growth rate minus the risk free rate.

*Source: Bloomberg.*

# Earnings Growth for S&P 500 Companies



Notes: Data are yearly. Nominal earnings are market-cap weighted actual earnings per share for S&P 500 companies.
Real earnings are nominal earnings deflated by the consumer price index.

Source: Bloomberg.

# S&P 500 P/E Ratios

## Trailing P/E: Jan 1954 – Dec 2011

Mean: 16.36x
Median: 16.64x
Standard Deviation: 4.93x
Skewness: 0.30x
Kurtosis: -0.14x

December 2011: 13.25x
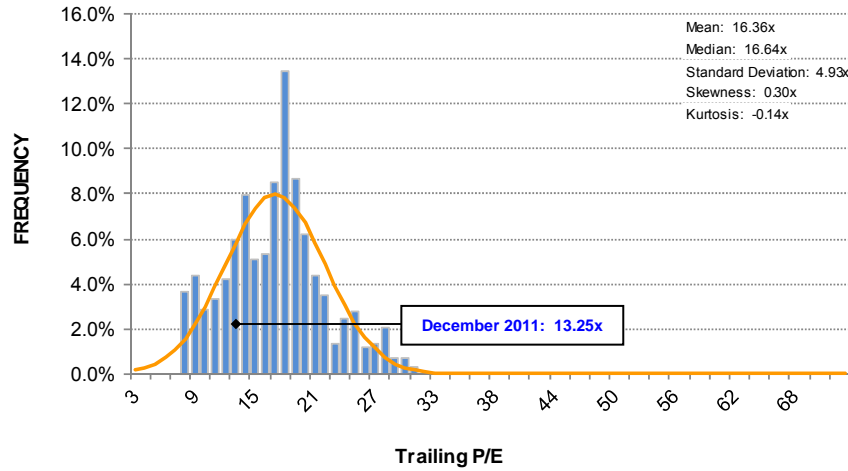
## Current P/E: Jan 2006 – Dec 2011

Mean: 14.58x
Median: 14.77x
Standard Deviation: 1.49x
Skewness: 0.00x
Kurtosis: -0.54x

December 2011: 12.73x
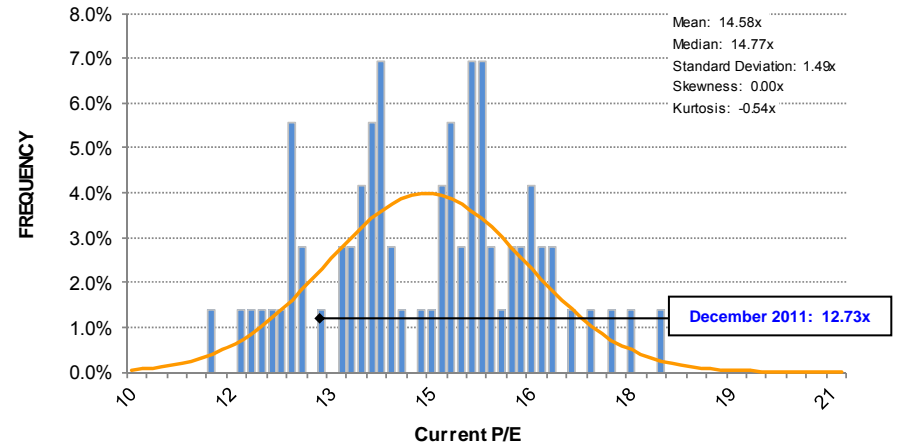
## Next Year P/E: Jan 2006 – Dec 2011

Mean: 12.62x
Median: 12.45x
Standard Deviation: 1.34x
Skewness: -0.24x
Kurtosis: -0.78x

December 2011: 11.60x
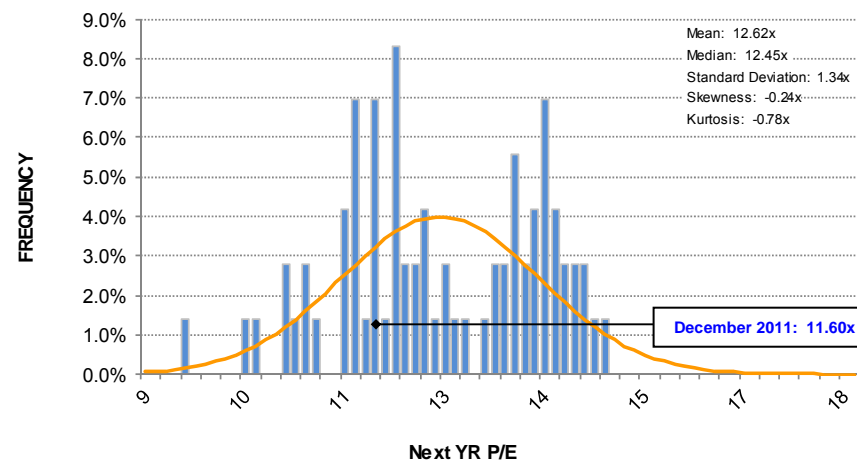
*Source: Bloomberg.*

# Cyclically and Non-Cyclically Adjusted P/E Ratios vs. Long-Term Interest Rates

## Non-Cyclically Adjusted P/E Ratio: Jan 1871 – Aug 2011

Mean: 15.50x
Median: 14.43x
Standard Deviation: 8.52x
Skewness: 6.59x
Kurtosis: 68.33x

**August 2011: 13.50x**

FREQUENCY

Non-Cyclically Adjusted P/E
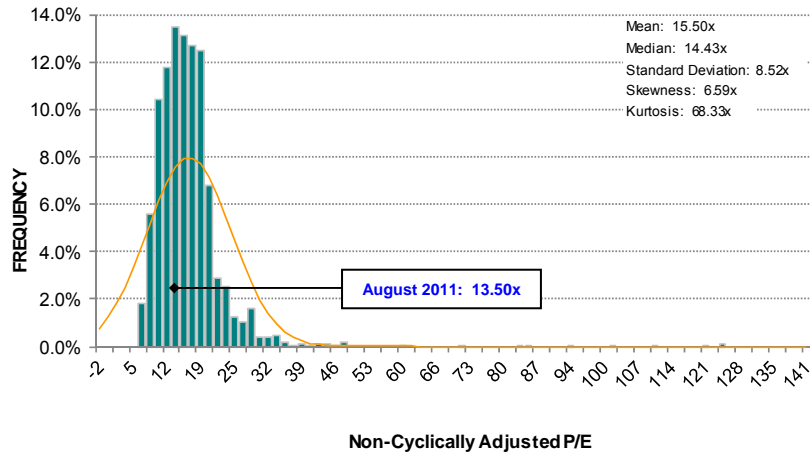
## Cyclically Adjusted P/E Ratio: Jan 1881 – Aug 2011

Mean: 16.43x
Median: 15.81x
Standard Deviation: 6.59x
Skewness: 122x
Kurtosis: 2.66x

**August 2011: 19.78x**

FREQUENCY

Cyclically Adjusted P/E
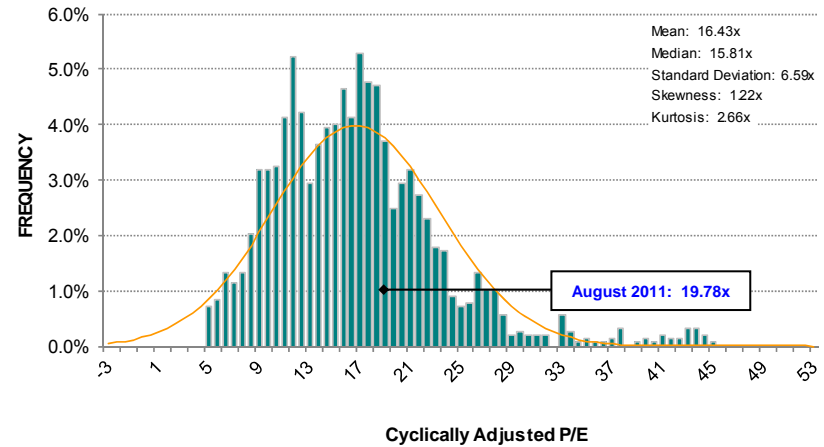
## P/E Ratio vs. LT-Interest Rates

Non-Adjusted P/E — Cyclically Adjusted P/E — LT Interest Rate

P/E Ratio

LT Interest Rates
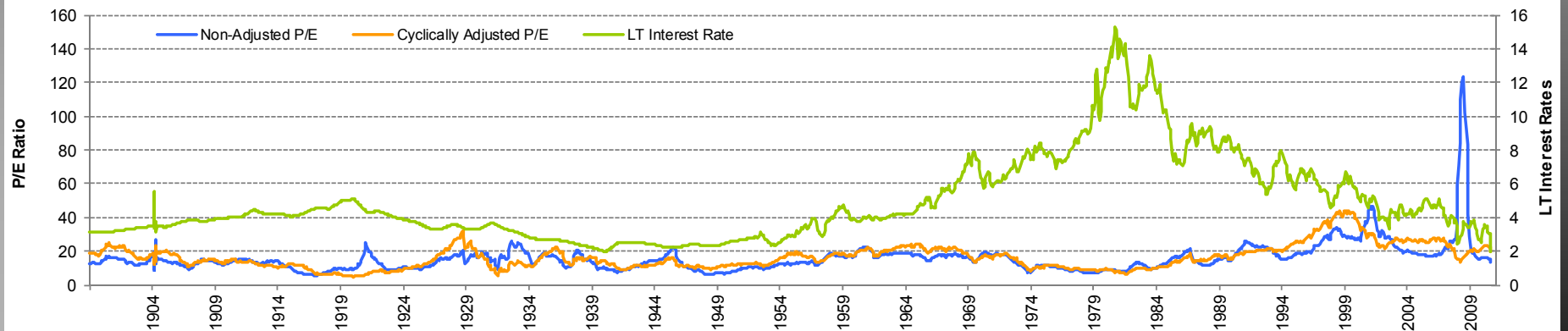
*Source: Robert Shiller, NBER.*

# How Firms Calculate the Cost of Capital

## Cost of Equity Capital Method



Percentage of CFOs who Always or Almost Always Use a Given Method
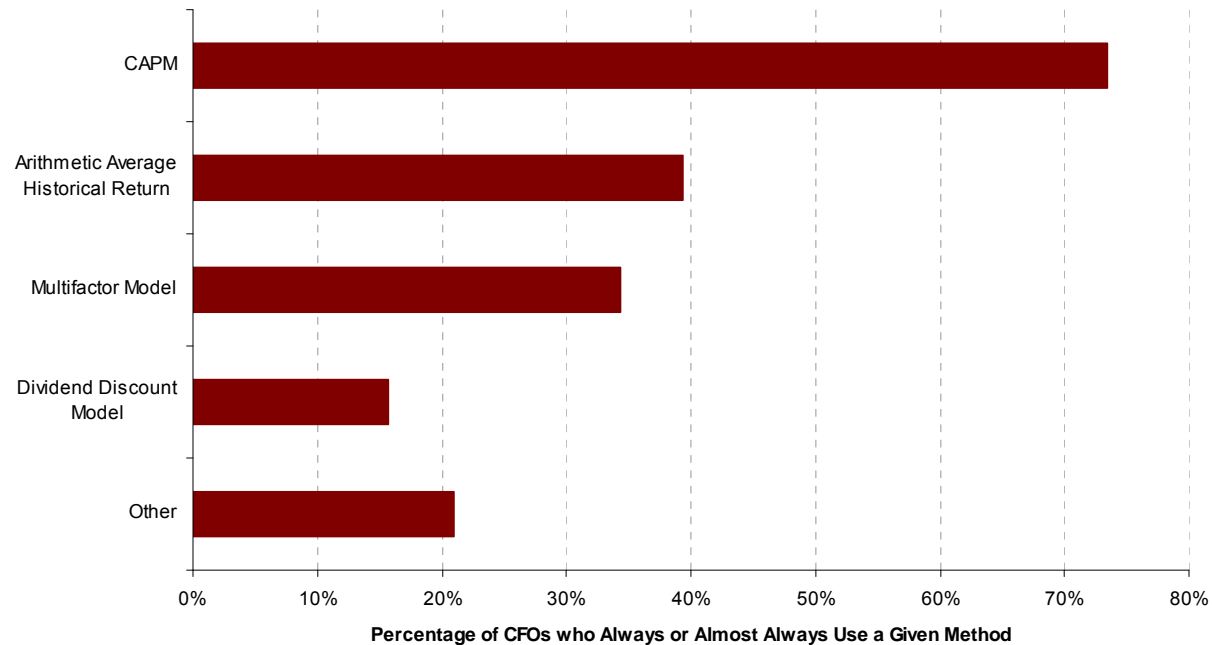
◆ **According to the study compiled by J. R. Graham and C. R. Harvey, majority of CFOs prefer to use the capital asset pricing model to estimate cost of equity attributable to a particular company**

# Firms' Leverage Policies

## Debt-Equity Ratio Policies
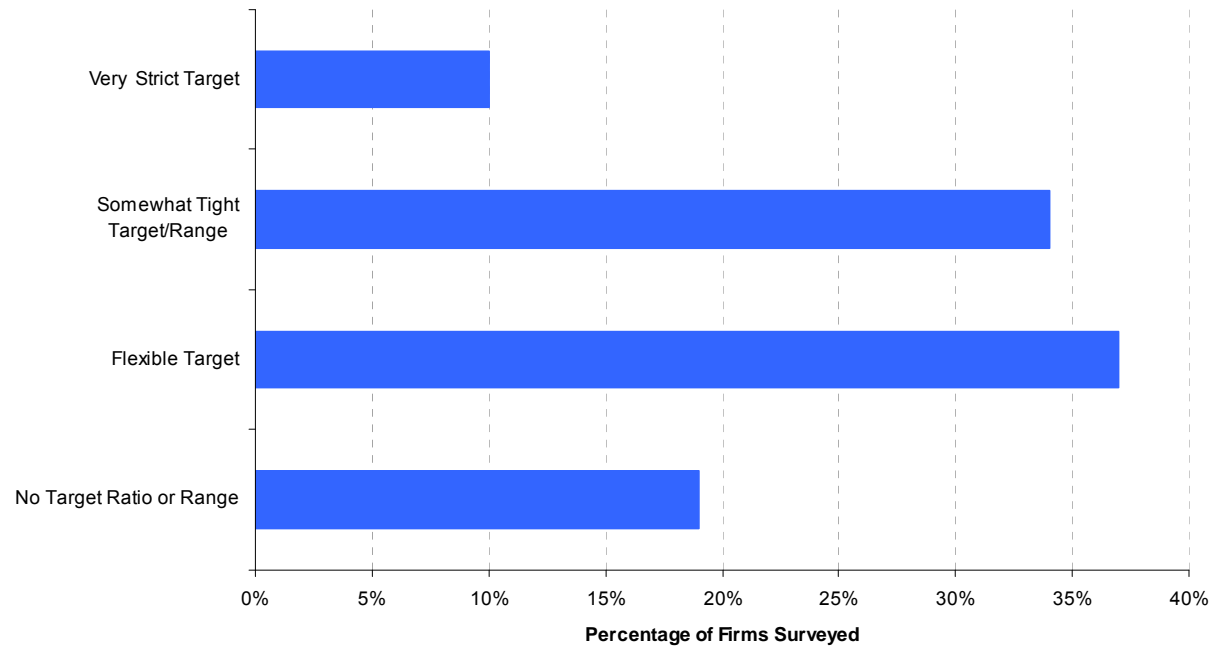


- **The same study also concludes that most firms do not implement stringent guidelines with regards to their leverage metrics**

*Source: J. R. Graham and C. R. Harvey, "The Theory and Practice of Corporate Finance: Evidence from the Field," Journal of Financial Economics 60 (2001): 187–243.*

# Valuation by Triangulation

*Composite overview of various valuation methods shows that the enterprise value of the target company will likely be between $30 and $40 billion.*

**Target Company Valuation**

**Deal Comps Multiples**

| | EV / Revenue (x) | $29,322.5 | $68,867.7 |
| | EV / EBITDA (x) | $29,483.7 | $66,523.2 |
| | EV / EBIT (x) | $22,514.2 | $43,058.4 |
| | Equity / Net Income (x) | $26,507.8 | $40,258.2 |
| | Equity / Book Value (x) | $24,533.9 | $42,323.9 |

**Trading Comps Multiples**

| | EV / EBITDA (x) | $31,143.1 | $44,517.6 |
| | Equity / Book Value (x) | $26,657.3 | $36,157.3 |
| | Price / EPS (x) | $30,336.7 | $35,420.3 |
| | NPV | $26,854.8 | $34,258.1 |

**Enterprise Value ($ Mil)**

x-axis: $0  $10,000  $20,000  $30,000  $40,000  $50,000  $60,000  $70,000

**Deal Comps Multiples**

| | Min. | Max. |
|---|---|---|
| EV / Revenue (x) | 2.1x | 4.9x |
| EV / EBITDA (x) | 7.2x | 16.2x |
| EV / EBIT (x) | 10.4x | 19.8x |
| Equity / Net Income (x) | 12.7x | 25.8x |
| Equity / Book Value (x) | 1.0x | 2.6x |

**Trading Comps Multiples**

| | Min. | Max. |
|---|---|---|
| EV / EBITDA (x) | 6.6x | 9.5x |
| Equity / Book Value (x) | 1.2x | 2.0x |
| Price / EPS (x) | 12.3x | 16.0x |

*Note: Ranges are based on minimum and maximum values observed in each respective analysis.*

# Valuation by Triangulation

**Target Company Valuation**

**Price / Book**

| | |
|---|---|
| SO | 2.0 |
| ED | 1.4 |
| PGN | 1.4 |
| EIX | 1.2 |
| SRE | 1.4 |
| XEL | 1.4 |
| NU | 1.6 |
| SCG | 1.4 |
| Median | 1.4 |
| PCG | 1.5 |

**EV/ Est. EBITDA 2011Y**

| | |
|---|---|
| SO | 9.5 |
| ED | 8.4 |
| PGN | 8.7 |
| EIX | 6.6 |
| SRE | 7.6 |
| XEL | 7.9 |
| NU | 8.9 |
| SCG | 8.6 |
| Median | 8.5 |
| PCG | 7.5 |

**Est. P/E 2011Y**

| | |
|---|---|
| SO | 16.0 |
| ED | 15.0 |
| PGN | 15.3 |
| EIX | 13.8 |
| SRE | 12.3 |
| XEL | 14.0 |
| NU | 15.1 |
| SCG | 13.0 |
| Median | 14.5 |
| PCG | 12.0 |

**LT Est. EPS Growth (%)**

| | |
|---|---|
| SO | 5.3% |
| ED | 3.4% |
| PGN | 4.4% |
| EIX | 2.8% |
| SRE | 6.7% |
| XEL | 5.4% |
| NU | 7.9% |
| SCG | 4.2% |
| Median | 4.8% |
| PCG | 6.1% |
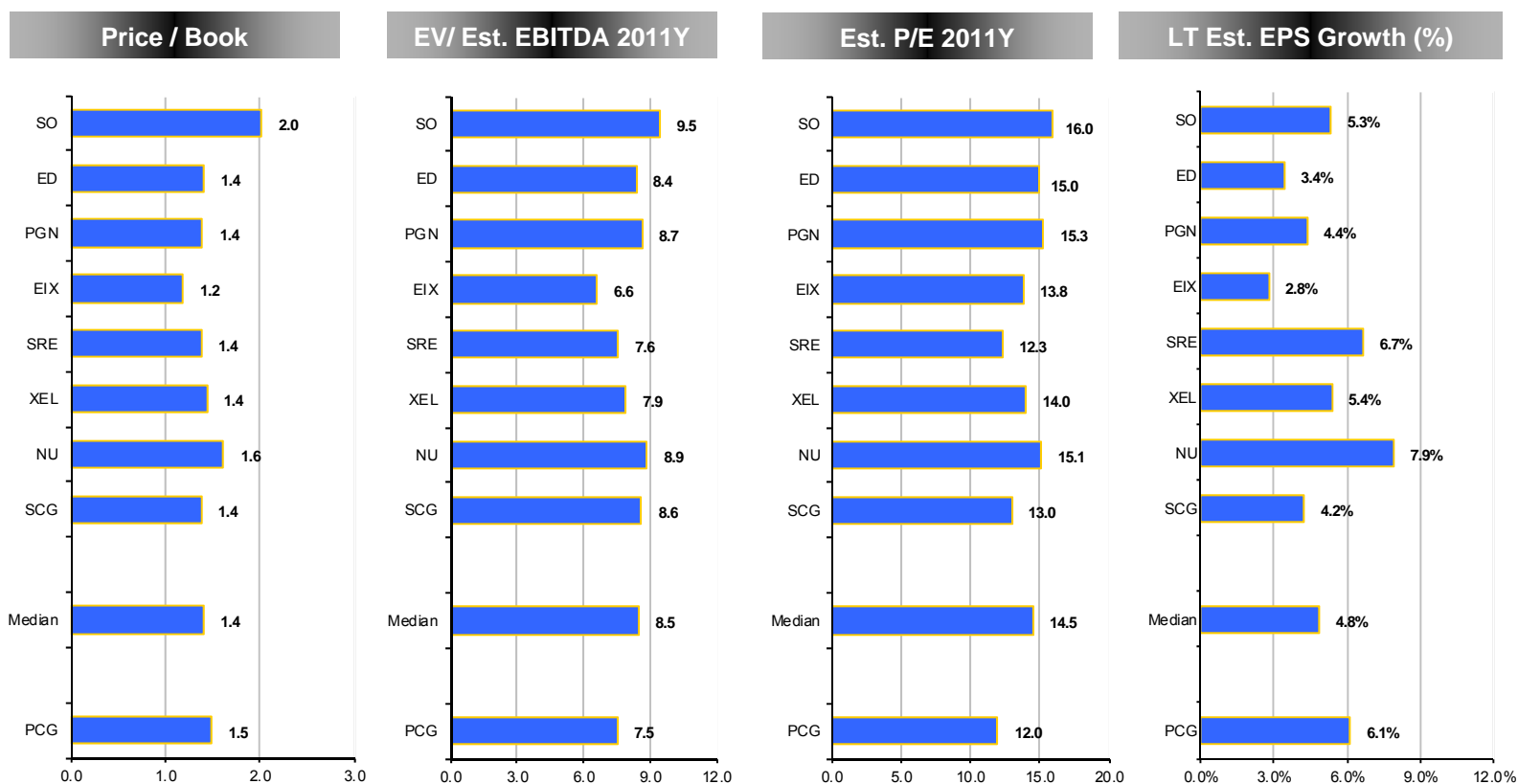
*Source: Robert Shiller, NBER.*

# Utility Sector Valuation Trends

## Price / Book Value vs. Est. FY11 ROE



$y = 0.15x - 0.02$
$R^2 = 0.61$
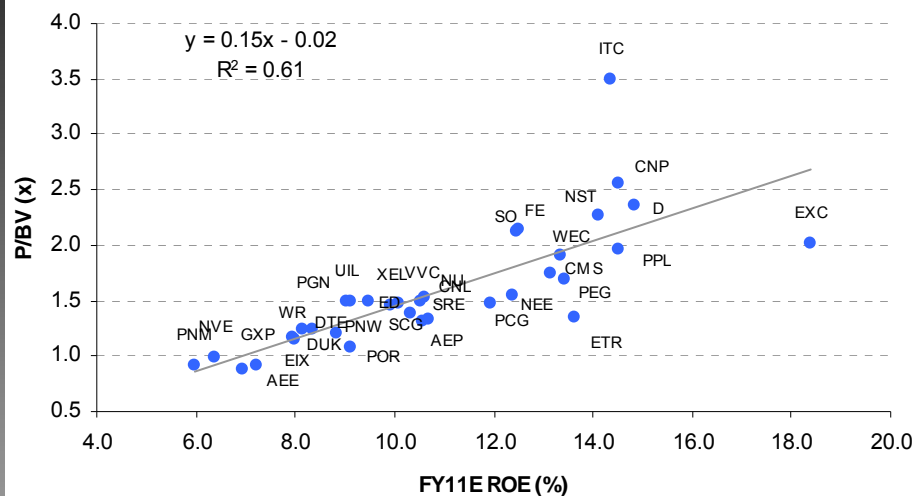
## FY11 Est. P/E vs. Est. LT EPS Growth



$y = 0.42x + 11.88$
$R^2 = 0.38$

## FY11 Est. P/E vs. Est. ST EPS Growth



$y = 0.14x + 13.28$
$R^2 = 0.44$
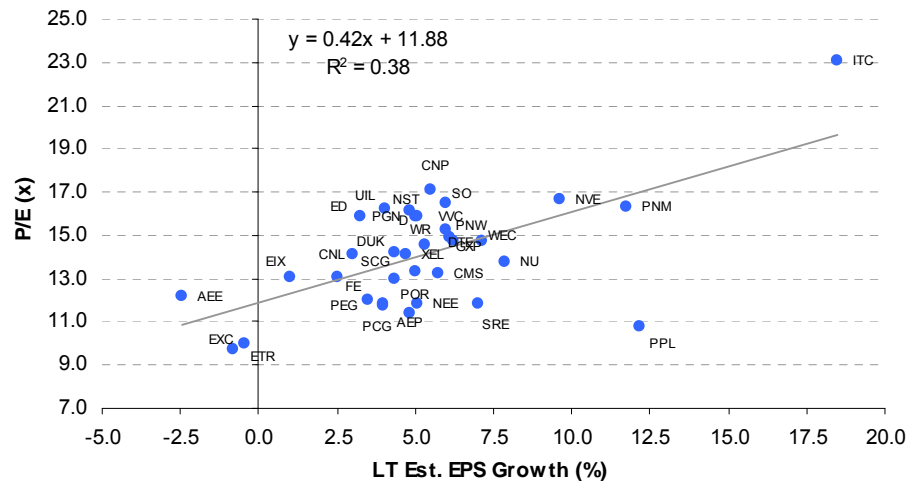
- ◆ **Companies in the utility sector show a high $R^2$ between ROEs and P/BV multiples as well as between EPS growth estimates and P/Es**
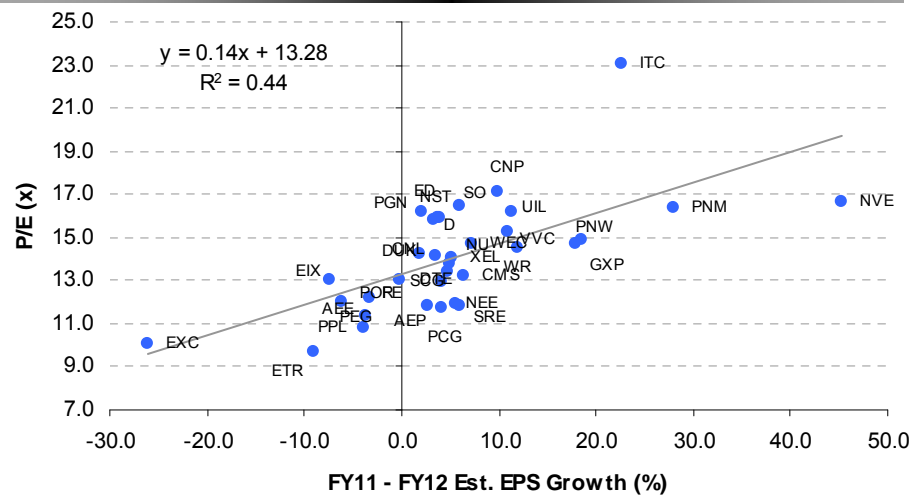
*Source: Bloomberg.*

# Utility M&A Stock Price Reactions

*Since 2005, utility companies whose acquisition announcements were followed by negative rating agency actions, saw their shares perform relatively poorly post acquisition announcement.*

## Selected Utility M&A Transactions, Jan 05 – Sep 11

| Acquiror Name | Target Name | Announcement Date | Enterprise Value ($ Mil) | % Cash | Acquiror Ratings Action (Moody's / S&P) | | | Total Acquiror Stock Return (Market Adjusted, %) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Action | Ratings Before | Ratings After | (-1,+1) | (-1,+30) | (-1,+90) | (-1,+180) |
| Exelon Corp. | Constellation Energy Group Inc. | 4/27/2011 | 10,598.1 | - | Outlook Neg. / None | Baa1 / BBB | Baa1 *- / BBB | 0.78 | -0.81 | 5.02 | n.a. |
| AES Corp. | DPL Inc. | 4/21/2011 | 4,662.3 | 100.0 | Outlook Pos. / Outlook Neg. | B1/BB | B1 *+ / BB *- | 0.83 | -5.06 | -7.62 | n.a. |
| Duke Energy Corp. | Progress Energy Inc. | 1/10/2011 | 25,711.3 | - | None / None | Baa2 / A- | Baa2 / A- | -0.43 | 0.21 | 2.55 | 1.01 |
| Exelon Generation Co LLC | John Deere Renewables LLC | 8/31/2010 | 900.0 | 100.0 | None / None | A3 / BBB | A3 / BBB | 0.19 | 1.74 | -2.93 | -1.44 |
| NRG Energy Inc. | Dynergy Corp. - Power Plants | 8/13/2010 | 1,360.0 | 100.0 | Outlook Neg. / None | Ba3 / BB- | Ba3 *- / BB- | -2.60 | -5.60 | -16.12 | -13.96 |
| NRG Energy Inc. | Cottonwood Generating Station | 8/13/2010 | 525.0 | 100.0 | Outlook Neg. / None | Ba3 / BB- | Ba3 *- / BB- | -2.60 | -5.60 | -16.12 | -13.96 |
| Constellation Energy Group Inc. | Boston Generating LLC - Power Plants | 8/9/2010 | 1,100.0 | 100.0 | None / None | Baa3 / BBB- | Baa3 / BBB- | -1.71 | 0.56 | -3.83 | 2.74 |
| UIL Holdings Corp. | Southern Connecticut Gas | 5/25/2010 | 1,296.0 | 74.5 | None / None | Baa3 / BBB | Baa3 / BBB | -9.37 | -5.86 | -8.17 | 2.84 |
| PPL Corp. | E.ON US LLC | 4/28/2010 | 7,625.0 | 87.9 | Downgrade / Outlook Pos. | Baa2 / BBB | Baa3 / BBB *+ | -10.96 | -2.82 | -4.16 | -10.14 |
| New Development Holdings LLC | Conectiv Energy Inc. | 4/21/2010 | 1,630.0 | 100.0 | Upgrade / None | B2' / B | B1' / B | 6.89 | 10.19 | 9.73 | -6.73 |
| RRI Energy Inc. | Mirant Corp. | 4/11/2010 | 2,082.4 | - | None / Outlook Pos. | B2 / B | B2 / B *+ | 14.34 | 1.73 | 3.51 | -11.81 |
| Public Service Co. of Colorado | Calpine Corp - Power Plants | 4/5/2010 | 739.0 | 100.0 | None / None | Baa1 / BBB+ | Baa1 / BBB+ | 0.62 | 1.48 | 3.18 | 4.36 |
| FirstEnergy Corp. | Allegheny Energy Inc. | 2/11/2010 | 8,943.9 | - | None / Downgrade | Baa3 / BBB | Baa3 / BBB | -5.51 | -8.65 | -17.69 | -18.70 |
| Nevada Power Co. | Reliant Energy Inc. - Power Plant | 4/22/2008 | 500.0 | 100.0 | None / None | Ba2 / BB- | Ba2 / BB- | 5.25 | 2.79 | -3.15 | -10.27 |
| Consumers Energy Co. | LS Power Group - Power Plant | 5/25/2007 | 517.0 | 100.0 | None / None | Baa3' / BBB- | Baa3' / BBB- | -0.46 | -1.90 | -5.52 | -8.08 |
| Great Plains Energy Inc. | Aquila Inc. | 2/7/2007 | 2,766.7 | 24.9 | None / Outlook Neg. | Baa2' / BBB | Baa2' / BBB *- | -1.30 | -3.87 | -10.14 | -15.65 |
| ITC Midwest LLC | Interstate Power & Light Co. - Assets | 1/19/2007 | 750.0 | 100.0 | None / None | Baa3 / BBB | Baa3 / BBB | 11.54 | 8.91 | -4.23 | -0.48 |
| FPL Energy Inc. | Wisconsin Elec. Power Co. - Power Plant | 12/20/2006 | 924.0 | 100.0 | None / None | A2 / A | A2 / A | 0.16 | 2.12 | 3.81 | 1.60 |
| AES Corp. | Termoelectrica del Golfo | 11/6/2006 | 615.0 | 15.4 | None / None | B1 / BB- | B1 / BB- | 1.13 | 1.92 | -8.11 | -18.20 |
| Dynegy Inc. | LS Power Group. | 9/15/2006 | 2,333.4 | 4.3 | None / None | NR / B | NR / B | 6.29 | -2.64 | 12.05 | 34.41 |
| WPS Resources Corp. | Peoples Energy Corp. | 7/6/2006 | 2,450.0 | - | Outlook Neg. / Outlook Neg. | Aa3 / A+ | Aa3 *- / A+ *- | -4.68 | -1.25 | -4.65 | -3.16 |
| ITC Holdings Corp. | Michigan Electric Transmission | 5/12/2006 | 888.5 | 56.1 | None / Outlook Neg. | Baa3' / BBB | Baa3' / BBB *- | 2.97 | 4.26 | 15.97 | 28.21 |
| NRG Energy Inc. | Texas Genco Holdings Inc. | 10/2/2005 | 8,608.0 | 51.1 | None / None | B1 / B+ | B1 / B+ | 12.95 | 2.70 | 16.09 | 12.72 |
| WPS Resources Corp. | Aquila Inc - Natural Gas Distribution | 9/21/2005 | 557.5 | 100.0 | None / Outlook Neg. | Aa3 / A+ | Aa3 / A+ *- | -0.25 | -1.27 | 0.45 | -8.60 |
| Duke Energy Corp. | Cinergy Corp. | 5/9/2005 | 14,137.8 | - | None / Outlook Neg. | NR / BBB | NR / BBB *- | -4.67 | -5.42 | -8.57 | -13.74 |
| | | | | | **Mean (Negative Action)** | | | **-2.54** | **-3.28** | **-5.78** | **-7.74** |
| | | | | | **Median (Negative Action)** | | | **-2.60** | **-3.87** | **-7.62** | **-13.74** |
| | | | | | **Mean (No Negative Action)** | | | **3.38** | **1.71** | **1.07** | **0.19** |
| | | | | | **Median (No Negative Action)** | | | **0.87** | **1.73** | **-0.19** | **0.26** |
| | | | | | **Mean (All)** | | | **0.78** | **-0.49** | **-1.95** | **-2.91** |
| | | | | | **Median (All)** | | | **0.16** | **-0.81** | **-3.83** | **-6.73** |

*Note: Gray lines indicate M&A announcements accompanied by negative rating agency actions.*
*' Denotes senior unsecured ratings as per Moody's.*
*Table only includes transactions > $500 million.*
*Total returns are calculated against the S&P 500 Utilities Index.*

*Source: Bloomberg & Thomson Financial.*

# Tracking the M&A Spread in a Target's Stock Price

*Post acquisition announcement, target company's shares converge towards the implied acquisition exchange rate; however, this process is not immediate.*


EXC & CEG, Announced 04/27/11
— CEG  — EXC*0.93  — Spread (RA)
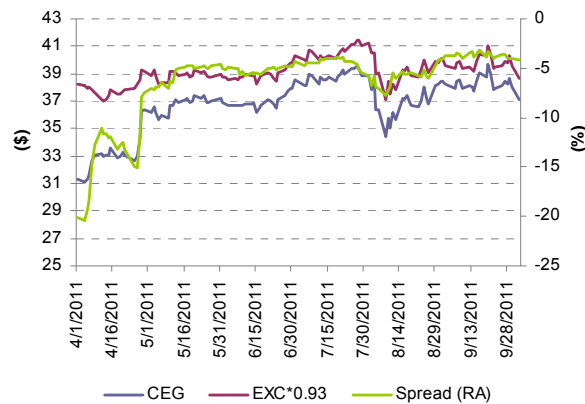

AES & DPL, Announced 04/20/11
— DPL  — $30 Cash  — Spread (RA)
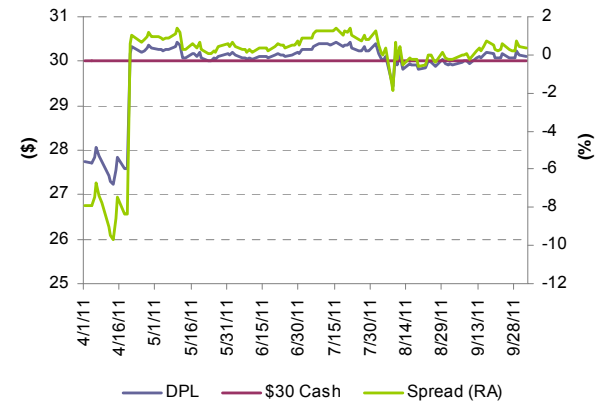

PGN & DUK, Announced 01/10/11
— PGN  — DUK*2.6125  — Spread (RA)


AYE & FE, Announced 02/11/10
— AYE  — FE*0.667  — Spread (RA)

# Conglomerate Discounts: Unlocking Hidden Value

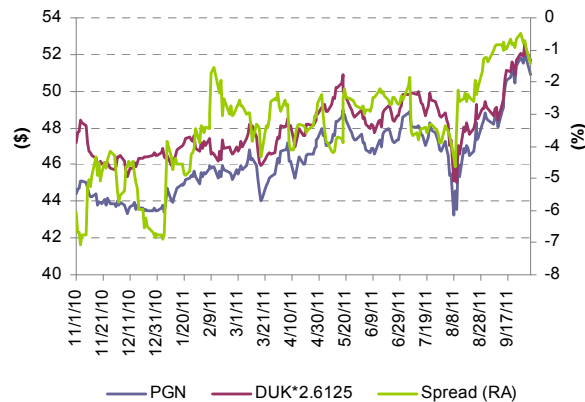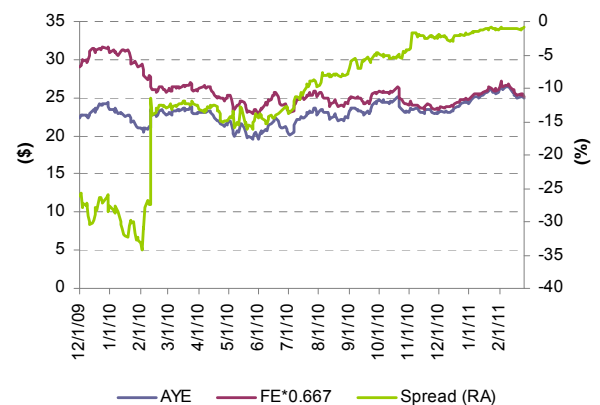➤ Diversified conglomerates appear to trade at discounts relative to more focused firms

  o *Conglomerates have both benefits and costs, where theoretical reasoning alone cannot predict whether conglomerates create or destroy value*

  o *Theoretically, conglomeration should allow firms better access to capital, increased debt capacity, lower average taxes and the opportunity to leverage managerial talent*

  o *However, empirically, diversified conglomerates appear to have lower trading multiples than focused firms and this difference cannot be explained by firm size or industry*

  o *Some believe the discount is a result of diversified firms having difficultly in providing executive incentives, not addressing investor segmentation, cross-subsidizing poorly performing segments and not realizing a takeover premium for subsidiaries*

  o *Others contend that diversification itself does not cause the discount but is correlated with the underlying factors*

➤ Spin-offs and equity carve-outs are two transactions that can help diversified firms become more focused and potentially reduce any valuation discount resulting from diversification

  o *Equity carve-outs allow the parent to establish a market price for its subsidiaries and monetize a portion of its investment while retaining majority control*

  o *Spin-offs allow the parent to complete a separation from a subsidiary*

➤ Subsequent to spin-offs and equity carve-outs, companies tend to out-perform the broader market

  o *However, there is substantial variation in subsequent performance with some firms experiencing very strong or weak returns, suggesting that understanding when to engage in refocusing transactions is of critical importance*

➤ Moreover, there are key similarities and differences between firms that employ spin-offs and equity carve-outs

  o *Similarities include:*

    ▪ Overall activity of both appear positively correlated with M&A activity

    ▪ These transactions are popular across a wide range of industries

    ▪ A similar fraction of spin-offs and equity carve-outs are later acquired by other companies

  o *Notable differences:*

    ▪ After a spin-off the operating performance of both the parent and the subsidiary appear to remain relatively stable

    ▪ Subsidiaries that are carved out experience declines in operating performance the year after they are carved out, while the parent firms experience modest increases in operating performance

# Distribution of Equity Carve-Outs and Spin-Offs

*Spin-offs tend to have larger sizes while carve-outs have higher valuations.*

## Summary Financials

### Spin-Offs
($ in millions)

|  | Mean | 25th Percentile | Median | 75th Percentile |
|---|---|---|---|---|
| Market Value of Sub | $1,432 | $256 | $790 | $1,676 |
| Assets | $2,085 | $314 | $776 | $1,761 |
| Sales | $2,113 | $281 | $781 | $1,803 |
| EBITDA | $320 | $38 | $141 | $280 |
| Market to Book | 4.3x | 1.0x | 1.7x | 3.7x |
| ROA | 22.9% | 9.8% | 17.0% | 27.2% |
| % of Parent | 30.3% | 6.8% | 19.2% | 49.6% |

### Equity Carve-Outs
($ in millions)

|  | Mean | 25th Percentile | Median | 75th Percentile |
|---|---|---|---|---|
| Market Value of Carve-Out Offer | $895 | $104 | $296 | $888 |
| Assets | $4,279 | $90 | $327 | $3,358 |
| Sales | $2,348 | $64 | $259 | $1,295 |
| EBITDA | $339 | $6 | $93 | $284 |
| Market to Book | 10.7x | 1.0x | 2.7x | 9.1x |
| ROA | 59.4% | 9.4% | 17.8% | 41.0% |
| % of Parent | 38.6% | 8.0% | 19.6% | 51.7% |

Source: SDC, Factset as of Q2 2005.

Note:   Sample set includes 104 spin-offs from 1996 to Q2 2005, valued at at least $75 mm at the time of spin-off and 125 carve-out transactions from 1997 to Q2 2005, with the market value of the carve-out offer valued at at-least $20 mm. Market-to-book statistics exclude negative values and values exceeding 100.

# Parent Returns Following Spin-off Announcement

## Selected Spin-off Announcements

| Announce Date | Name | Spun-Off Company Name | Total Returns vs. S&P 500 Index (%) | |
|---|---|---|---|---|
| | | | (-1,+1) | (-1,+30) |
| 4-Aug-2011 | Kraft Foods Inc | North American grocery business | 6.493 | na |
| 28-Jul-2011 | L-3 Communications Holdings Inc | Engility Corp | 0.957 | na |
| 14-Jul-2011 | ConocoPhillips | ConocoPhillips Refining and Marketing Business | 2.833 | -0.363 |
| 24-May-2011 | El Paso Corp | EP Energy Corp | 10.979 | 6.164 |
| 7-Apr-2011 | Expedia Inc | Tripadvisor Holdings LLC | 13.092 | 20.417 |
| 15-Mar-2011 | Northrop Grumman Corp | Huntington Ingalls Industries Inc | 0.963 | -0.198 |
| 14-Feb-2011 | Marriott International Inc/DE | Marriott Vacations Worldwide Corp | 0.636 | -12.971 |
| 28-Jan-2011 | Sara Lee Corp | International Coffee and Tea business | -2.768 | -3.377 |
| 13-Jan-2011 | Marathon Oil Corp | Marathon Petroleum Corp | 4.514 | 17.560 |
| 12-Jan-2011 | ITT Corp | Xylem Inc | 11.898 | 5.799 |
| 12-Jan-2011 | ITT Corp | ITT Exelis | 11.898 | 5.799 |
| 16-Dec-2010 | Cablevision Systems Corp | AMC Networks Inc | -2.062 | -5.235 |
| 8-Dec-2010 | Fortune Brands Inc | Fortune Brands Home & Security LLC | 1.827 | -4.984 |
| 30-Jul-2009 | Cablevision Systems Corp | Madison Square Garden Co/The | 6.859 | 21.933 |
| 28-May-2009 | Time Warner Inc | AOL Inc | -1.111 | 5.241 |
| 29-Sep-2008 | Cardinal Health Inc | CareFusion Corp | 3.002 | 5.592 |
| 9-Sep-2008 | Discovery Communications Inc | Ascent Capital Group Inc | na | -7.210 |
| 21-May-2008 | Time Warner Inc | Time Warner Cable Inc | 3.614 | 0.954 |
| 26-Mar-2008 | Motorola Solutions Inc | Motorola Mobility Holdings Inc | -0.677 | -1.816 |
| 13-Feb-2008 | Fidelity National Information Services Inc | Lender Processing Services Inc | -4.691 | -8.003 |
| 29-Oct-2007 | FMC Technologies Inc | John Bean Technologies Corp | -7.221 | -9.163 |
| 29-Aug-2007 | Altria Group Inc | Philip Morris International Inc | -1.536 | -6.882 |
| | **Median** | | **1.827** | **-0.280** |
| | **Average** | | **2.833** | **1.463** |

*Source: Bloomberg.*

# Parent and Sub Returns Following Carve-Out Announcement

## Selected Carve-out Announcements

| Announc. Date | Filing Date | IPO Date | Issuer | Offer Price | Proceeds ($ mil) | Parent Company | % of Company Carve-Out | Current Ownership % | Ramirez Particip. | Total Return Parent (Market Adjusted, %) | | Total Return Subsidiary (Market Adjusted, %) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Announc. (-1, +1) | Filing (-1, +1) | Pricing (+1) | Pricing (+30) |
| 6/15/2010 | 3/23/2011 | 07/20/2011 | Suncoke Energy Inc. | 16.00 | 185.60 | Sunoco Inc. | 16.6 | 80.9 | ✔ | 6.35 | 0.26 | 4.94 | 2.25 |
| 5/8/2008 | 11/5/2009 | 03/31/2010 | Primerica Inc. | 15.00 | 320.40 | Citigroup Inc. | 59.0 | 23.1 | ✔ | -2.11 | 0.06 | 30.58 | 56.89 |
| 3/16/2008 | 9/15/2008 | 02/10/2009 | Mead Johnson Nutrition Co. | 24.00 | 720.00 | Bristol-Myers Squibb Co. | 15.0 | 0.0 | ✔ | 0.01 | -0.46 | 14.24 | 27.24 |
| 2/7/2007 | 4/26/2007 | 08/13/2007 | VMware Inc. | 29.00 | 957.00 | EMC Corp. | 13.0 | 29.8 | | 6.73 | -0.56 | 77.70 | 165.93 |
| 1/26/2006 | 3/21/2006 | 11/15/2006 | KBR Inc. | 17.00 | 473.28 | Halliburton Co. | 17.0 | 0.0 | | 4.24 | 0.74 | 21.56 | 36.79 |
| 9/20/2005 | 10/25/2005 | 01/25/2006 | Chipotle Mexican Grill Inc. | 22.00 | 173.33 | McDonald's Corp. | 31.0 | 0.0 | ✔ | -2.77 | -1.78 | 99.44 | 110.12 |
| 8/8/2005 | 8/10/2005 | 11/10/2005 | Clear Channel Outdoor Hldg Inc. | 18.00 | 630.00 | Clear Channel Commun Inc. | 10.0 | 90.0 | ✔ | 1.23 | 0.31 | 1.88 | 3.30 |
| 3/13/2005 | 3/14/2005 | 06/28/2005 | DSW Inc. | 19.00 | 267.19 | Retail Ventures Inc. | 33.8 | 0.0 | | 25.12 | 22.73 | 26.04 | 33.23 |
| 11/23/2004 | 11/23/2004 | 02/15/2005 | Wright Express Corp. | 18.00 | 720.00 | Cendant Corp. | 100.0 | 0.0 | | 1.08 | 0.06 | -5.37 | -2.53 |
| 12/16/2003 | 12/17/2003 | 07/15/2004 | Freescale Semiconductor Inc. | 13.00 | 1,581.08 | Motorola Inc. | 30.4 | 0.0 | ✔ | -1.34 | -0.81 | 8.75 | 2.43 |
| 11/18/2003 | 1/20/2004 | 05/24/2004 | Genworth Financial Inc. | 19.50 | 2,827.50 | General Electric Co. | 34.0 | 0.0 | ✔ | 2.81 | 0.81 | -1.78 | 8.11 |
| 9/24/2003 | 10/24/2003 | 02/04/2004 | Assurant Inc. | 22.00 | 1,760.00 | Fortis SA/NV. | 65.0 | 0.0 | | 0.95 | 0.52 | 12.91 | 12.73 |
| 1/22/2002 | 4/25/2002 | 07/01/2002 | CIT Group Inc. | 23.00 | 4,600.00 | Tyco International Ltd. | 100.0 | 0.0 | ✔ | -5.95 | -21.64 | -0.15 | 5.29 |
| 8/22/2001 | 8/24/2001 | 02/12/2002 | GameStop Corp. | 18.00 | 325.00 | Barnes & Noble Inc. | 33.4 | 0.0 | | 3.24 | 2.17 | -44.79 | -46.08 |
| 10/30/2000 | 2/20/2001 | 06/13/2001 | FMC Technologies Inc. | 20.00 | 44.20 | FMC Corp. | 17.0 | 0.0 | | 4.10 | 2.14 | -71.05 | -74.74 |
| 6/26/2000 | 3/16/2001 | 06/12/2001 | Kraft Foods Inc. | 31.00 | 1,357.61 | Philip Morris Cos Inc. | 16.1 | 0.0 | ✔ | 1.48 | 0.00 | 1.80 | 3.25 |
| | | | Mean | | | | | | | 2.82 | 0.29 | 11.04 | 21.51 |
| | | | Median | | | | | | | 1.35 | 0.16 | 6.85 | 6.70 |

- ◆ **On average, equity carve-out announcements are well received by the market**

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