



Finance and Economics in Current Utility Markets: Implications for Distributed Generation

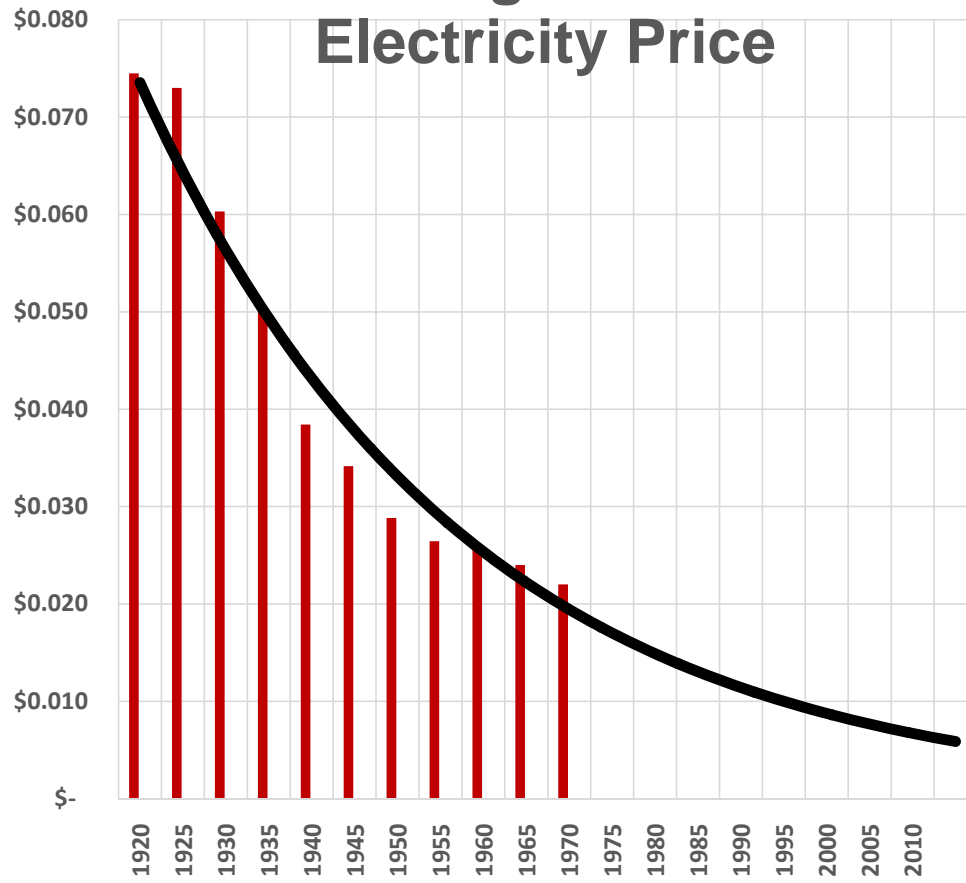
Steve Kihm, CFA
Principal and Chief Economist

January 22, 2016

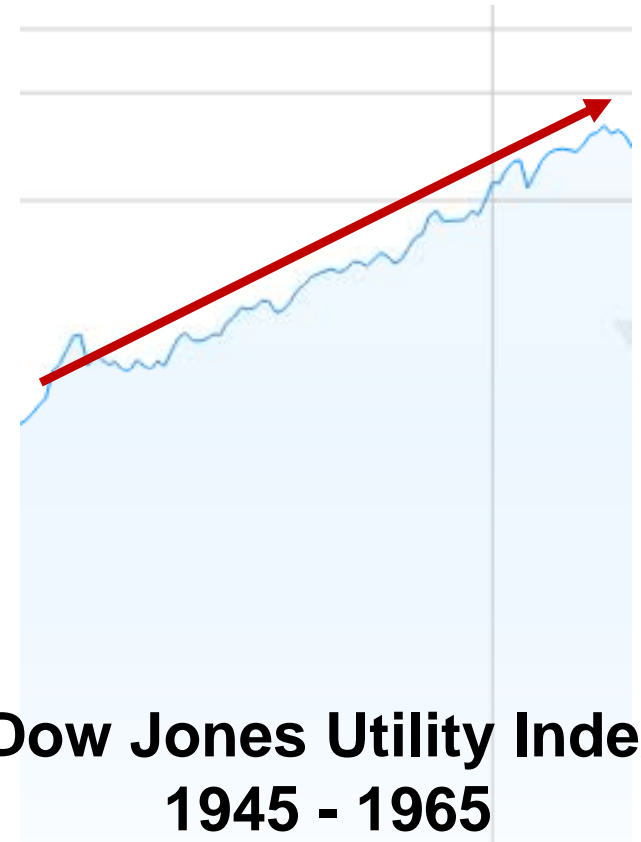
Which is the “Best” Pathway Forward?

1. Eliminate all fossil fuel subsidies.
2. Strengthen Federal and State policy incentives, like rebates and tax credits for household and commercial adoption.
3. Eliminate all energy subsidies and let the market work.
4. Eliminate all energy subsidies and establish a carbon tax.
5. Ramp up Federal “clean” energy R&D.
6. Rely on State regulations to require utilities to meet targets.
7. Rely on the Clean Power Plan to induce virtuous cascade.
8. Eliminate utility franchise areas and permit full customer choice.

U.S. Average Residential Electricity Price

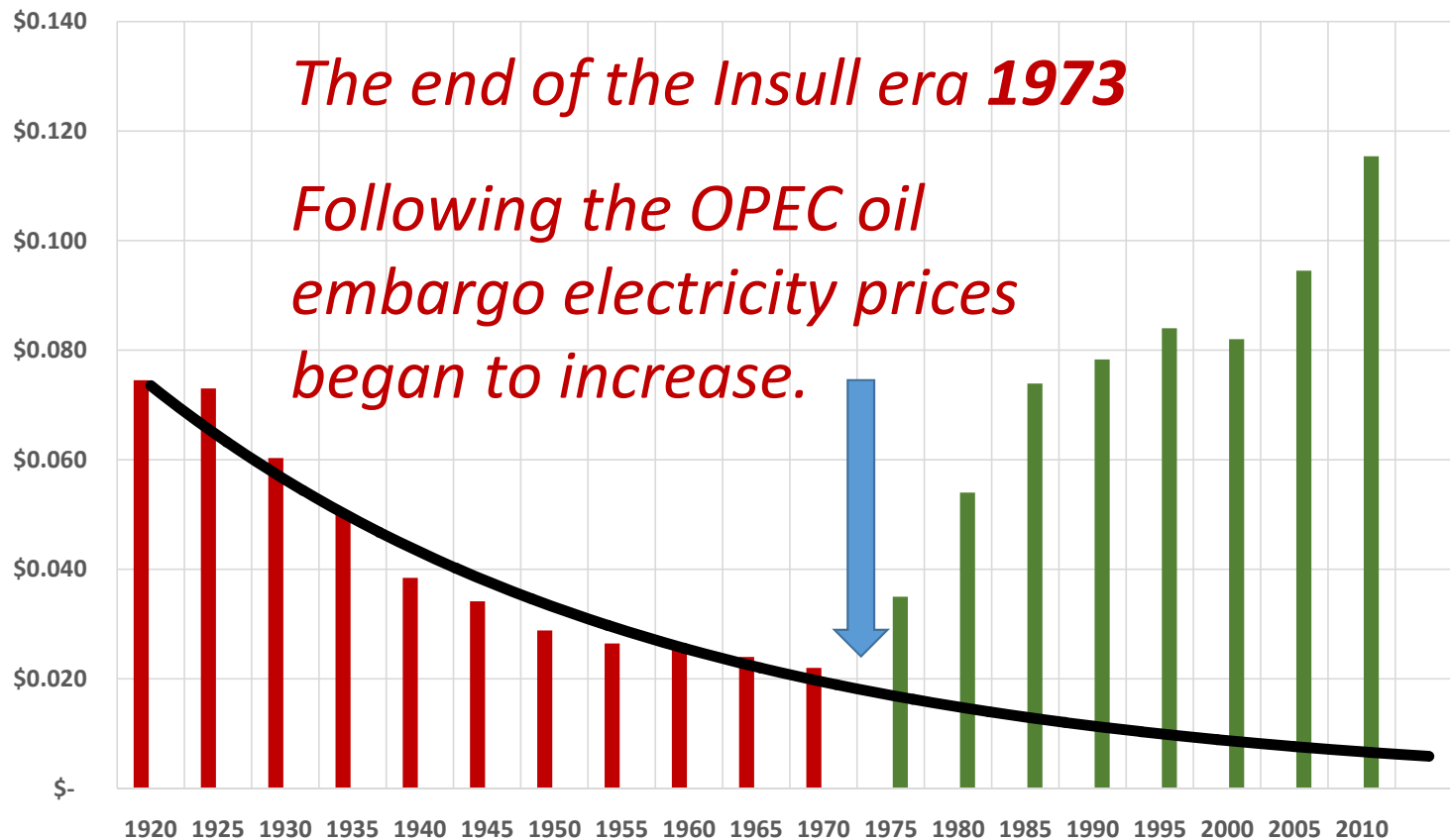


Dow Jones Utility Index 1945 - 1965



Power got more expensive

US Average Residential Electricity Price

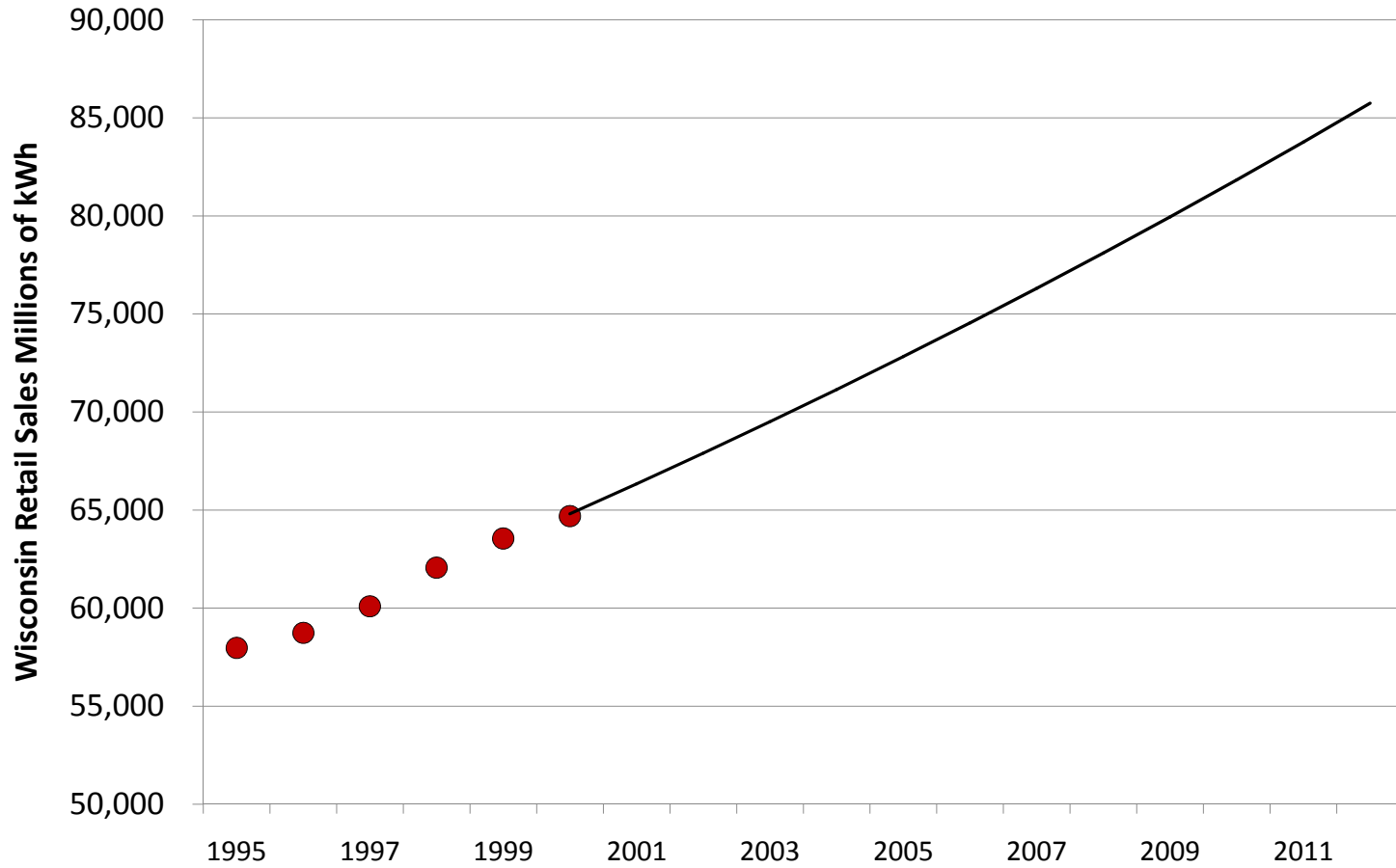


Power Got Expensive; Investors Got Nowhere



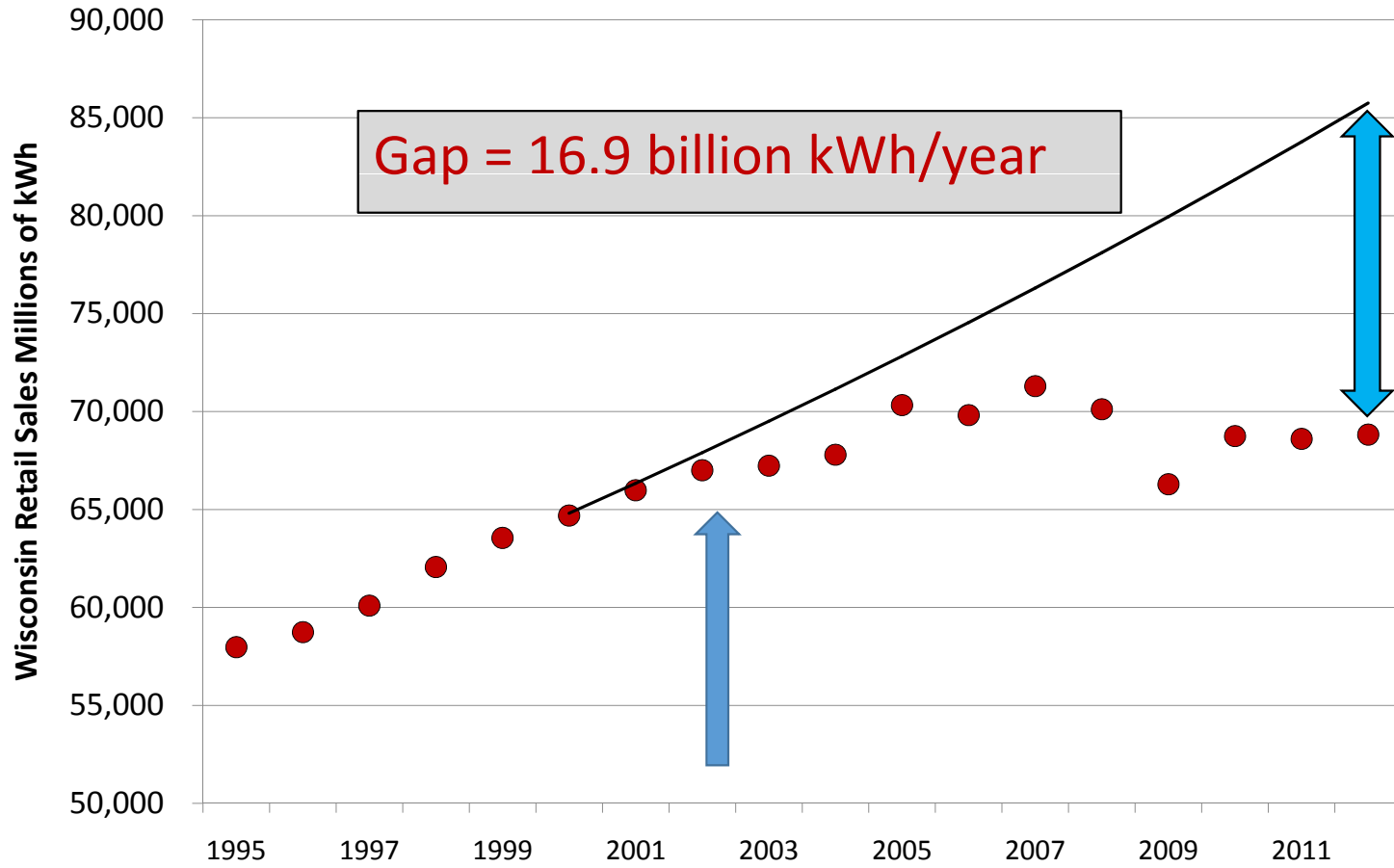
Dow Jones Utility Index
1965 - 1985

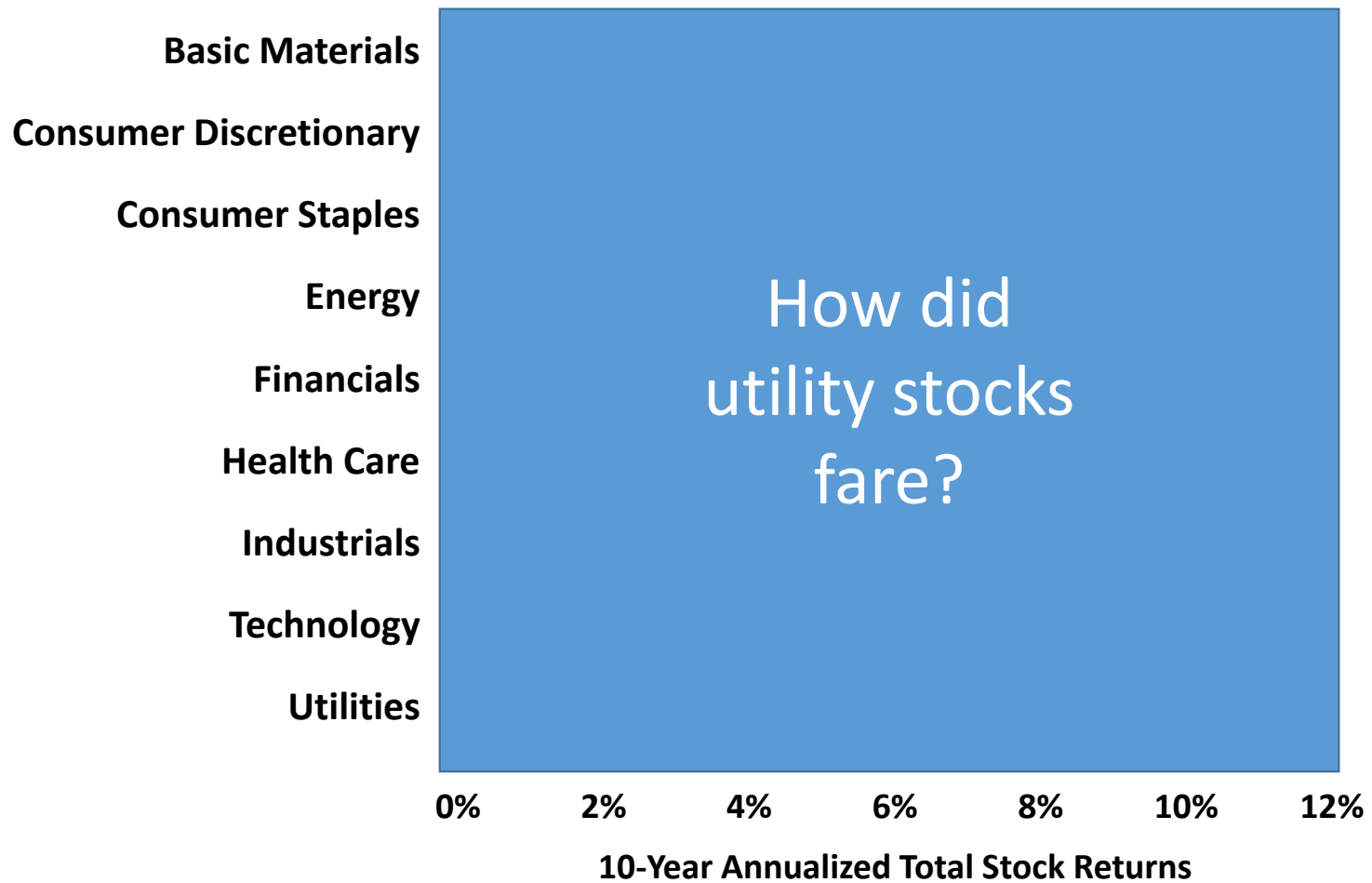
**At the turn of the century, Wisconsin utilities expected
sales to grow at 2.3% per year
(Source data: 2013 Wisconsin Energy Statistics)**



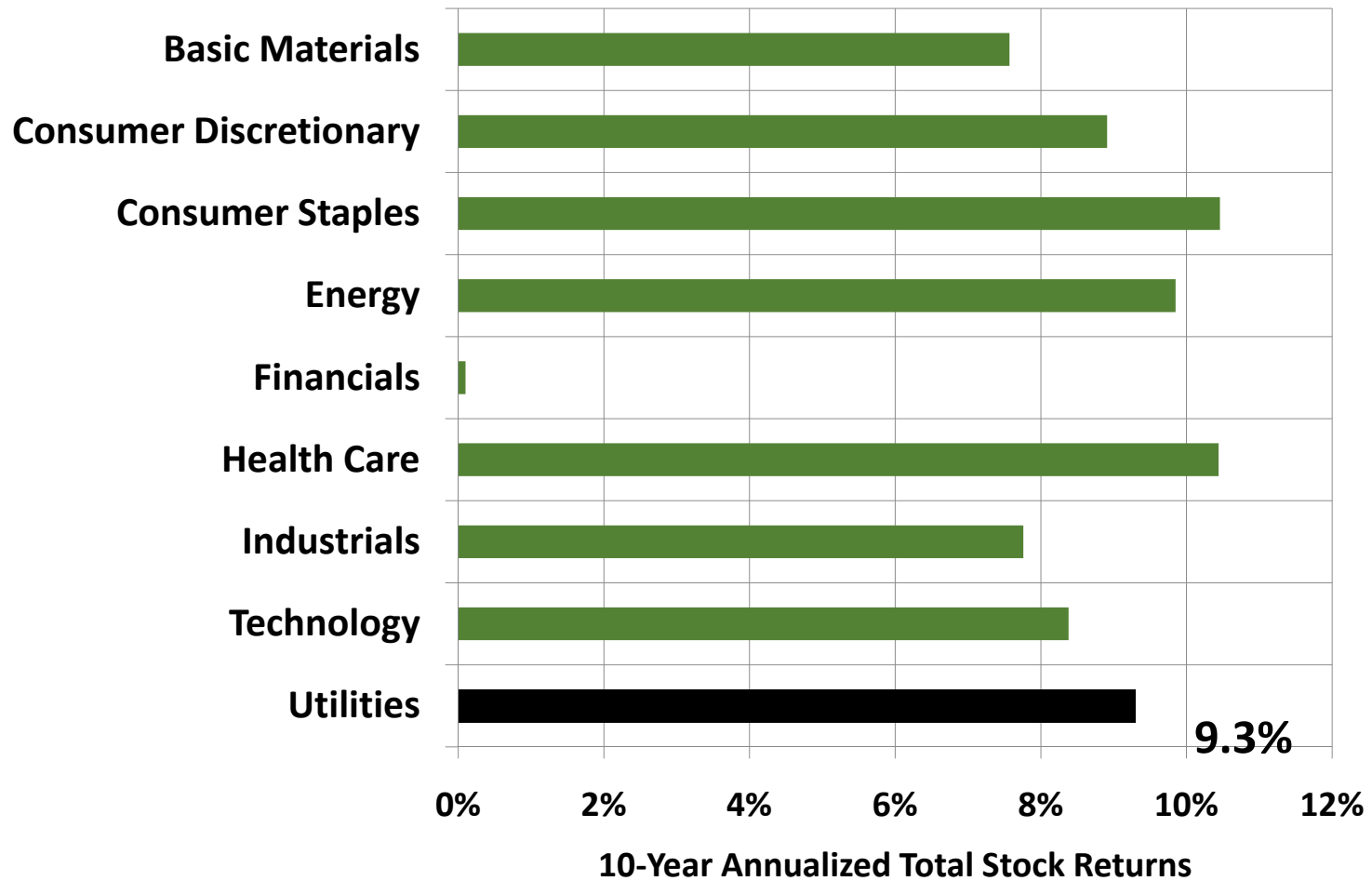
They didn't

(Source data: 2013 Wisconsin Energy Statistics)



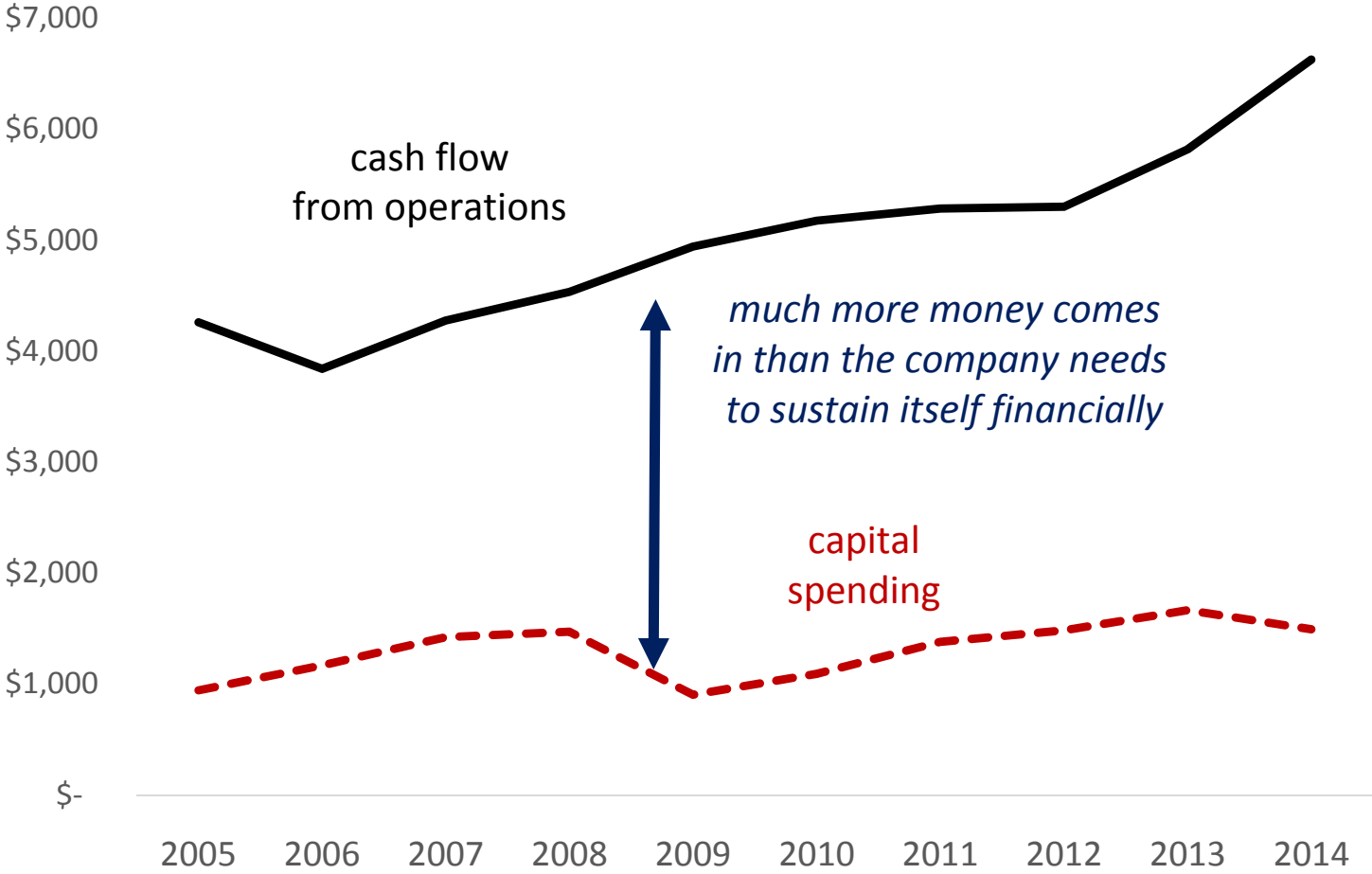


Are Utilities in Financial Trouble? Not now

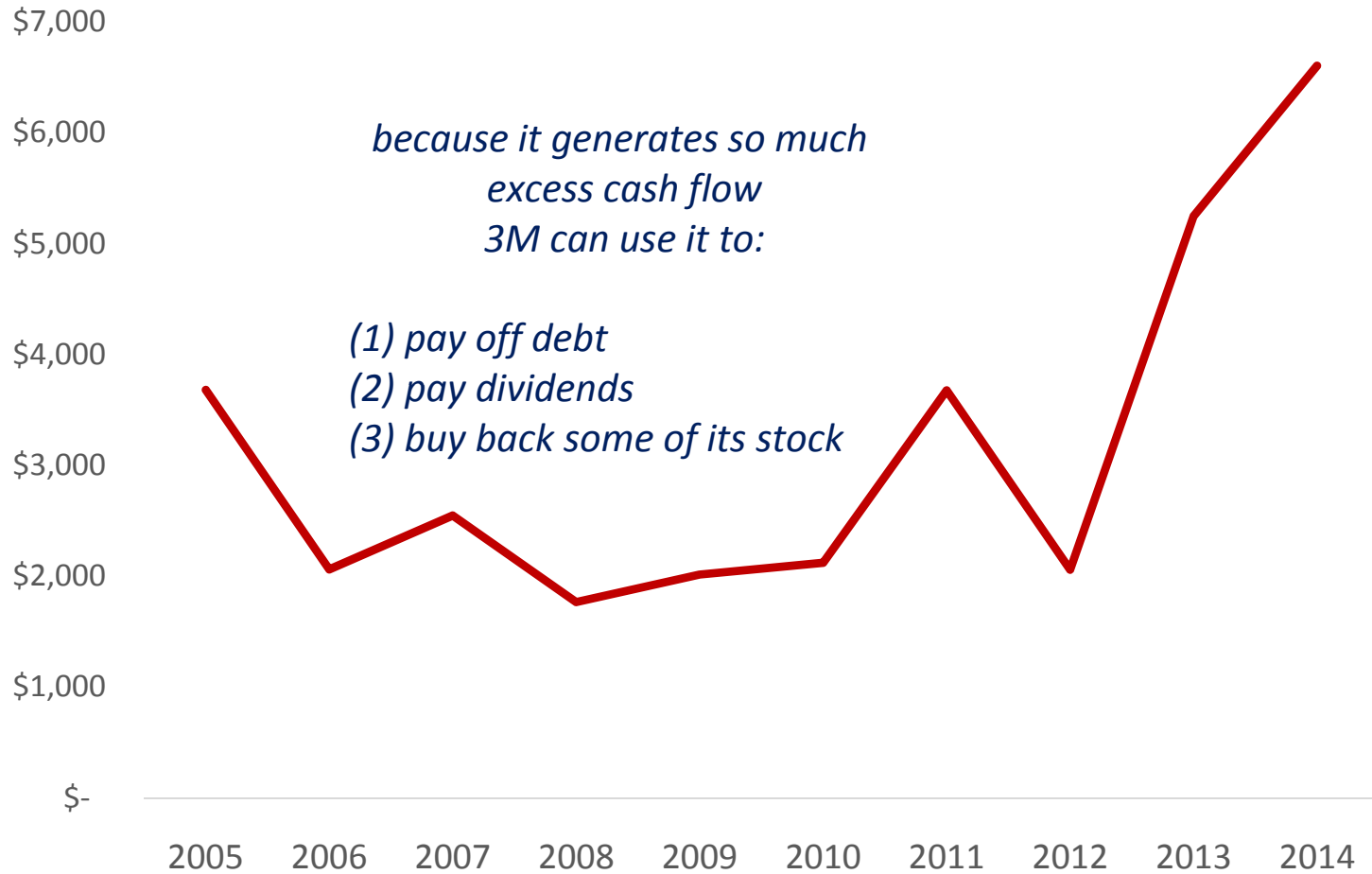


3M Corp Cash Flows

The business finances itself

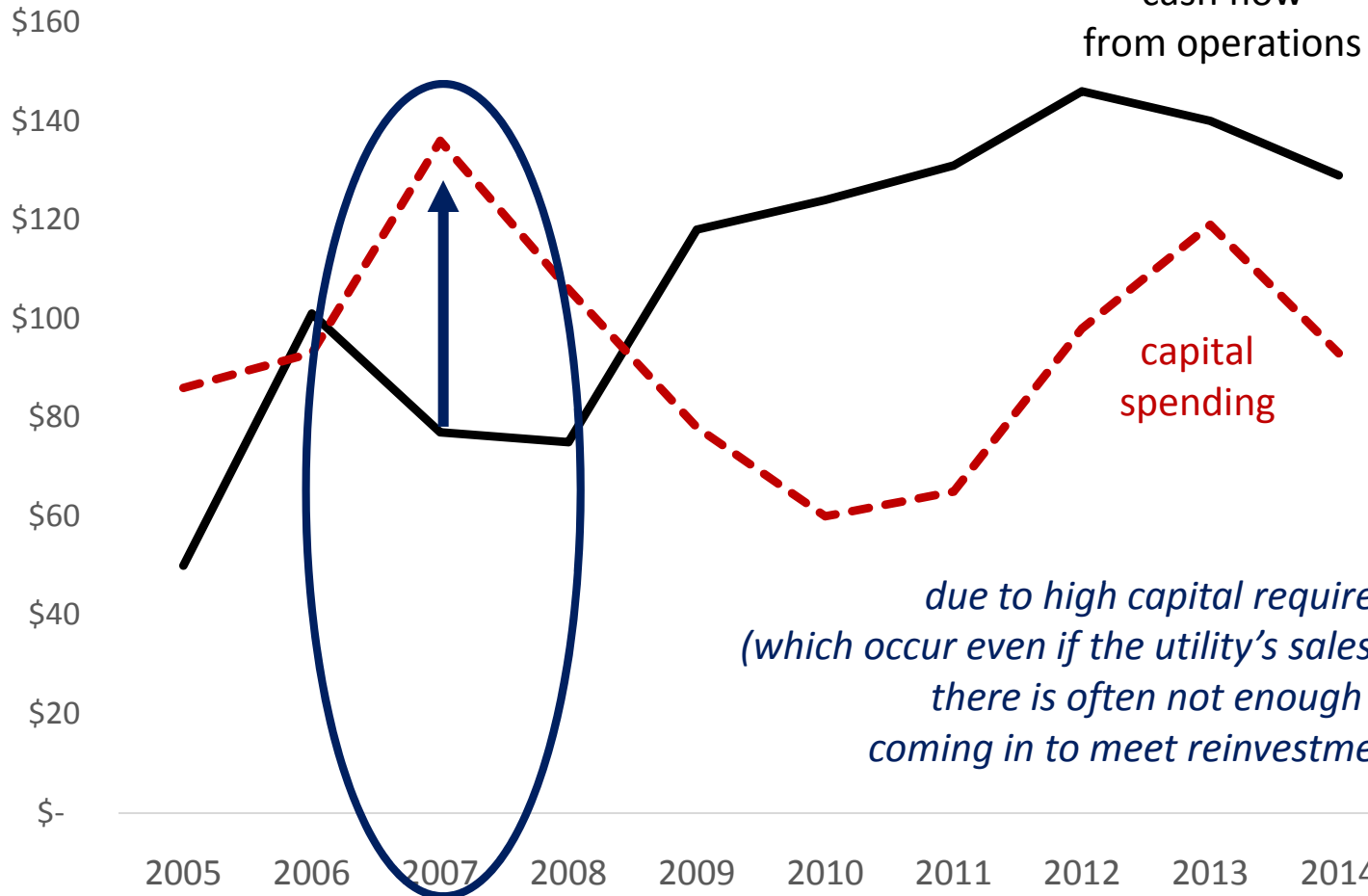


3M Corp Cash Flows
Net cash returned to investors



MGE Energy Cash Flows

It needs external capital

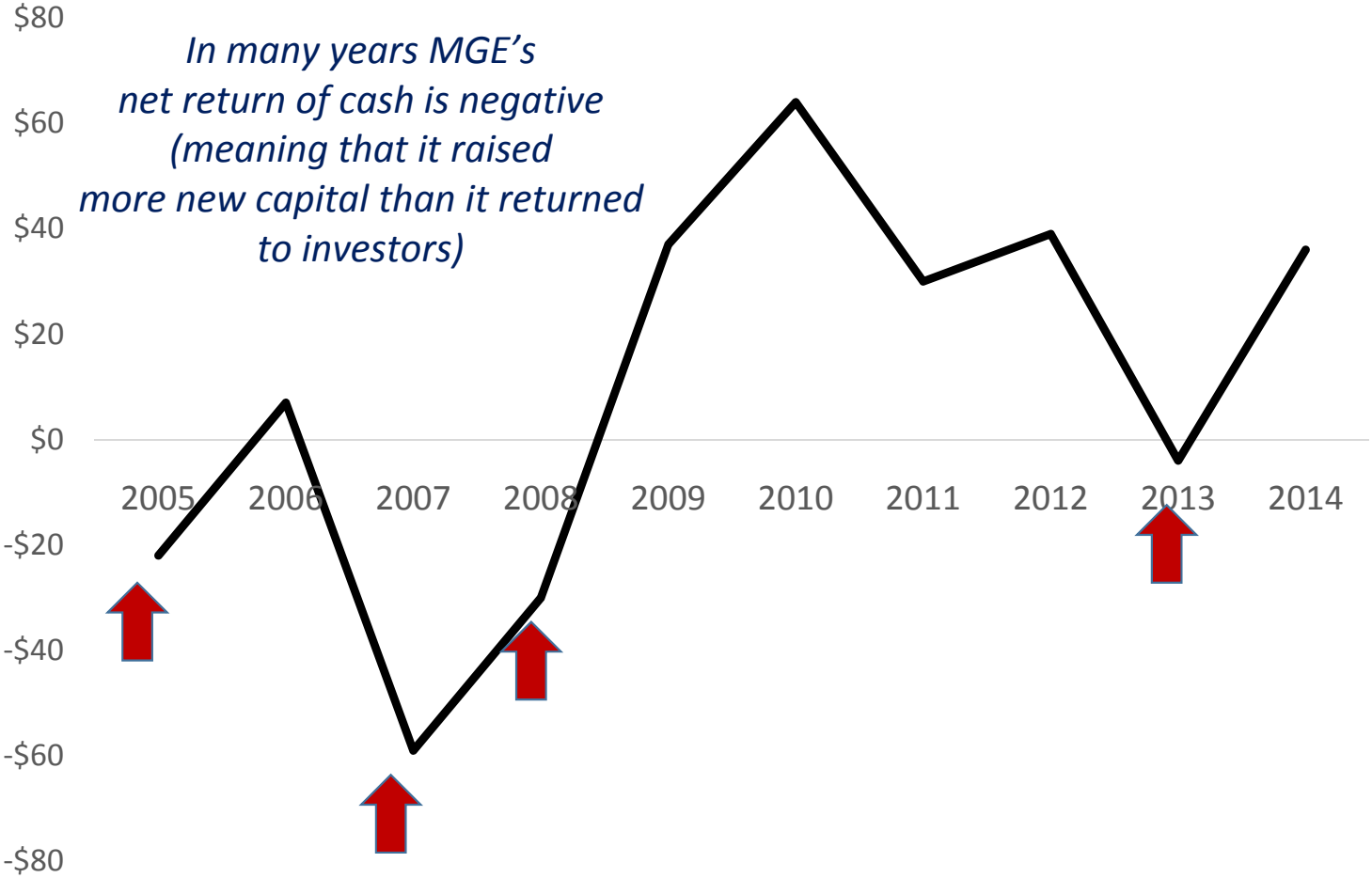


cash flow
from operations

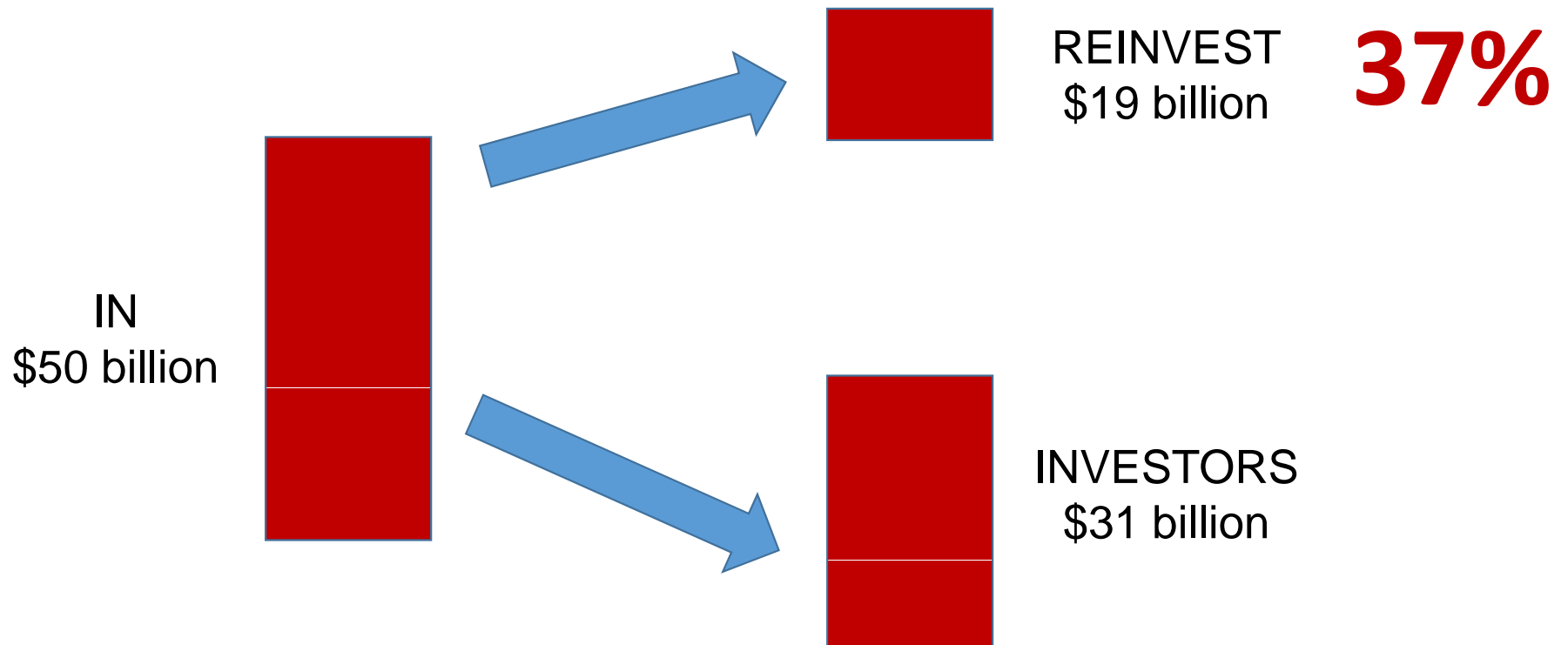
capital
spending

*due to high capital requirement
(which occur even if the utility's sales aren't growing)
there is often not enough cash
coming in to meet reinvestment needs*

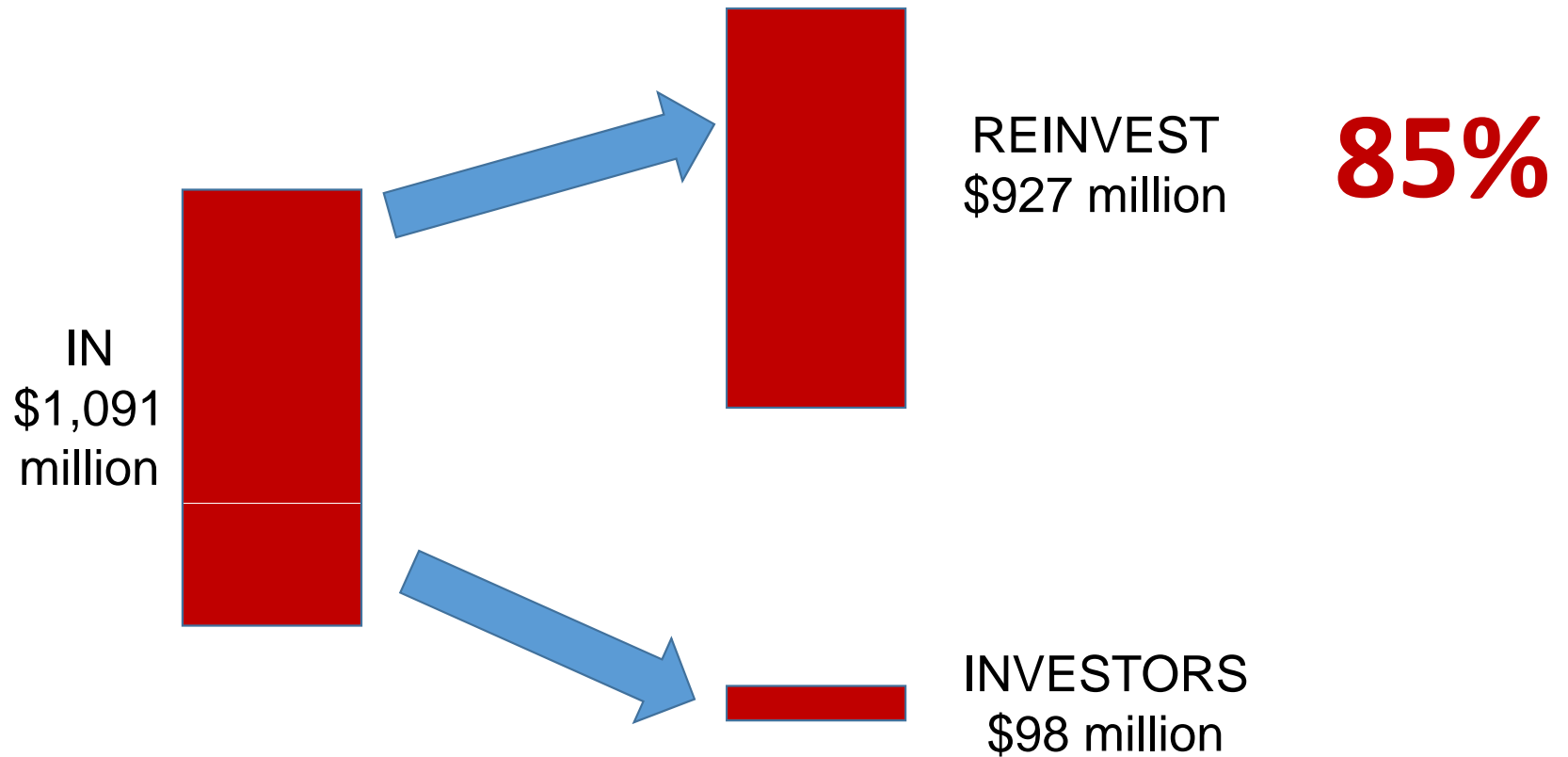
MGE Energy
Net cash returned to investors



Follow the cash: 3M Corp, past 10 years (net)



Follow the cash: MGE, past 10 years (**net**)



Cash Flow

Get Cash Flow for:

View: [Annual Data](#) | [Quarterly Data](#)

All numbers in thousands

Period Ending	Dec 31, 2014	Dec 31, 2013	Dec 31, 2012
Net Income	80,319	74,905	64,446
Operating Activities, Cash Flows Provided By or Used In			
Depreciation	40,695	38,838	38,707
Adjustments To Net Income	42,281	44,799	57,852
Changes In Accounts Receivables	2,835	(7,547)	(8,716)
Changes In Liabilities	(4,760)	(27,636)	(28,704)
Changes In Inventories	(10,399)	2,488	1,457
Changes In Other Operating Activities	(22,209)	14,420	20,962
Total Cash Flow From Operating Activities	128,762	140,267	146,004
Investing Activities, Cash Flows Provided By or Used In			
Capital Expenditures	(92,676)	(119,047)	(98,435)
Investments	(2,185)	(1,670)	(2,422)
Other Cash flows from Investing Activities	(1,297)	(1,205)	(496)
Total Cash Flows From Investing Activities	(96,158)	(121,922)	(101,353)
Financing Activities, Cash Flows Provided By or Used In			
Dividends Paid	(38,429)	(37,107)	(35,951)
Sale Purchase of Stock	-	-	-
Net Borrowings	2,897	41,988	(2,668)
Other Cash Flows from Financing Activities	(130)	(770)	(844)
Total Cash Flows From Financing Activities	(35,662)	4,111	(39,463)
Effect Of Exchange Rate Changes	-	-	-
Change In Cash and Cash Equivalents	(3,058)	22,456	5,188

Cash Flow

Get Cash Flow for:

View: [Annual Data](#) | [Quarterly Data](#)

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Market evolution and regulatory reform



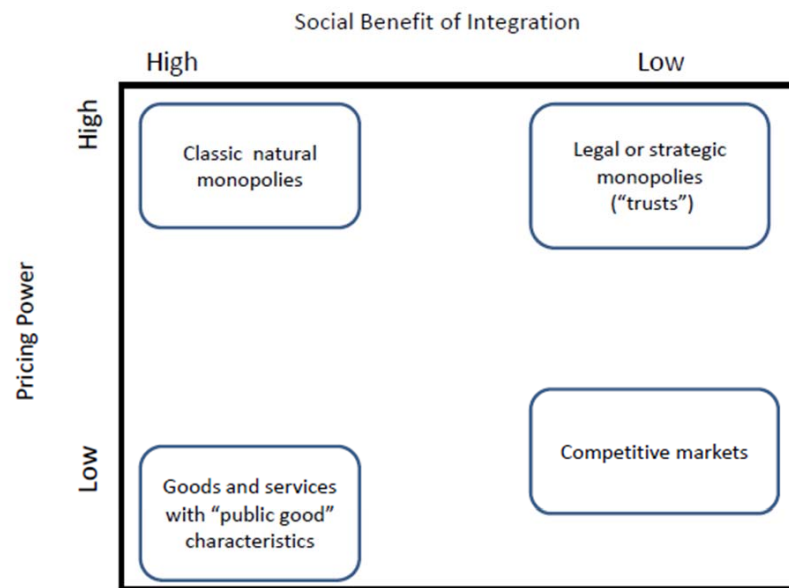
Electric Industry Structure and Regulatory Responses in a High Distributed Energy Resources Future

Steve Corneli

Steve Kihm, Seventhwave

Project Manager and Technical Editor:

Lisa Schwartz, Lawrence Berkeley National Laboratory

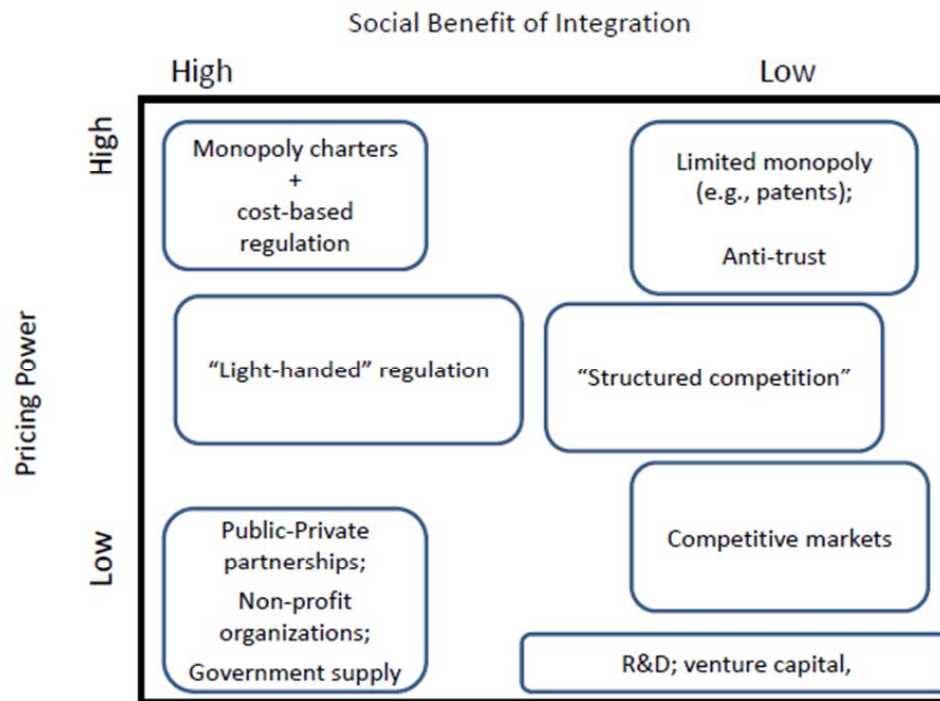


©Steven Corneli

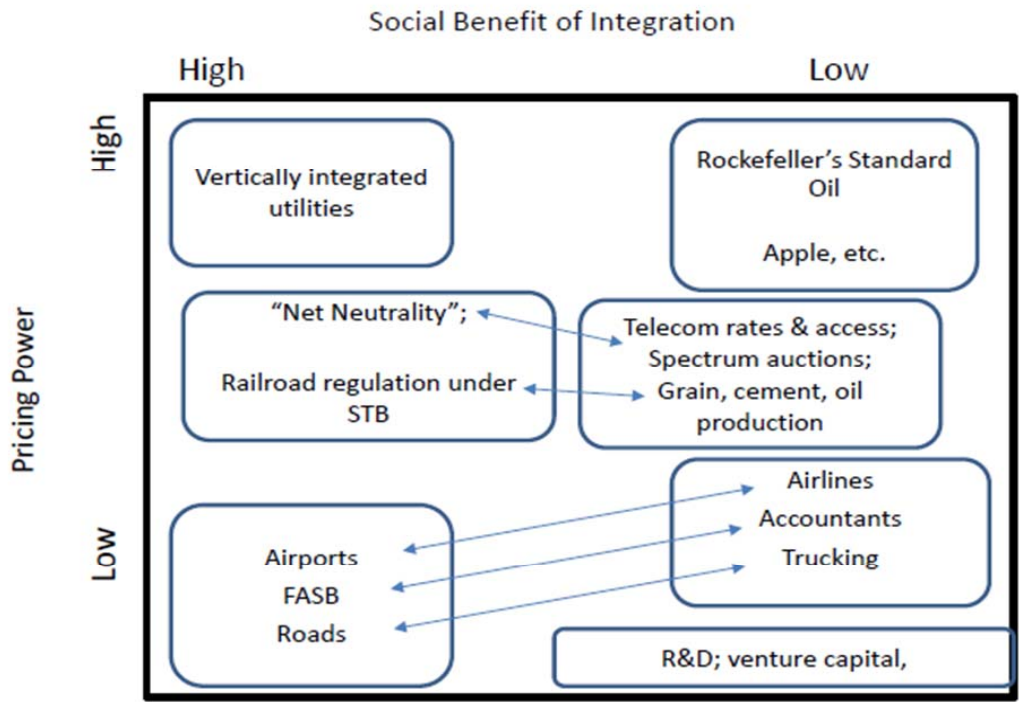
Two dimensions capture key features of natural monopolies, markets and non-market social values:

- **Pricing power** (the ability to set prices at or above effectively competitive levels and
- The **social benefits of integration** (due to economies of scale, scope, integration or network).

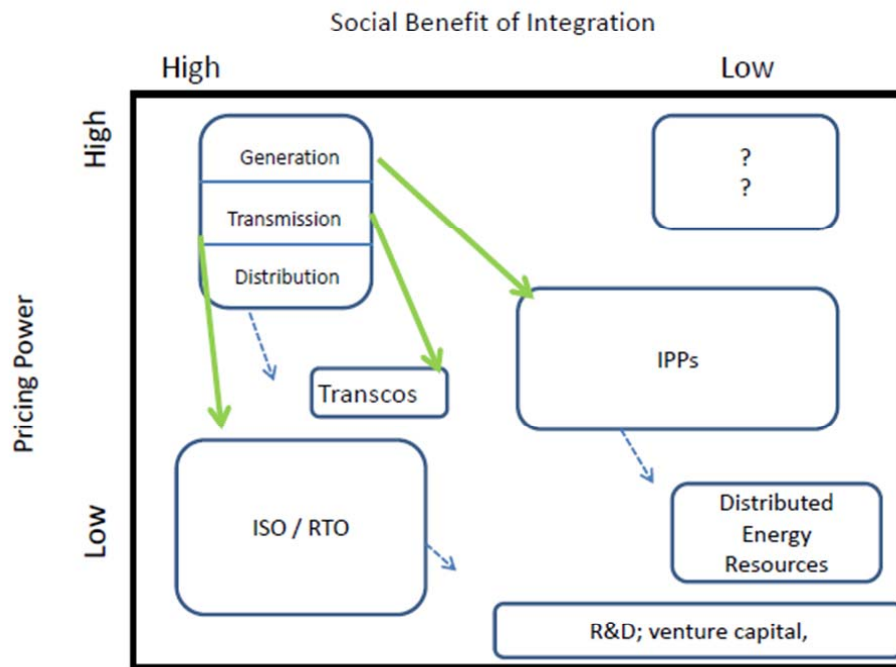
This framework encompasses and distinguishes natural monopolies, markets, “public good” type market failures, and legally sanctioned or strategic monopolies, as well as intermediate industry structures, and can help identify appropriate policy and regulatory approaches. It also can capture the role of innovation in increasing societies’ overall wealth while reducing negative externalities.



Policy analysis and experience suggest different institutional structures depending on the combination of these characteristics



Various industries and organizations can be effectively located in this space
Note synergies from right to left



The power sector can also be seen more clearly in this framework -- both the institutional changes of the last 15 years (green arrows) and potential impacts of DERs (blue dotted arrows)

Dow Jones Utility Average (^DJU) ★ Watchlist

578.66 -0.37 (-0.06%) Dow Jones - As of 4:30PM EST

Beat the market

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+ Indicator + Comparison 1d 5d 1m 3m 6m 1y 2y 5y 10y Max Log Go To Symbol



Dow Jones Utility Average (^DJU) ★ Watchlist

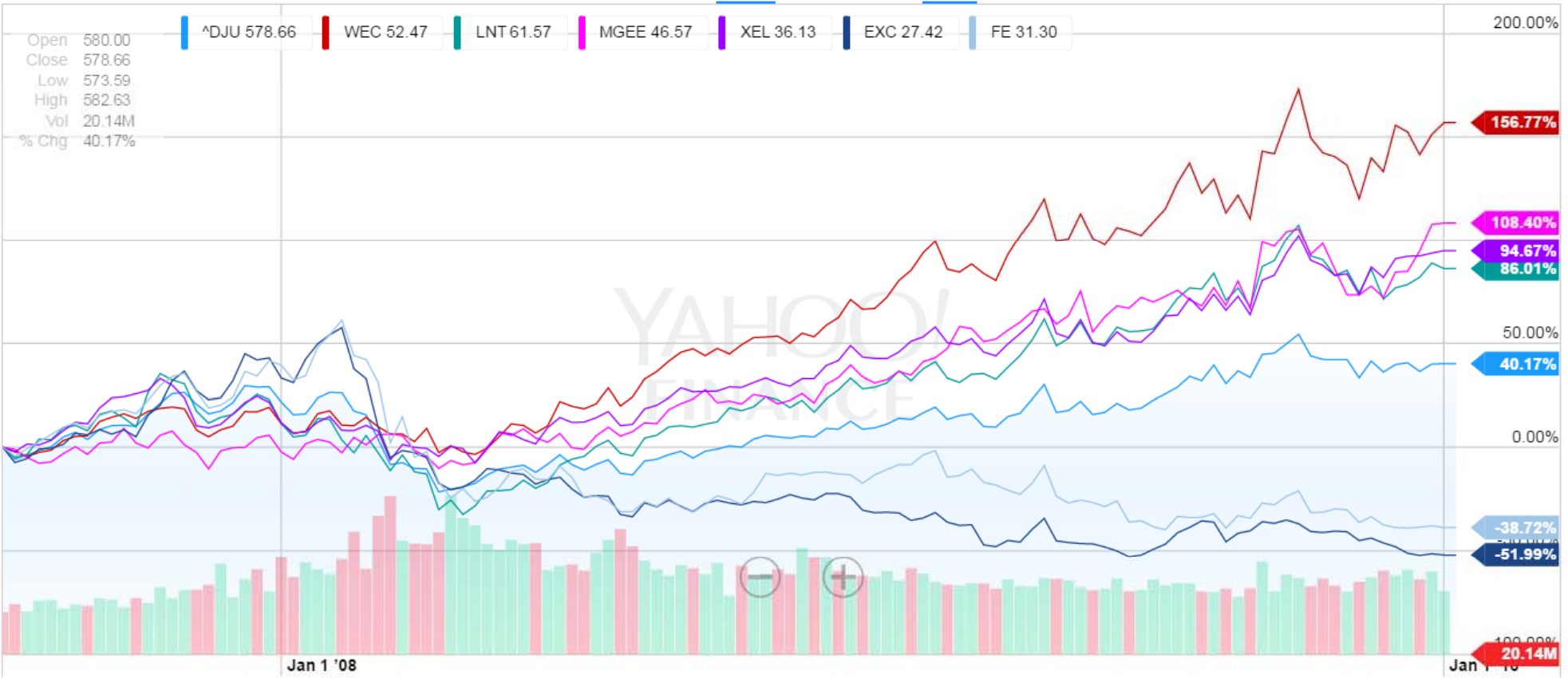
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Beat the market

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+ Indicator + Comparison 1d 5d 1m 3m 6m 1y 2y 5y **10y** Max Log Go To Symbol





Applying an accurate financial framework

YOU GET WHAT YOU PAY FOR:

Moving Toward Value in Utility Compensation

PART ONE – REVENUE AND PROFIT

Steve Kihm, principal and chief economist, Seventhwave

Ron Lehr, director, Western Grid Group

Sonia Aggarwal, director, America's Power Plan

Edward Burgess, program manager, Utility of the Future Center, Arizona State University

June 2015

STOCK PRICE FORMATION

Value flows from the gap between the return on equity r and the cost of equity k expressed explicitly in stock pricing formulas, such as this one²⁰:

$$P = BV + \frac{(r - k)BV}{k - g}$$

In this model, P represents the stock price, BV is the accounting book value, and g is the long-run growth in residual earnings.²¹ It is the difference between the return on equity and the cost of equity ($r - k$) that we focus on here. **The larger the gap between r and k , the greater the value opportunity per dollar of capital invested.**

$$P = BV + \frac{(k - k)BV}{k - g} = BV + 0 = BV$$

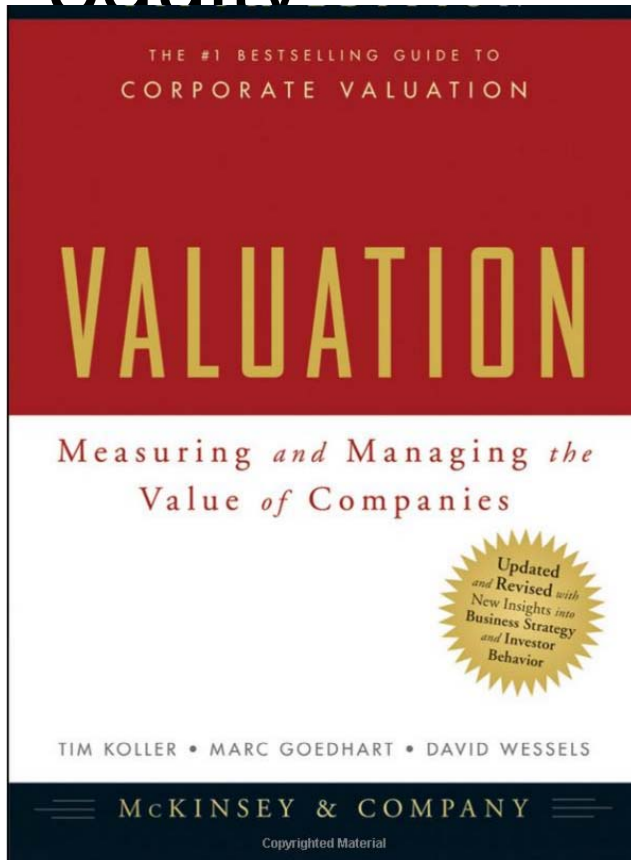
If regulators set the return on equity at the cost of equity, utility stocks would trade at book value.

• MGE Energy		
• Stock price	\$46.65	
• Book value	\$20.00	
• WEC Energy Group		
• Stock price	\$52.94	stock price exceeds book value
• Book value	\$27.45	
• Alliant Energy		
• Stock price	\$61.76	returns on equity must be noticeably higher than the cost of equity— and that's OK
• Book value	\$31.95	
• Xcel Energy		
• Stock price	\$36.26	
• Book value	\$20.90	

Recent estimates

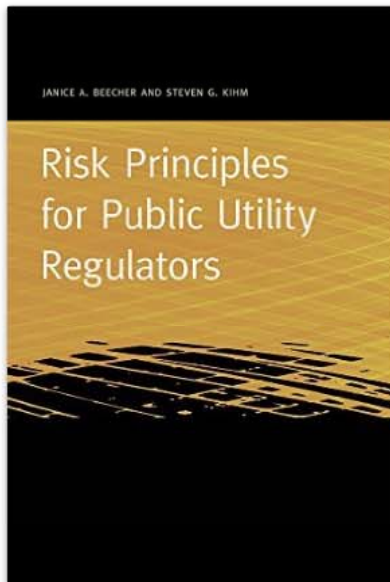
- Value Line median estimated electric utility ROE 10.0%
- Estimated cost of equity using finance principles 7.8%
- **Both seem reasonable** (even though most people in the industry would say the cost of equity is about 10%--but there must be a gap between r and k given the relationship between stock prices and book value)

McKinsey & Co on risk and the cost of equity



Investors require compensation only for risks they cannot diversify away. The risks they cannot diversify away are those that affect all companies—for example, exposure to economic cycles [interest rates, inflation, recession—not distributed generation]. Since most of the risks that companies face are in fact diversifiable, **most risks don't affect a company's cost of equity.**

Books › Business & Money › Industries



[See this image](#)

Risk Principles for Public Utility Regulators (Public Utility Regulation) Paperback 2016

by [Janice A. Beecher](#) (Author), [Steven G. Kihm](#) (Author)

[▶ See all formats and editions](#)

Paperback

\$29.95

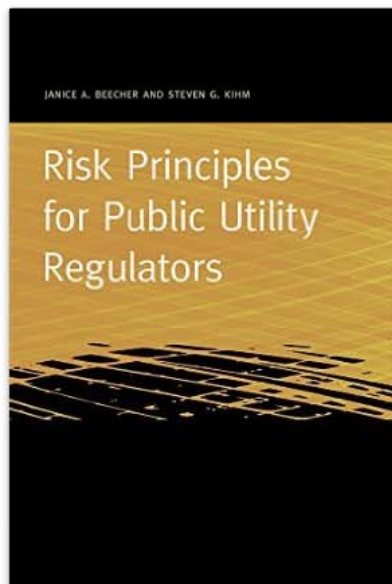
1 New from \$29.95

Risk and risk allocation have always been central issues in public utility regulation. Unfortunately, the term “risk” can easily be misrepresented and misinterpreted, especially when disconnected from long-standing principles of corporate finance.

This book provides those in the regulatory policy community with a basic theoretical and practical grounding in risk as it relates specifically to economic regulation in order to focus and elevate discourse about risk in the utility sector in the contemporary context of economic, technological, and regulatory change. This is not a “how-to” book with regard to calculating risks and returns but rather a resource that aims to improve understanding of the nature of risk. It draws from the fields of corporate finance, behavioral finance, and decision theory as well as the broader legal and economic theories that

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Technical aside:

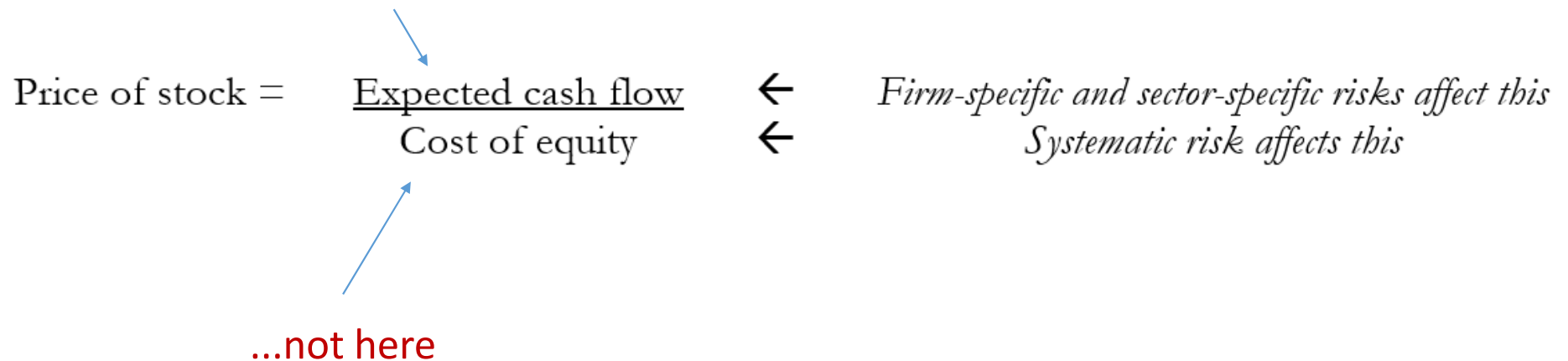
Today's presentation discusses the effect of risk on equity holders. The impact on debt is more complicated. (see book)

How does risk affect utility stock prices?

$$\text{Price of stock} = \frac{\text{Expected cash flow}}{\text{Cost of equity}} \quad \begin{array}{l} \leftarrow \\ \leftarrow \end{array} \quad \begin{array}{l} \textit{Firm-specific and sector-specific risks affect this} \\ \textit{Systematic risk affects this} \end{array}$$

How does risk affect utility stock prices?

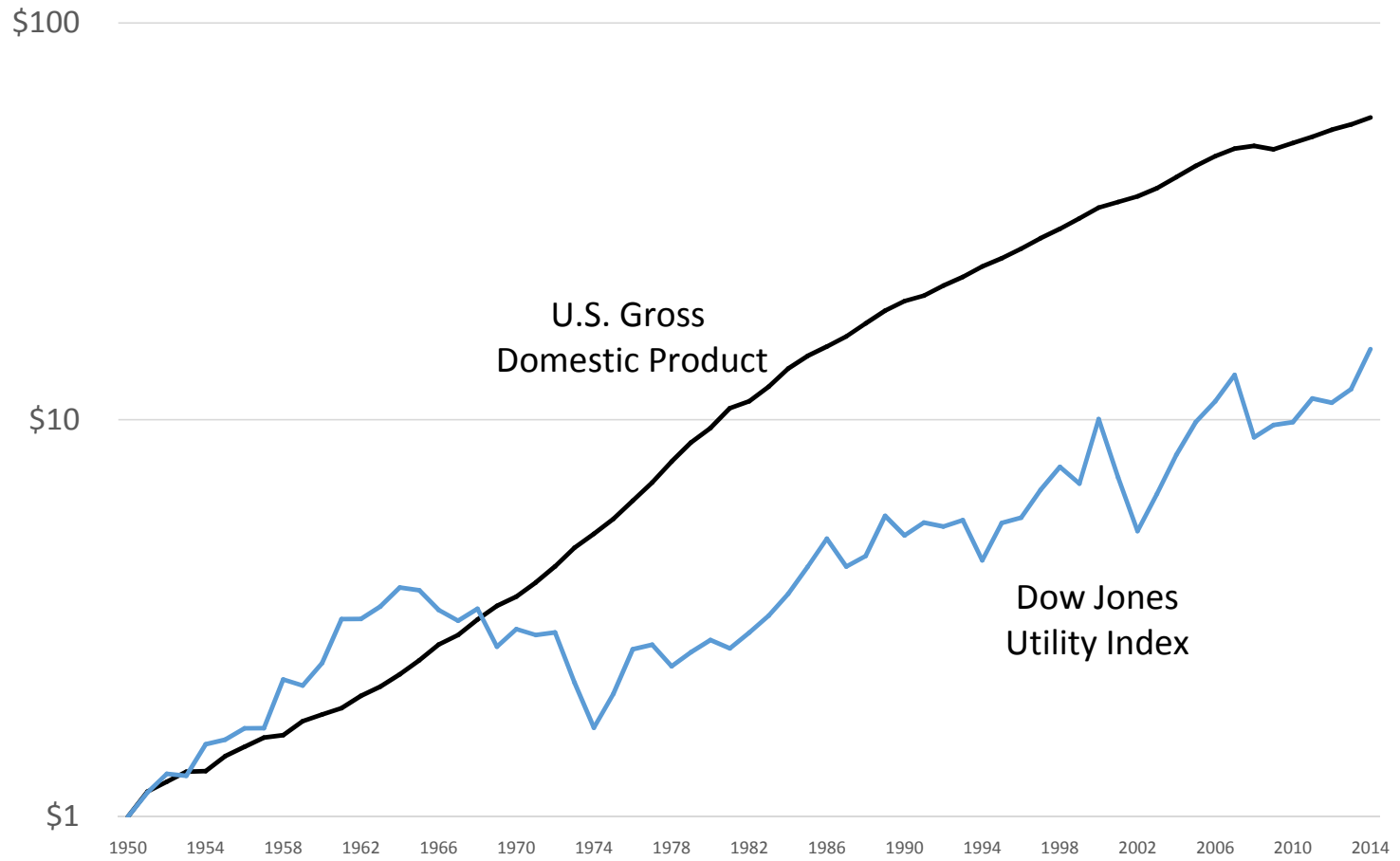
Most of the risk associated with distributed generation resides here...



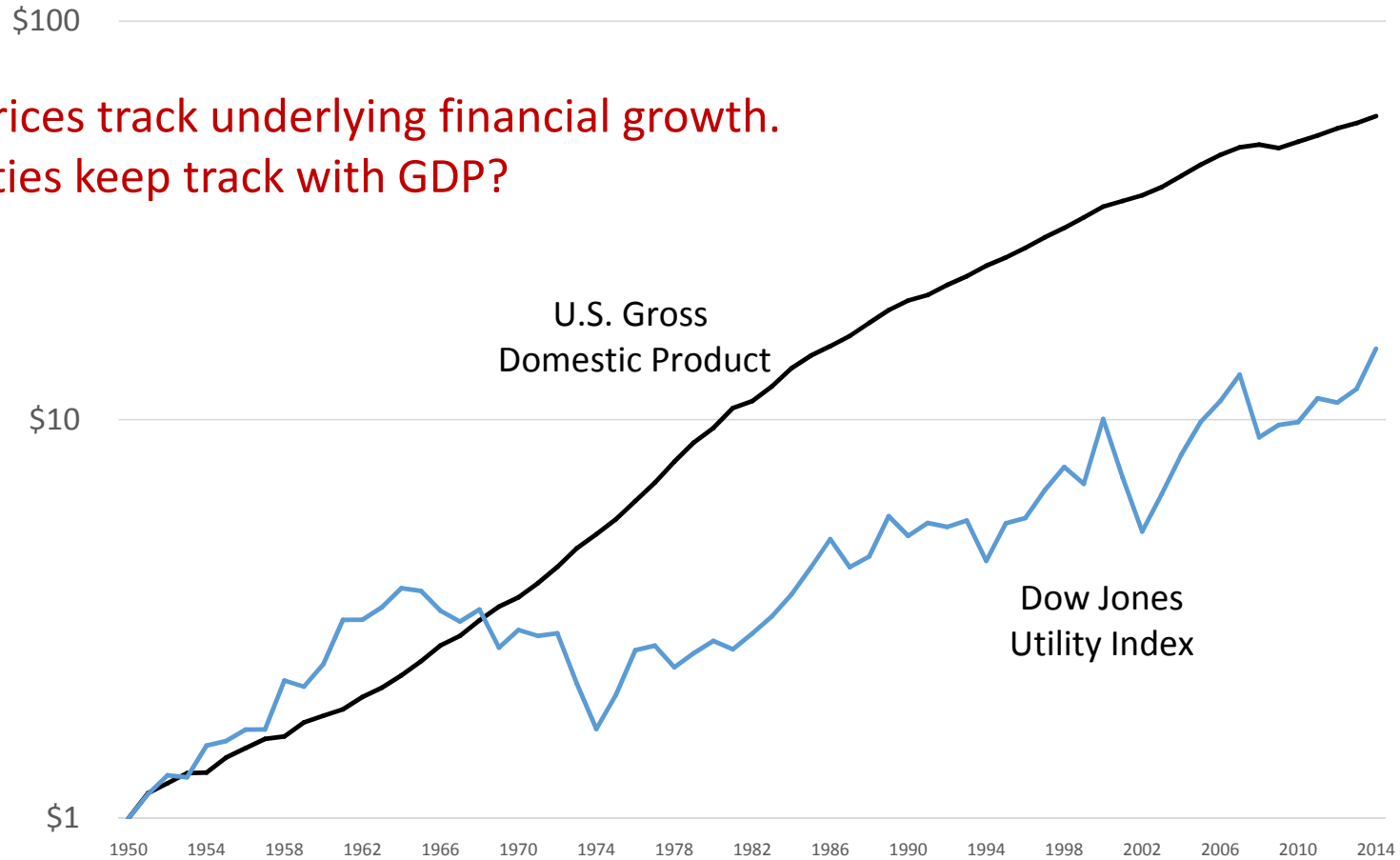
Question

- Is the cost of equity for utilities today:
 - 10 to 11% (all risk in cost of capital)
 - 7 to 8% (only macroeconomic risk in cost of capital)
- Is the long-term growth in utility dividends likely to:
 - track GDP growth (5.0%)
 - lag GDP growth (3.8%)

Value of \$1.00 Invested in 1950 (1950 -2014)



Value of \$1.00 Invested in 1950 (1950 -2014)



Stock prices track underlying financial growth.
Do utilities keep track with GDP?

No.

Question

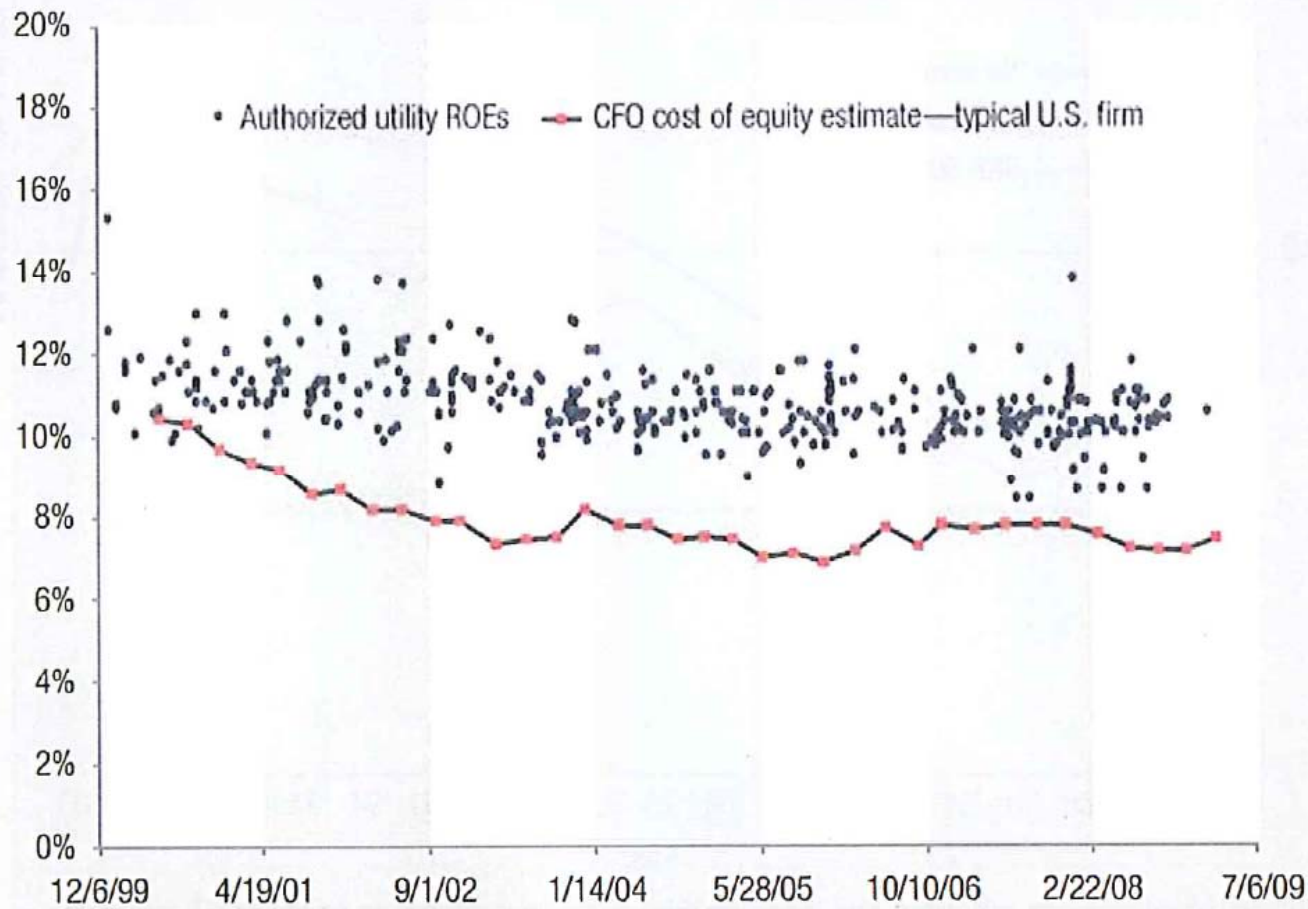
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 - lag GDP growth (3.8%)

Morningstar on WEC Energy Group

- We forecast \$7.5 billion in capital expenditures through 2019, in line with management expectations, and rate-base growth in line with our long-term earnings forecast. **We use a 7.5% cost of equity** and a 5.6% weighted average cost of capital in our discounted cash flow valuation.

FIG. 1

AUTHORIZED ROE VS. COST OF EQUITY



Authorized returns on equity lie above the cost of equity—as they should—when compared to CFOs' estimates for costs of equity.

Alfred Kahn on the return on equity

- If we set the return on equity = the cost of equity (the minimum) **we do not promote economic progress**
- *The rate of return must fulfill what we may term an institutional function: it somehow must **provide the incentives** to private management that competition and profit-maximization are supposed to provide in the nonregulated price economy generally.*

Don't confuse my comments on cost of equity with notions of return on equity—current levels of that variable are fine (the key is that it's a different variable).

CFA Institute Equity Valuation Conference

Philadelphia, PA

November 2015

THE COST OF CAPITAL:



MISUNDERSTOOD,
MISESTIMATED AND MISUSED!

Aswath Damodaran

Why stockholders care only about macro risks

- | | |
|--------------------------|----------|
| • Competition Scenario 1 | |
| • Solar City | up 40% |
| • Utilities | down 40% |
| • Competition Scenario 2 | |
| • Solar City | down 40% |
| • Utilities | up 40% |

little net impact
on portfolio

- It's the net effect across all stocks in institutional investor portfolios that matter to investors

Why stockholders care only about macro risks

- Competition Scenario 1
 - Solar City up 40%
 - Utilities down 40%
- Competition Scenario 2
 - Solar City down 40%
 - Utilities up 40%
- It's the net effect across all stocks in institutional investor portfolios that matter to investors

- Macro Scenario-recession
 - Solar City down 40%
 - Utilities down 40%

big net impact
on portfolio

Why stockholders care only about macro risks

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this is a real risk to the utility,
but not to its equity investors

- It's the net effect across all stocks in institutional investor portfolios that matter to investors

Why stockholders care only about macro risks

- Competition Scenario 1
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this is a real risk to the utility,
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Why stockholders care only about macro risks

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this is the distributed generation scenario

- It's the net effect across all stocks in institutional investor portfolios that matter to investors

Who understands the cost of equity concept?

McKinsey & Co—only macro risks matter to equity investors

OR

Those who think all risks affect the cost of equity

MGE Energy ($k = 10.0\%$; $g = 5.0\%$)

all risk here

track GDP

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$20.00 + \frac{(0.130 - 0.100)\$20.90}{0.100 - 0.05} = \$32.00$$

WEC Energy Group ($k = 10.0\%$; $g = 5.0\%$)
all risk here **track GDP**

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$27.45 + \frac{(0.110 - 0.100)\$27.45}{0.100 - 0.05} = \$32.94$$

Alliant Energy ($k = 10.0\%$; $g = 5.0\%$)

all risk here

track GDP

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$31.95 + \frac{(0.115 - 0.100)\$31.95}{0.100 - 0.05} = \$41.54$$

Xcel Energy ($k = 10.0\%$; $g = 5.0\%$)

all risk here

track GDP

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$20.90 + \frac{(0.100 - 0.100)\$20.90}{0.100 - 0.05} = \$20.90$$

MGE Energy ($k = 7.8\%$; $g = 3.8\%$)

only macro risk here normal growth

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$20.00 + \frac{(0.130 - 0.078)\$20.00}{0.078 - 0.038} = \$46.00$$

WEC Energy Group ($k = 7.8\%$; $g = 3.8\%$)

only macro risk here

normal growth

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$27.45 + \frac{(0.110 - 0.078)\$27.45}{0.078 - 0.038} = \$49.41$$

Alliant Energy ($k = 7.8\%$; $g = 3.8\%$)

only macro risk here normal growth

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$31.95 + \frac{(0.115 - 0.078)\$31.95}{0.078 - 0.038} = \$61.50$$

Xcel Energy ($k = 7.8\%$; $g = 3.8\%$)

only macro risk here normal growth

$$P = B + \frac{(r - k)B}{k - g}$$

$$P = \$20.90 + \frac{(0.100 - 0.078)\$20.90}{0.078 - 0.038} = \$32.40$$

MGE Energy value estimates

- $k = 10.0\%$; $g = 5.0\%$ (all risk in k ; grow at GDP) \$32.00
- $k = 7.8\%$; $g = 3.8\%$ (only macro risk in k ; normal growth) \$46.00
- Actual stock price \$46.65

WEC Energy value estimates

- $k = 10.0\%$; $g = 5.0\%$ (all risk in k ; grow at GDP) \$32.94
- $k = 7.8\%$; $g = 3.8\%$ (only macro risk in k ; normal growth) \$49.41
- Actual stock price \$52.94

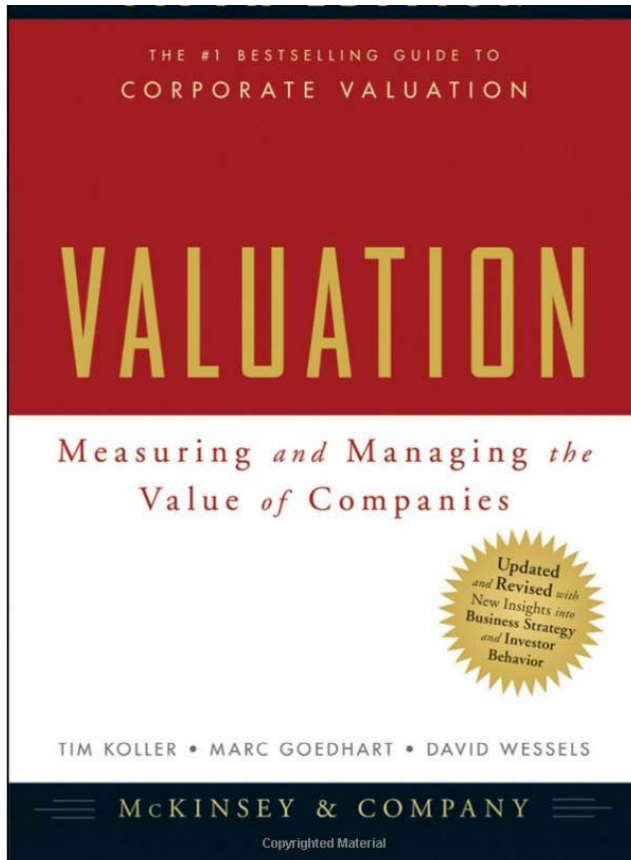
Alliant Energy value estimates

- $k = 10.0\%$; $g = 5.0\%$ (all risk in k ; grow at GDP) \$41.54
- $k = 7.8\%$; $g = 3.8\%$ (only macro risk in k ; normal growth) \$61.50
- Actual stock price \$61.76

Xcel Energy value estimates

- $k = 10.0\%$; $g = 5.0\%$ (all risk in k ; grow at GDP) \$20.90
- $k = 7.8\%$; $g = 3.8\%$ (only macro risk in k ; normal growth) \$32.40
- Actual stock price \$36.26

McKinsey & Co on risk



The unique risks that any particular company faces of say running into trouble or, even worse, bankruptcy (which clearly destroys shareholder value) are **not priced into the cost of equity**.

How does risk affect utility stock prices?

Most of the risk associated with distributed generation resides here...

$$\text{Price of stock} = \frac{\text{Expected cash flow}}{\text{Cost of equity}}$$

← *Firm-specific and sector-specific risks affect this*
← *Systematic risk affects this*

...not here

Distributed generation is a real threat to utilities and it can affect the value of their stocks. It just doesn't affect the cost of equity. That's Finance 101.

This is not a new idea

- A geologist looking for oil worries about the risk of a dry hole
- A pharmaceutical manufacturer worries about the risk of a new drug
- The owner of a hotel in a foreign country worries about expropriation

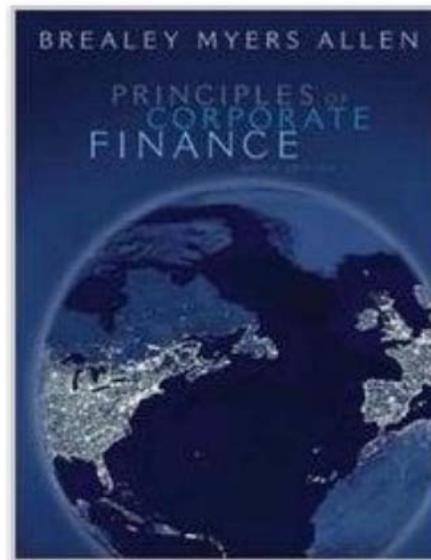


Are these risks that the firm should worry about?

This is not a new idea

Absolutely

- A geologist looking for oil worries about the risk of a dry hole
- A pharmaceutical manufacturer worries about the risk of a new drug
- The owner of a hotel in a foreign country worries about expropriation

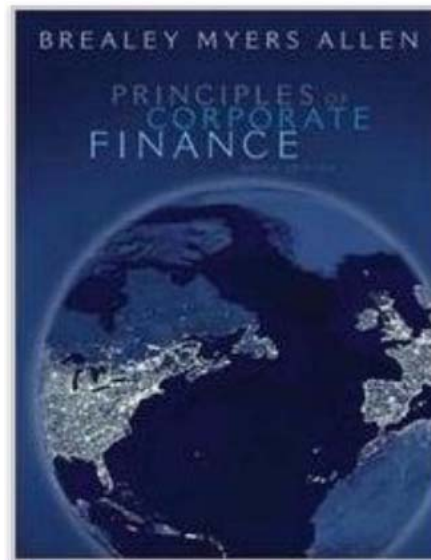


Are these risks that equity investors would worry about?

This is not a new idea

No

- A geologist looking for oil worries about the risk of a dry hole
- A pharmaceutical manufacturer worries about the risk of a new drug
- The owner of a hotel in a foreign country worries about expropriation



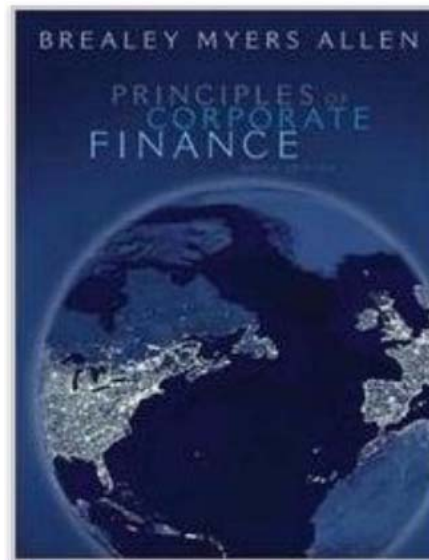
Are these risks that equity investors would worry about?

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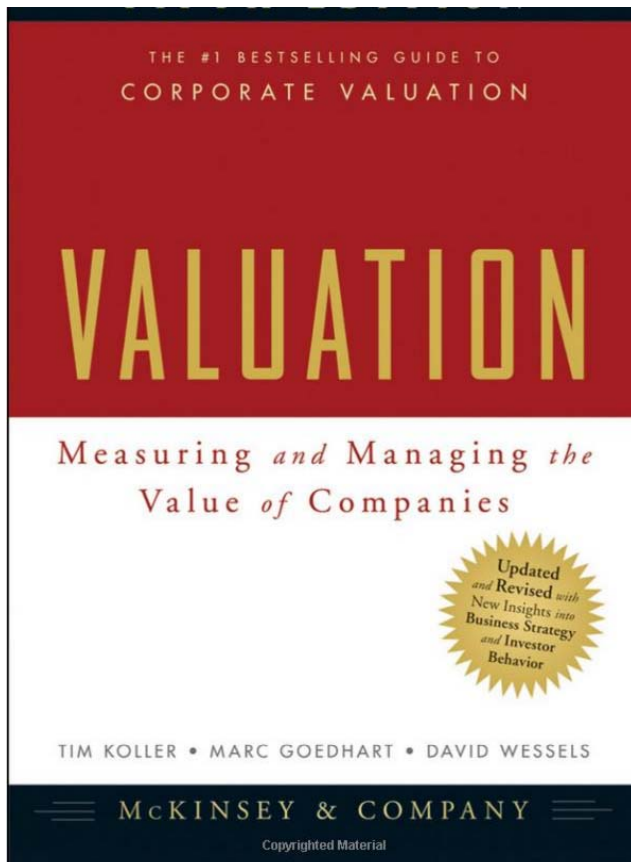
No

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The bad outcomes we cited appear to reflect unique risks that would not affect the rate of return demanded by investors. They affect cash flows.



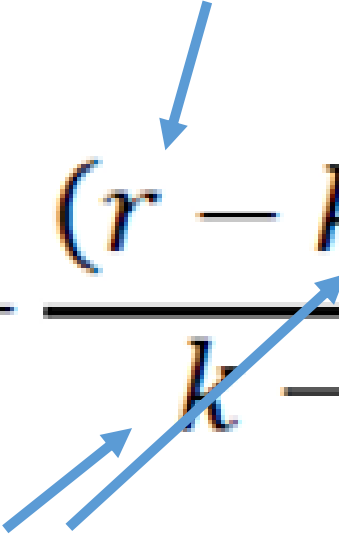
McKinsey & Co on risk



Companies certainly do need to worry about the affects that are not macro-related, even though those risks don't affect the cost of equity.

It's all about **cash flow risk**.

distributed generation ultimately will affect
the ability of utilities to earn returns
(or create more opportunities for utilities to earn them)

$$P = BV + \frac{(r - k)BV}{k - g}$$


but will not affect the cost of capital

capital will continue to flow even if risk
lowers the return utilities will earn

$$P = BV + \frac{(r - k)BV}{k - g}$$

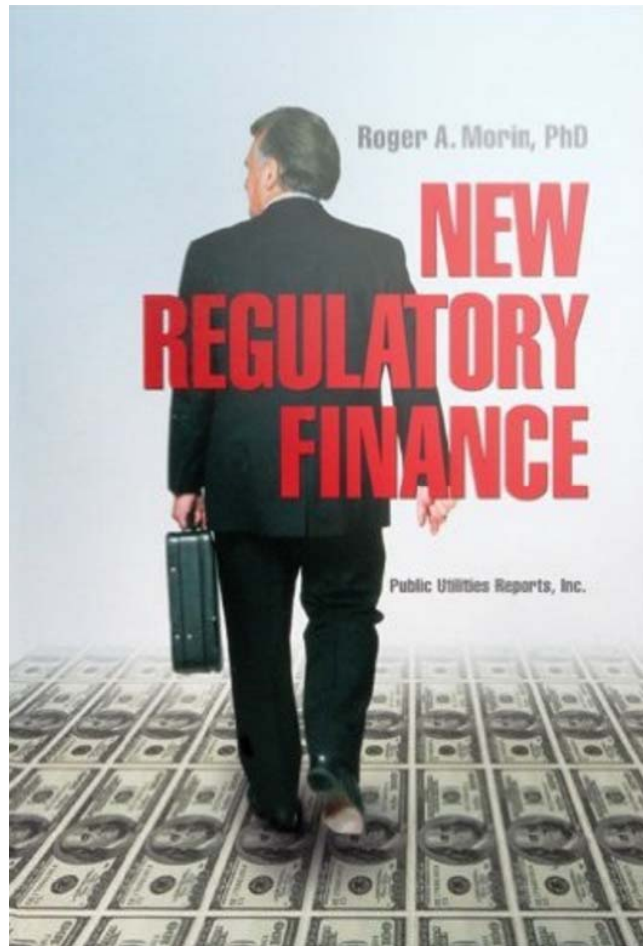
but investors will expect to earn the same
return as they did before the risk increase

capital will continue to flow even if risk lowers the return utilities will earn

to make this happen
the stock price must decline

$$P = BV + \frac{(r - k)BV}{k - g}$$

but investors will expect to earn the same return as they did before the risk increase



Utilities can raise capital even if they earn less than the cost of equity, but can do so only at the expense of their existing investors.

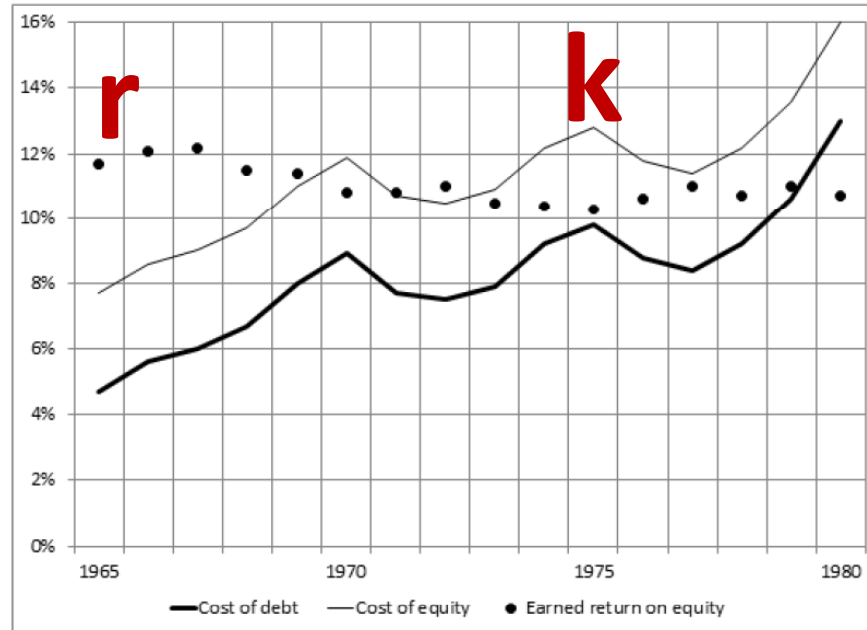


Figure 3. Utility Bond Yields, Estimated Cost of Equity (1965-1980) and Earned Returns on Equity for Moody's Electric Utility Stock Index. Source: *Moody's Public Utility Manual*.

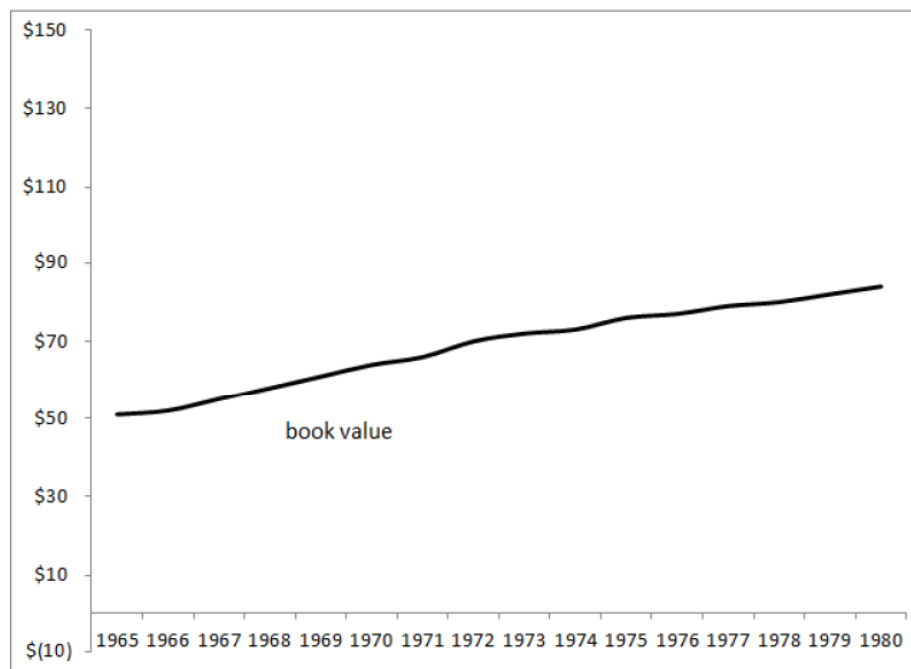


Figure 6. Moody's Electric Utility Index book value per share (1965-1980). Source: *Moody's Public Utility Manual*.

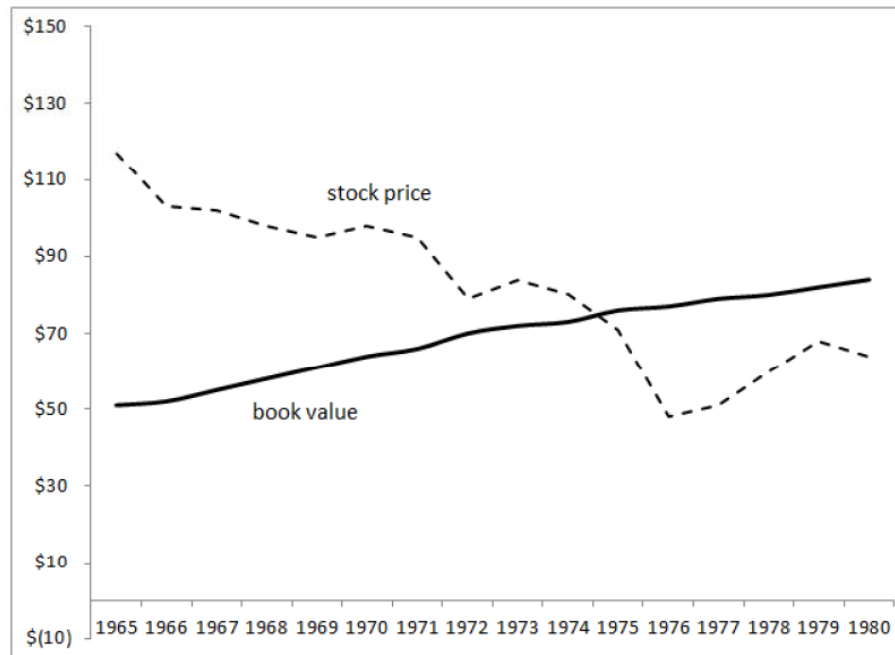
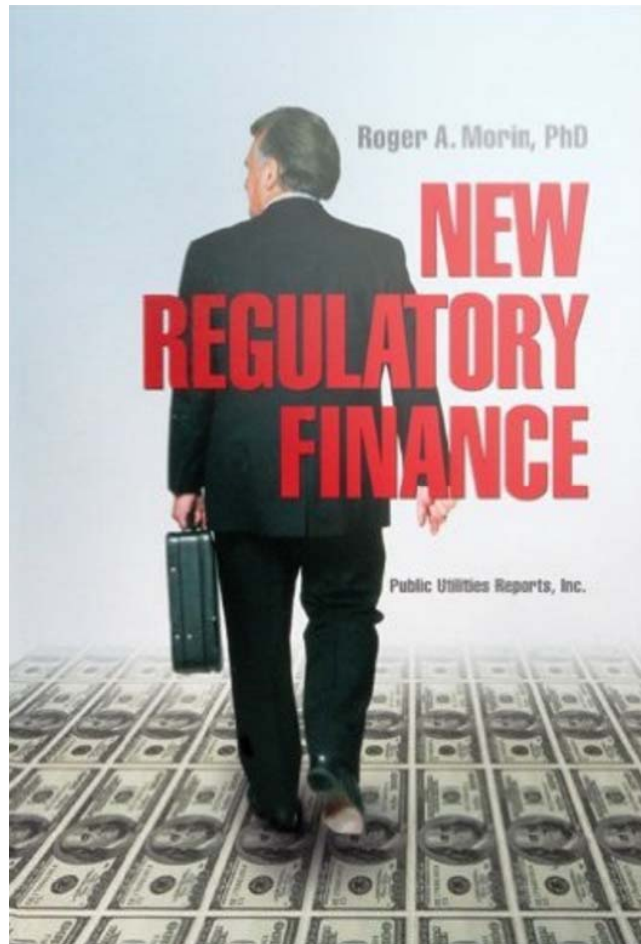


Figure 7. Moody's Electric Utility Index book value per share and stock price per share (1965-1980). Source: Moody's Public Utility Manual.



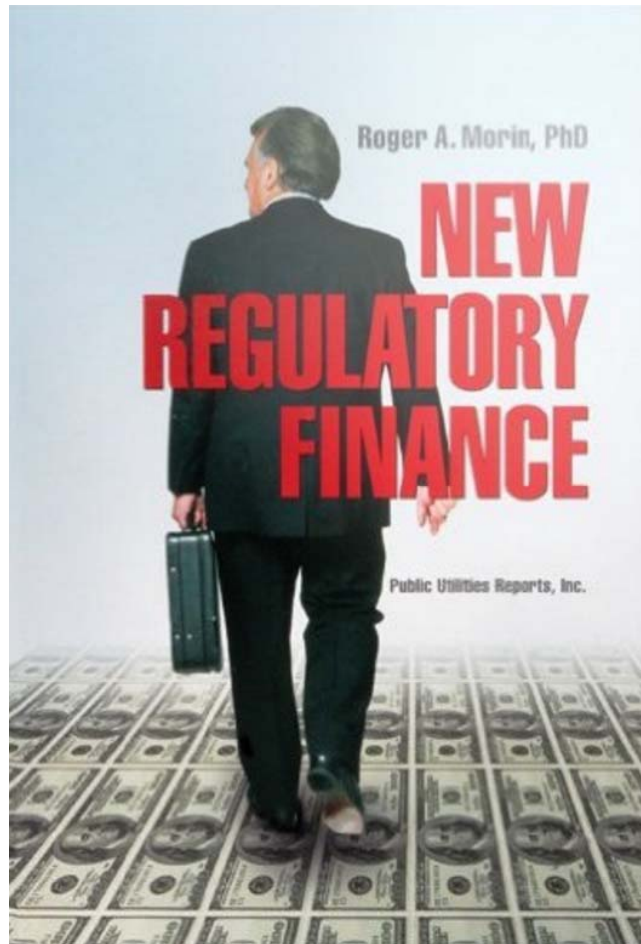
Utilities can raise capital even if they earn less than the cost of equity, but can do so only at the expense of their existing investors.

We don't want this to happen.

It's not fair.

But utilities can raise, and have raised, capital when it happens.

Whether they would do so willingly is a reasonable question.



The constraints here are institutional (regulators required to authorize a fair return) and managerial (executives want to protect existing investors), not a capital market restriction.

Takeaway

- If we don't understand finance principles, we will have a hard time developing sound strategies relating to distributed generation
- Knowing how risk affects value is critically important
- Knowing how capital flows is essential

Takeaway

- If we don't understand finance principles, we will have a hard time developing sound strategies relating to distributed generation
- Knowing how risk affects value is critically important
- Knowing how capital flows is essential
- **Are we getting this?**
- **What are the implications for distributed generation?**