



Energy Technologies Area

Lawrence Berkeley National Laboratory

*Regulatory Incentives and Disincentives
for Utility Investments in Grid Modernization*

Legislative Energy Horizon Institute Training
October 12, 2017
Washington, DC

Steve Kihm, CFA – Seventhwave

Lisa Schwartz, Berkeley Lab, is the project manager and technical editor. U.S. Department of Energy provided funding.

<https://emp.lbl.gov/publications/regulatory-incentives-and>

REGULATORY INCENTIVES AND DISINCENTIVES FOR UTILITY INVESTMENTS IN GRID MODERNIZATION

Steve Kihm, Seventhwave

**Janice Beecher, Institute of Public Utilities,
Michigan State University**

Ronald Lehr



Seventhwave delivers trusted expertise for bold energy leadership. We advance powerful strategies for real energy impacts through engineering, education and research.

MISSION

To inspire real and lasting change that advances **economic and environmental sustainability**.

- **Beecher**: Traditional regulation, if properly applied, can provide incentives for grid modernization
- **Lehr**: Traditional regulation, including its litigious processes, is not conducive to making a transition to a modern grid
- **Kihm**: Incentives vary based on circumstances—to understand whether incentives or disincentives exist we need to understand shareholder value

A Brief Summary of Co-Author Perspectives

Janice Beecher, PhD

“People call for a new paradigm, [saying] that the current regulatory model doesn’t fit with modernization So you hear that we need ‘incentive regulation.’ But from my perspective, **[regulation] is always about incentives. The dichotomy between traditional and incentive regulation is false.**”

“At a minimum, prudence should be defined in terms of **enforceable standards and generally accepted utility practices**, both of which can be substantially strengthened in light of technological advances and opportunities as well as dynamic supply and demand conditions.”

“The granting of **an exclusive franchise** to a monopoly by the state **has strings attached.**”

“The **regulatory compact is not set in stone.**
It is a living and evolving charter.”

“Motivating utilities toward evolving social ends **should not automatically be viewed as outside of the scope of the paradigm** or beyond the model and the means already available to economic regulators.”

“Meaningful regulatory reform does not necessarily require paradigmatic change. Without a doubt, **what might have been considered prudent even a decade ago would not be considered prudent today**, let alone for a utility of the future.”

“For grid modernization, we need **a new prudence** rather than a new paradigm.”

“To neglect the power of economic regulation to limit, channel, and mold the behavior of regulated firms is to neglect the very purpose of ‘regulation in the public interest’... **In the hands of capable regulators, and guided by clear requirements, the traditional model actually provides very powerful performance incentives.**”

Ron Lehr, JD

“New information from applications of new communications technologies enables consumers to become energy producers and to take more responsibility for their energy use. But **traditional regulation doesn't incent utilities to support increased consumer sovereignty.**”

“Return-on-equity incentives encourage utilities to invest in capital projects. They lack equivalent incentives for operations and customer engagement – operating expenses rather than capital expenses.
Only providing incentives to invest capital stands in the way of innovation.”

“A variety of factors stand in the way of creating well targeted and well aligned utility incentives, including **litigated processes, poor communications, relationships that do not build trust, and lack of consensus about outcomes.**”

“ Regulation can get us there, but **it will be a long road if we just try to litigate our way there.**”

“Among these alternatives are regulatory options that put relatively less regulatory time and effort into addressing the question **‘did we pay the right amount for what we got’** and more regulatory time and effort into anticipating the future, asking **‘what do we want, and how do we pay for that’?**”

Steve Kihm, CFA

- Can utilities raise capital for grid modernization? **Yes**

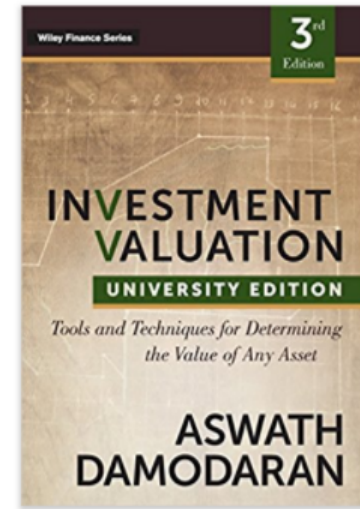
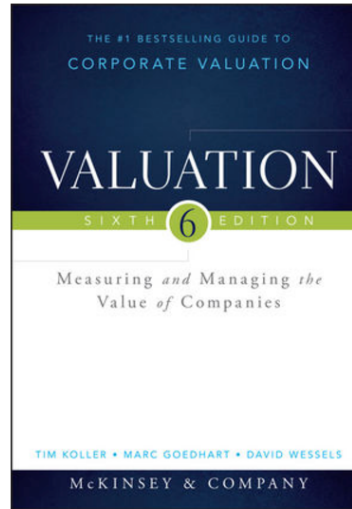
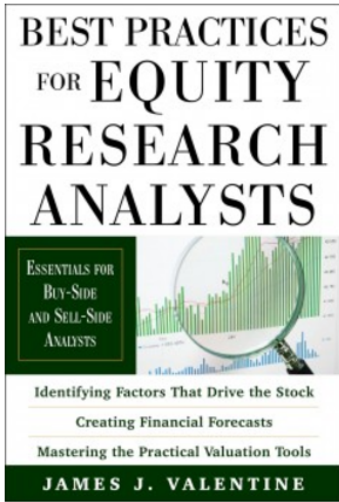
- Do utility managers see value for **current shareholders** in grid modernization projects? **Maybe**



This is the relevant question.

- Shareholder value (stock price)
 - **risk, return and scale**
- **Utility managers**, not the capital markets, decide whether investments should be made

Proper framing of the problem



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Capital Allocation

Evidence, Analytical Methods, and Assessment Guidance

October 19, 2016

Authors

Michael J. Mauboussin
michael.mauboussin@credit-suisse.com

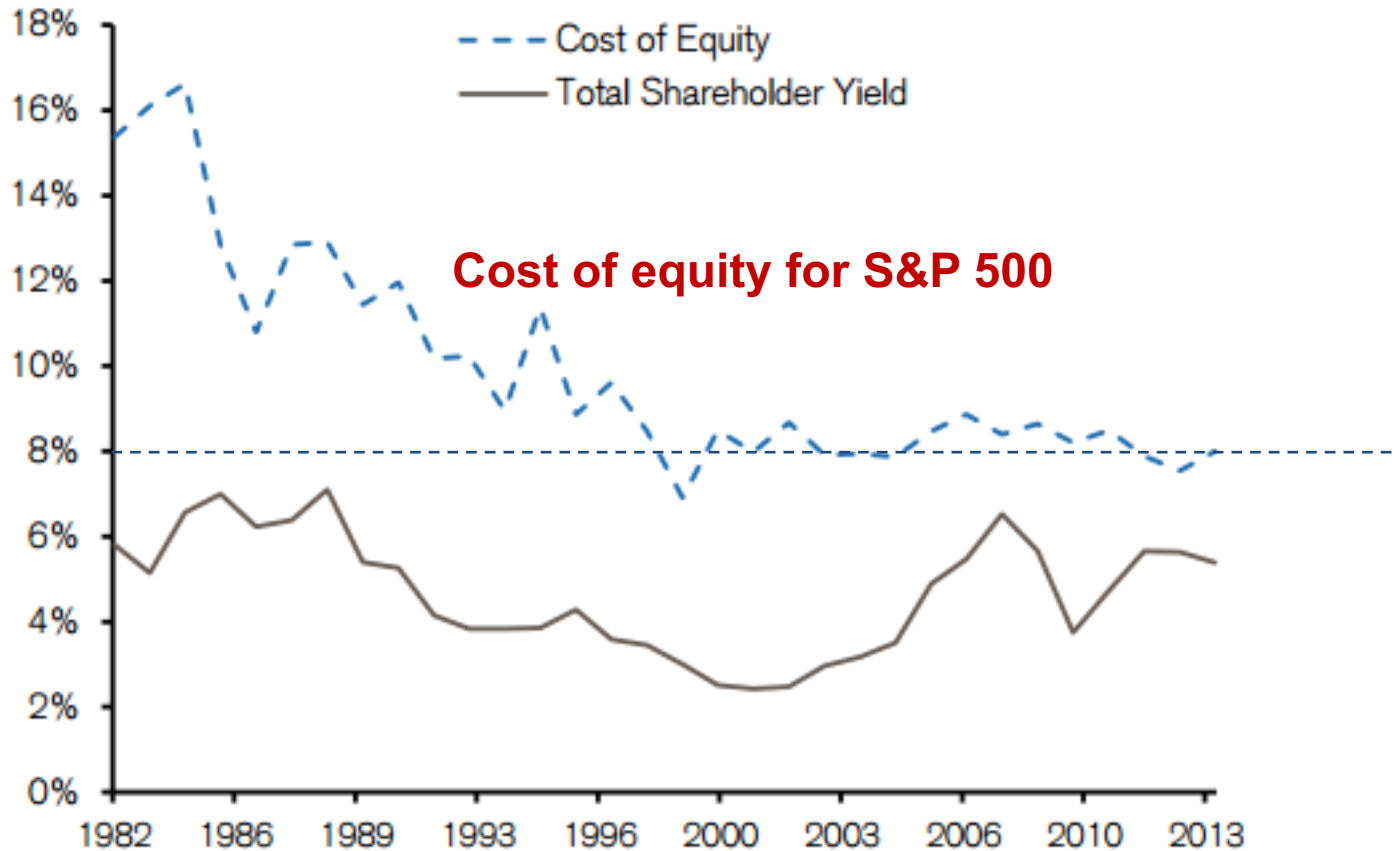
Dan Callahan, CFA
daniel.callahan@credit-suisse.com

Darius Majd
darius.majd@credit-suisse.com



Credit Suisse *Distributing Cash to Shareholders*

Exhibit 10: Total Shareholder Yield for the S&P 500 versus the Cost of Equity (1982-2013)



Source: Aswath Damodaran; S&P Dow Jones Indices, Liang and Sharpe, Credit Suisse estimates.





Xcel Energy

Beyond 2019, we assume a system wide normalized 10% average allowed ROE and 0.5% average annual long-term usage growth. We assume **a 7.5% cost of equity** in our discounted cash flow valuation. This is lower than the 9% rate of return we expect investors will demand of a diversified equity portfolio. A 2.25% long-term inflation outlook underpins our capital cost assumptions. Our cost of capital assumption is 5.9%.

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r

k

Xcel Energy

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Capital allocation is a senior management team's most fundamental responsibility...The objective of capital allocation is to build **long-term value per share.**

Mauboussin, M., et al. 2016. *Capital Allocation: Evidence, Analytical Methods, and Assessment Guidance*. Credit Suisse.

As EEl explains, “these projects also carry the most upfront development time, longer construction schedules, and overall risk.” However, without a sufficient ROE, **electric utilities are likely to choose** short-term, more local projects, instead of riskier, more strategic options. (Emphasis added.)

Kuzika, L. S. 2013, June 17. EEl Urges FERC to Reform its ROE Methodology. *Energy & Environmental Law Adviser*.

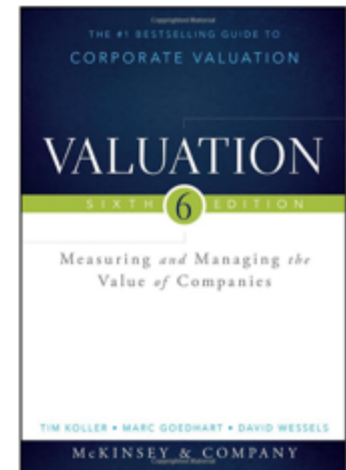
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**This is not saying utilities couldn't raise capital.
It's saying they won't want to invest in transmission.**

Shareholder value is created when a firm invests in a project that earns a return (r) that exceeds the cost of the capital used to finance it (k).

$$r > k$$



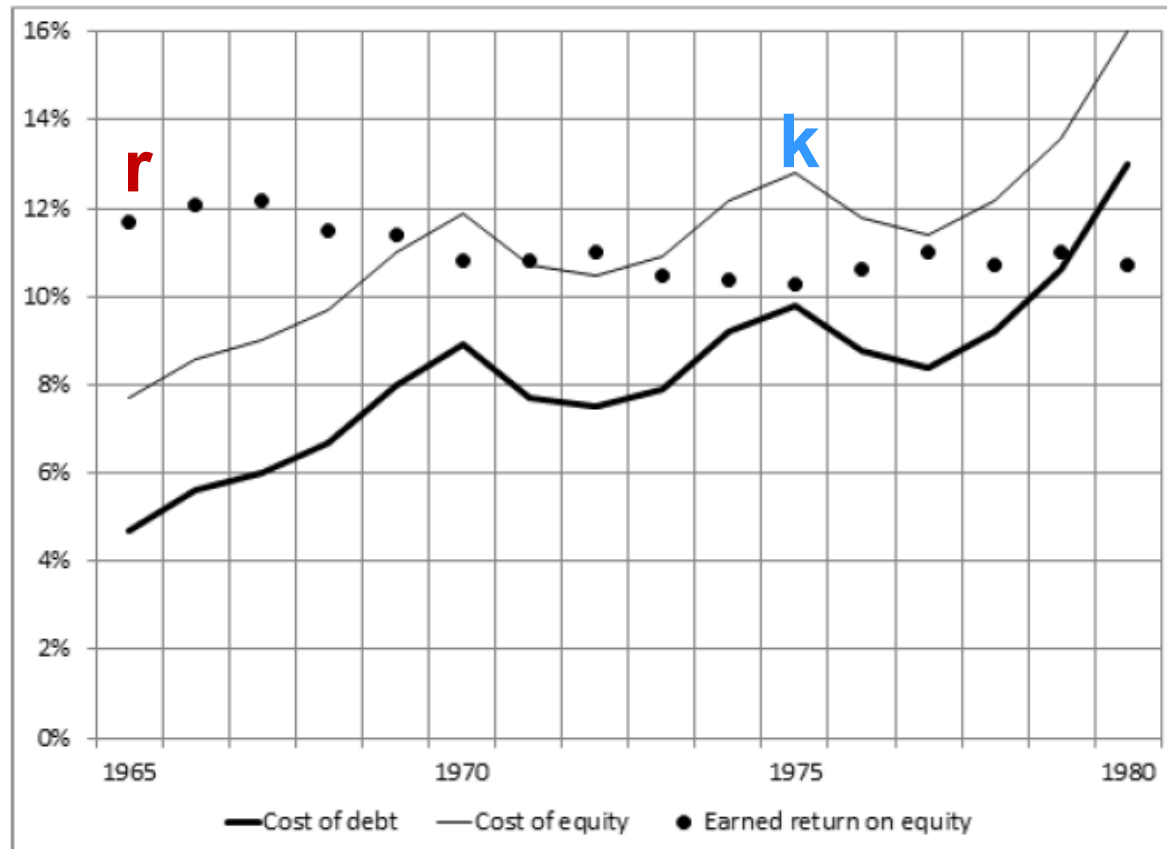


Figure 3. Utility Bond Yields, Estimated Cost of Equity (1965-1980) and Earned Returns on Equity for Moody's Electric Utility Stock Index. Source: *Moody's Public Utility Manual*.

When r is less than k

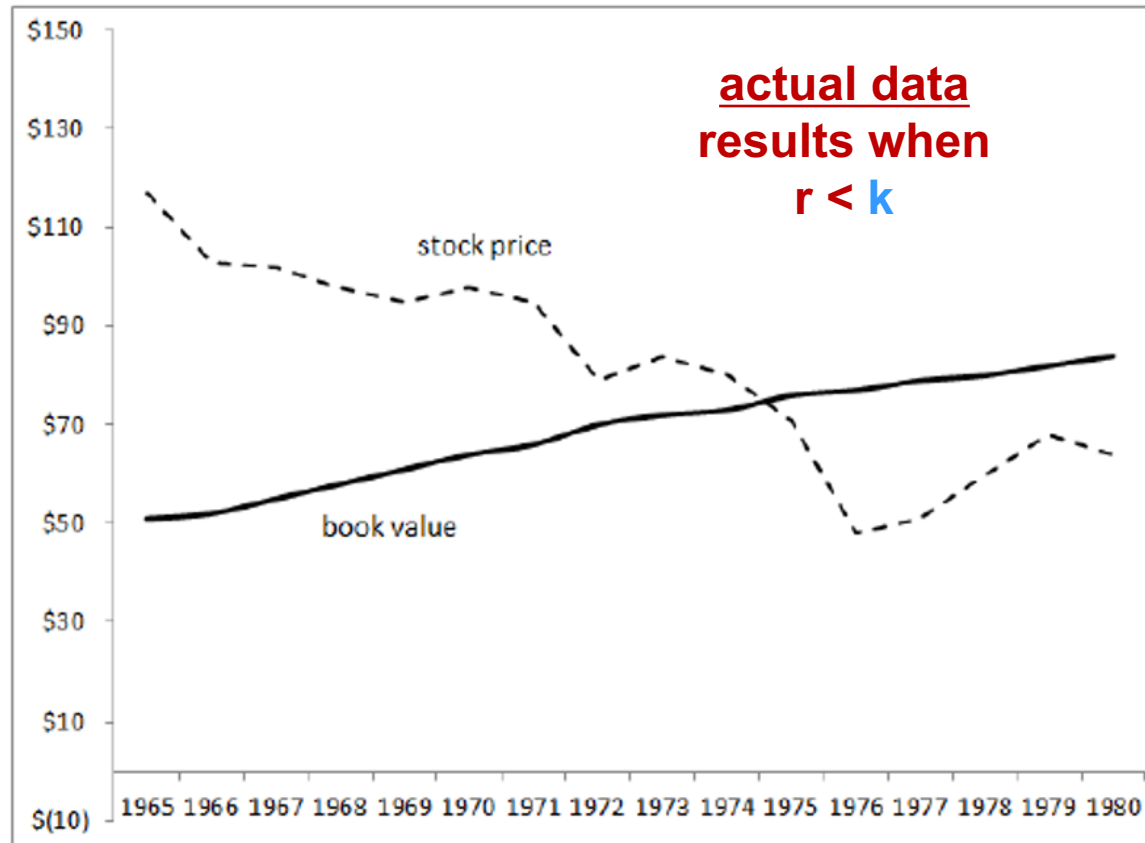


Figure 7. Moody's Electric Utility Index book value per share and stock price per share (1965-1980). Source: Moody's Public Utility Manual.

Profitable investment, but below the minimum acceptable level

Several decades ago utility executives en masse issued statements that they were going to avoid large-scale plant investment whenever possible, even if load continued to grow. Their statements were grounded in the financial concepts we discuss here. At that time the Congressional Budget Office feared that the disincentive for utilities to make plant investment could lead to a more-expensive power supply.

The nation's electricity supply could become less cost-effective if regulatory incentives continue to bias utilities away from capital investments (CBO 1986).

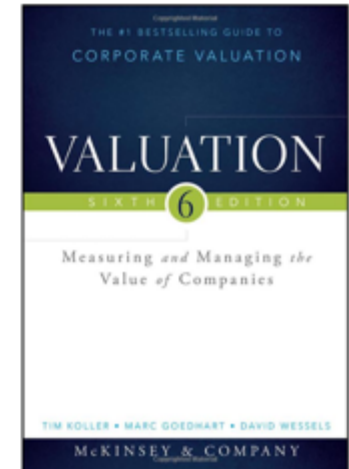
What model were utilities operating under that created a disincentive, not an incentive, to invest in plants? The same one in place today.

Kihm, Barrett, & Bell, 2014, ACEEE Summer Study

If r exceeds k , the more capital we invest (I) the more value we create.

$$V = (r - k) \times I$$

(value engine)



risk, return, and scale

If r exceeds k , the more capital we invest (I) the more value we create.

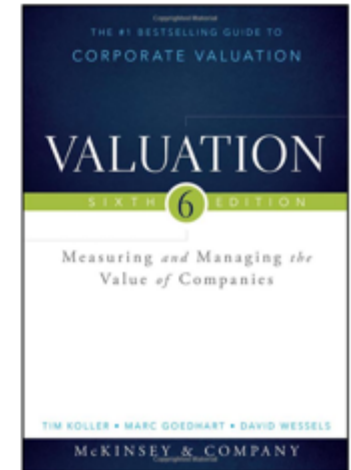
How does the policy affect the utility's systematic risk?

$$V = (r - k) \times I$$

(value engine)

How does the policy affect the expected return on equity?

risk, return, and scale



What are the scale differences between the utility's resource options?

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Xcel Energy

Beyond 2019, we assume a system wide normalized 10% average allowed ROE and 0.5% average annual long-term usage growth. We assume **a 7.5% cost of equity** in our discounted cash flow valuation. This is lower than the 9% rate of return we expect investors will demand of a diversified equity portfolio. A 2.25% long-term inflation outlook underpins our capital cost assumptions. Our cost of capital assumption is 5.9%.

To get the full price impact you would use such a model

$$P = \frac{N BVPS r (1 - b) + (r - k) I}{N (k - b r)}$$



Honda Civic

If both cars could be purchased for **\$15,000**, which model would attract more buyers?



BMW Series 7



Honda Civic

\$22,000

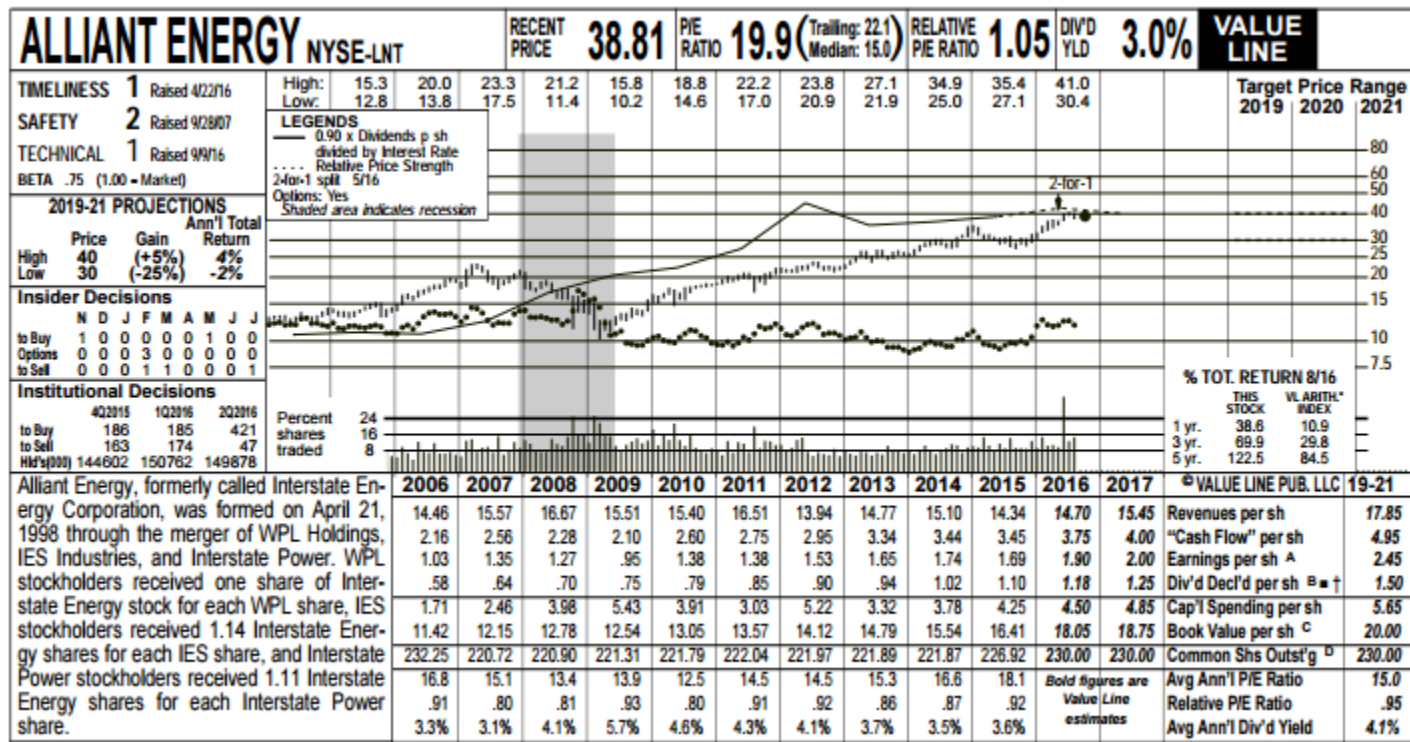
Now which model would attract more buyers?



BMW Series 7

\$97,000

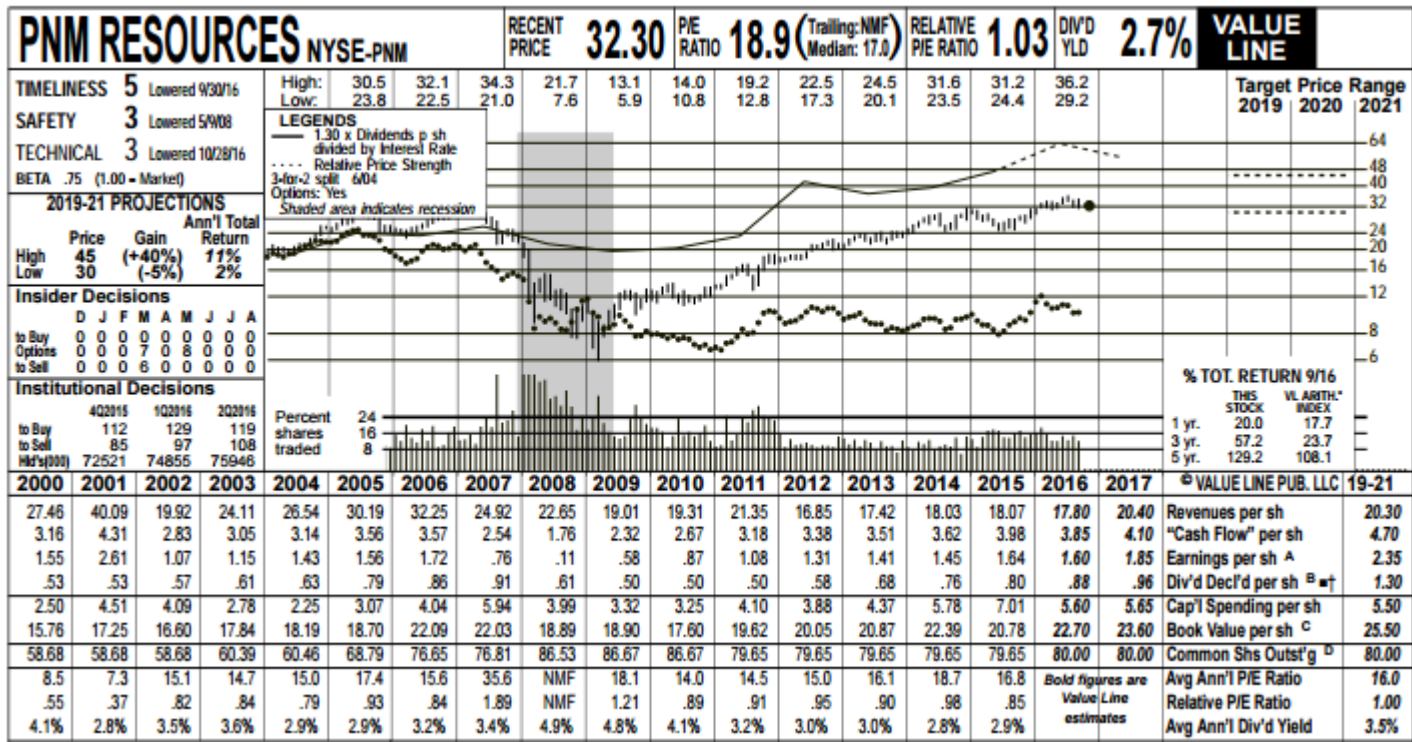
The Value Line Investment Survey



	2016	2017	2019-21
Return on Total Cap'l	5.5%	6.0%	7.0%
Return on Shr. Equity	10.5%	10.5%	12.0%
Return on Com Equity ^E	11.0%	11.0%	12.5%



The Value Line Investment Survey



2016 2017

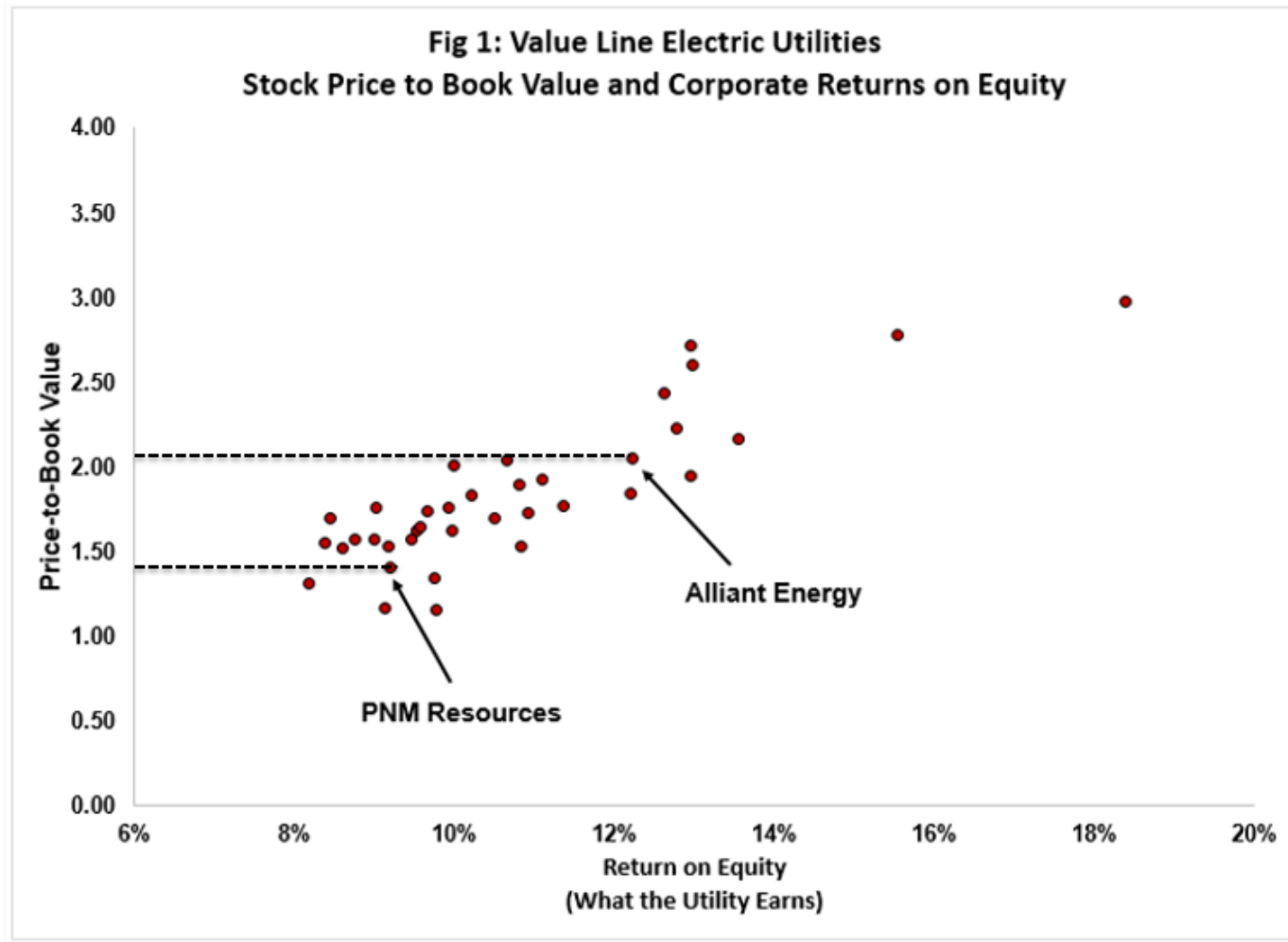
2019-21

5.0%	5.5%	Return on Total Cap'l	6.0%
7.5%	8.0%	Return on Shr. Equity	9.5%
7.5%	8.0%	Return on Com Equity ^E	9.5%



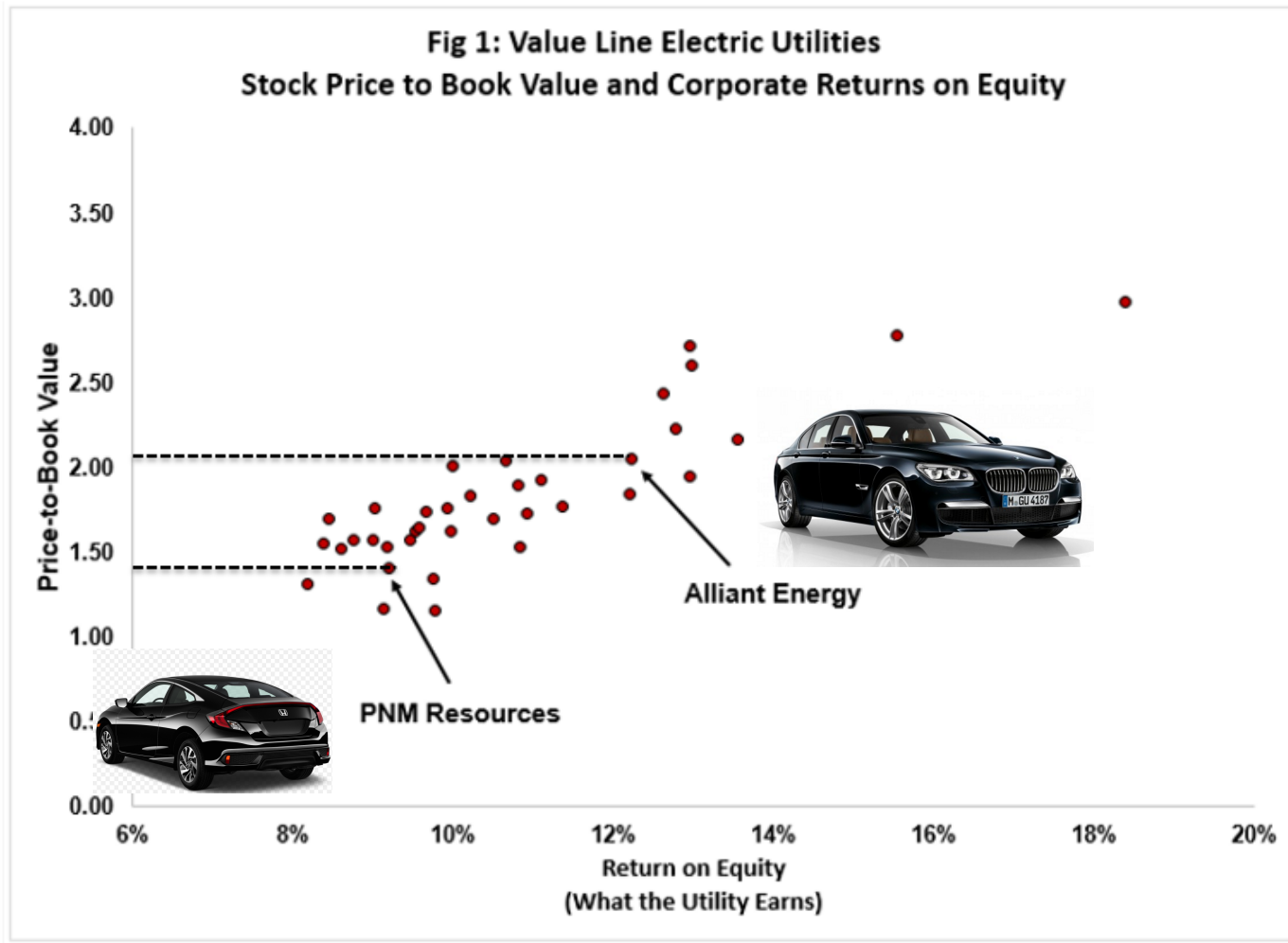
High returns on equity don't attract more capital

The market uses pricing so that capital flows easily to all utilities regardless of the return on equity the utility earns

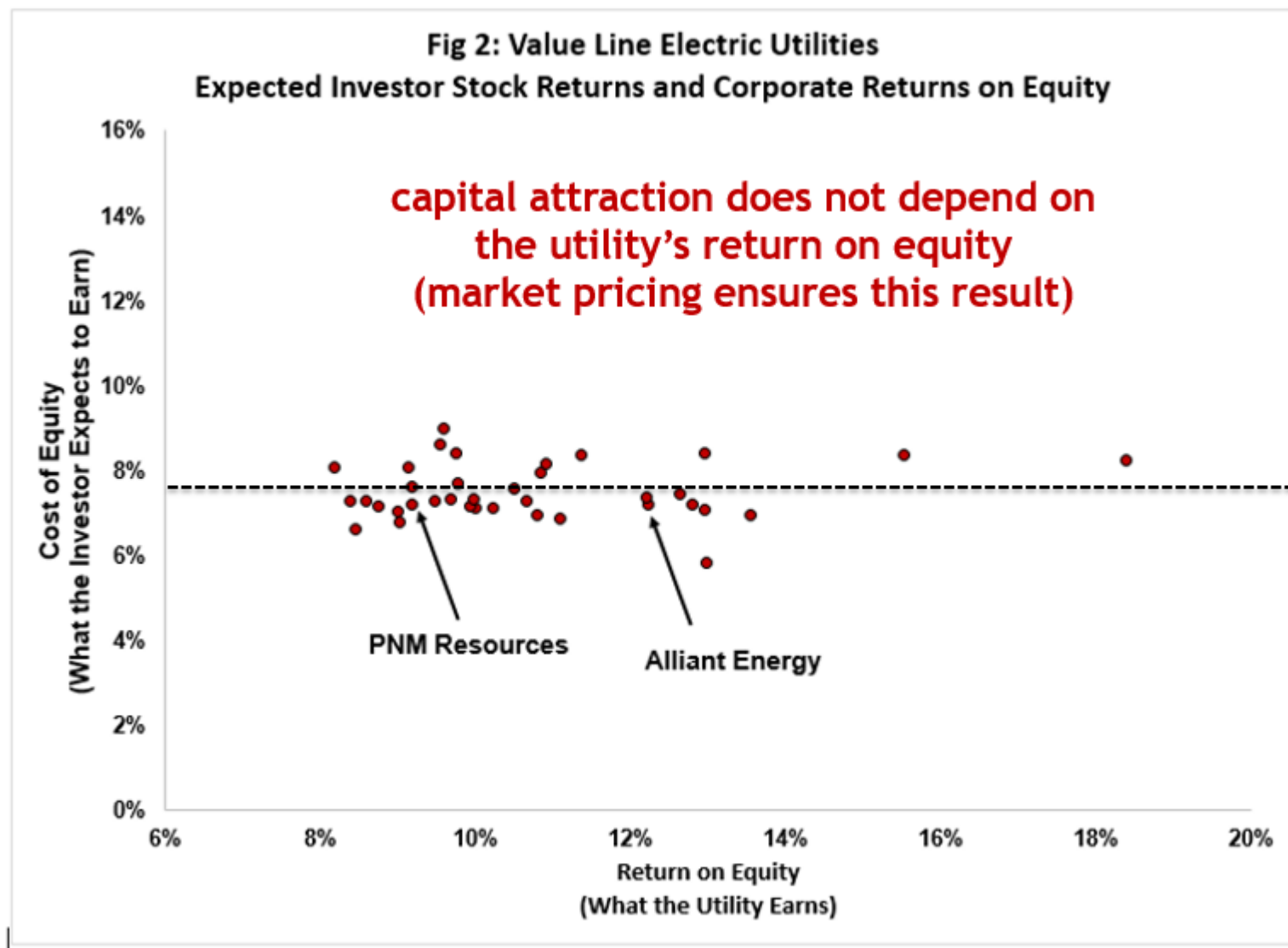


High returns on equity don't attract more capital

The market uses pricing so that capital flows easily to all utilities regardless of the return on equity the utility earns



New investors expect to earn about the same return on all utility stocks



**For every dollar invested
Alliant creates more value
for present shareholders**

$$\text{Alliant: } V = \underline{(0.125 - 0.075)} \times I$$

$$\text{PNM: } V = \underline{(0.095 - 0.075)} \times I$$

$$\text{Alliant: } V = (0.125 - 0.075) \times I$$

$$\text{PNM: } V = (0.095 - 0.075) \times I$$

Stocks are priced so that those providing new capital to either company expect to earn about the same return.

Here the project with the larger scale will create more value per-share for investors.



Substations: $V = (0.100 - 0.070)\$500,000,000 = \$15,000,000$

Two Way Flows: $V = (0.100 - 0.070)\$400,000,000 = \$12,000,000$

Can we provide an incentive to invest in the two-way flow project?

**Yes, if we set the
return high enough.**

Substations: $V = (0.100 - 0.070)\$500,000,000 = \$15,000,000$

Two Way Flows: $V = (0.120 - 0.070)\$400,000,000 = \$20,000,000$



**Now the project with the higher return
will create more value per-share for investors.**

But not just any higher return will do the trick.



Substations: $V = (0.100 - 0.070)\$500,000,000 = \$15,000,000$

Two Way Flows: $V = (10.5\% - 0.070)\$400,000,000 = \$14,000,000$

**Now the project with the lower return
will create more value per-share for investors
(scale again dominates).**


**New shareholders
provide all of this
capital**

**Present shareholders
capture the value
gain as a windfall**

Substations: $V = (0.100 - 0.070)\$500,000,000 = \$15,000,000$

Two Way Flows: $V = (10.5\% - 0.070)\$400,000,000 = \$14,000,000$

**New shareholders
earn the cost of equity based on
what they paid for the stock**

Note that an opportunity to invest in a project offering more than the cost of capital generates an immediate capital gain for investors. This is a **windfall gain**, since it is realized *ex ante*. 

Myers, S. 1972. The Application of Finance Theory to Public Utility Rate Cases. *The Bell Journal of Economics and Management Science*.

$$V = (r - k) \times I$$

(value engine)

It's all about the details
There are no general answers

Do these policies create incentives?

- Different rates of return and costs of capital for different utility assets (**it depends on r , k , and I**)
- De-risking certain resource types (**it depends on r , k , and I**)
- Providing rate base treatment for certain expense items (**it depends on r , k , and I**)
- Formula rates (**it depends on r , k , and I**)
- Price caps (**it depends on r , k , and I**)
- Earnings sharing mechanisms (**it depends on r , k , and I**)

Beware of statements such as

“Utilities have an incentive to...”
or “Utilities have a disincentive to...”

Ask: Which utility?

Ask: What’s the action in question?

**Incentives/disincentives
depend on circumstances**

Why Many Corporate Managers Struggle With the Shareholder Value Concept

Capital Allocation

Evidence, Analytical Methods, and Assessment Guidance

October 19, 2016

Authors

Michael J. Mauboussin
michael.mauboussin@credit-suisse.com

Dan Callahan, CFA
daniel.callahan@credit-suisse.com

Darius Majd
darius.majd@credit-suisse.com



Capital allocation is a senior management team's most fundamental responsibility. The problem is that **many CEOs don't know how to allocate capital effectively**. The objective of capital allocation is to build long-term value per share.

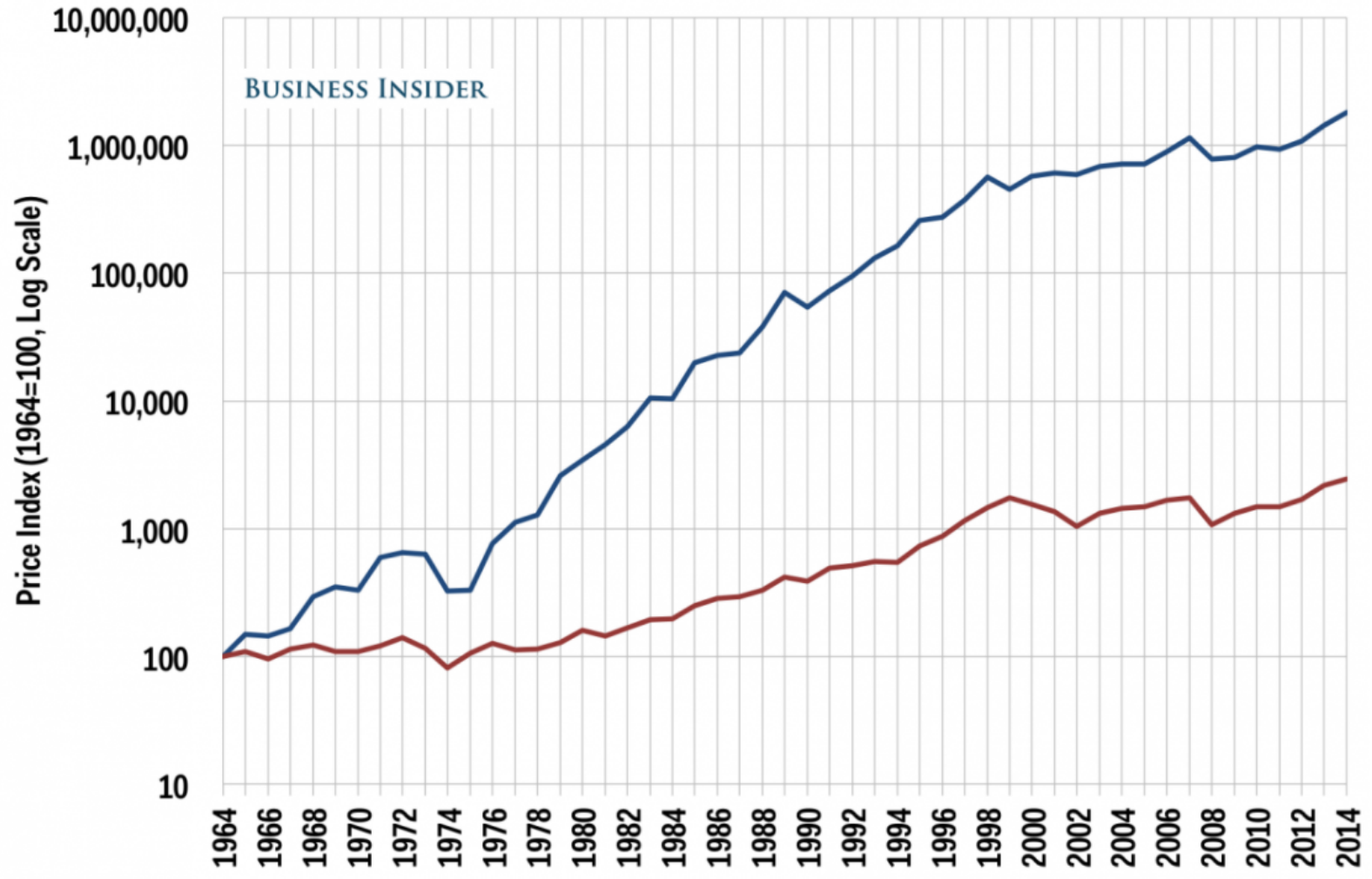


“I happen to have a
**talent for allocating
capital.**”

Warren Buffett

Berkshire Hathaway vs. S&P 500

— Berkshire Hathaway — S&P 500



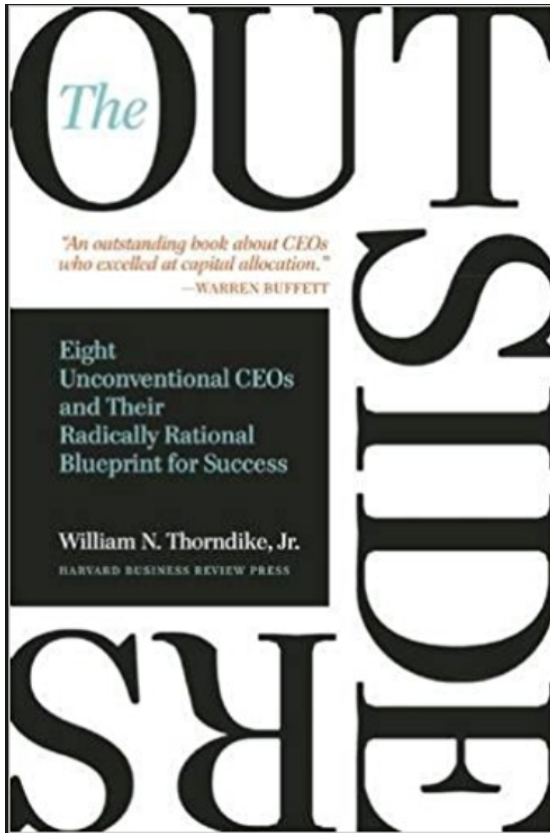
Buffett on why CEOs often don't maximize shareholder value

This point can be important because the heads of many companies are not skilled in capital allocation. Their inadequacy is not surprising. **Most bosses rise to the top because they have excelled in an area such as marketing, production, engineering, administration or, sometimes, institutional politics.**

Buffett on why CEOs often don't maximize shareholder value

Once they become CEOs, they face new responsibilities. They now must make capital allocation decisions, a critical job that they may have never tackled and that is not easily mastered. To stretch the point, **it's as if the final step for a highly-talented musician was not to perform at Carnegie Hall but, instead, to be named Chairman of the Federal Reserve.**

CEOs who understand shareholder value are the exception



Thorndike spent eight years working on the book and interviewed all the living CEOs he studied. The CEOs he ended up profiling were **Tom Murphy** of Capital Cities, **Henry Singleton** of Teledyne, **Bill Anders** of General Dynamics, **John Malone** of TCI, **Katharine Graham** of The Washington Post Co., **Bill Stiritz** of Ralston Purina, **Dick Smith** of General Cinema, and **Warren Buffett** of Berkshire Hathaway.

Managers don't understand the counterintuitive concept of value maximization

Mauboussin

Buffett

Thorndicke

Managers do understand the concept, but they prefer to act in their own interest (agency theory)

Jensen-Meckling

Managers should not attempt to maximize shareholder value, but should consider all stakeholders (legal argument)

Stout

Agency theory: Agents (managers) will act in their own interests, which sometimes conflict with those of shareholders (principals).

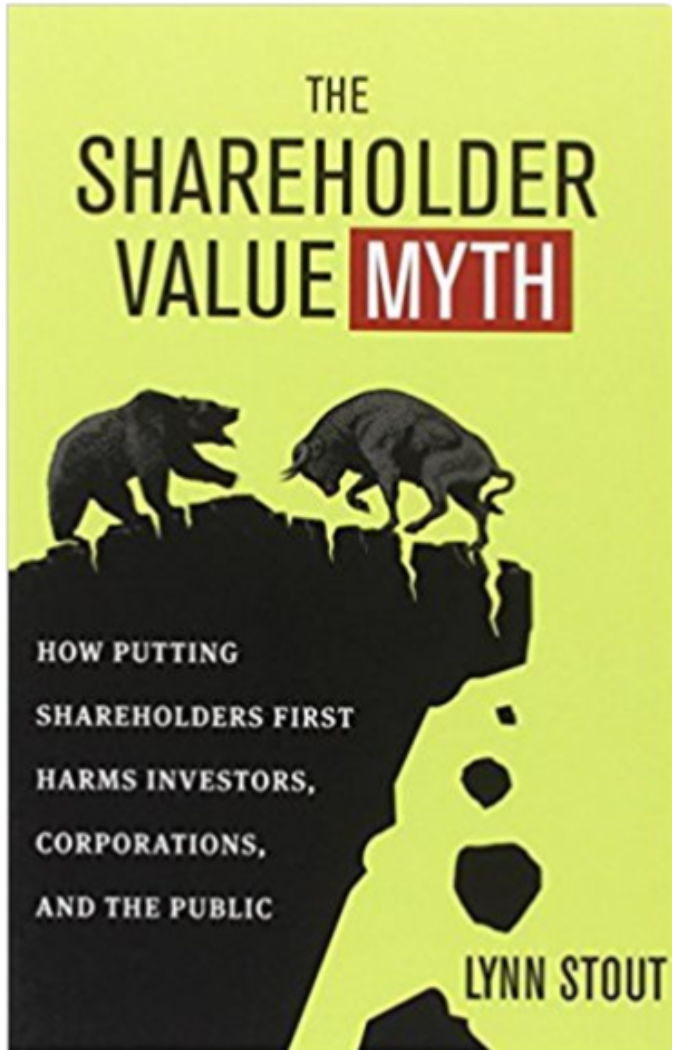
Journal of Financial Economics 3 (1976) 305–360. © North-Holland Publishing Company

**THEORY OF THE FIRM: MANAGERIAL BEHAVIOR,
AGENCY COSTS AND OWNERSHIP STRUCTURE**

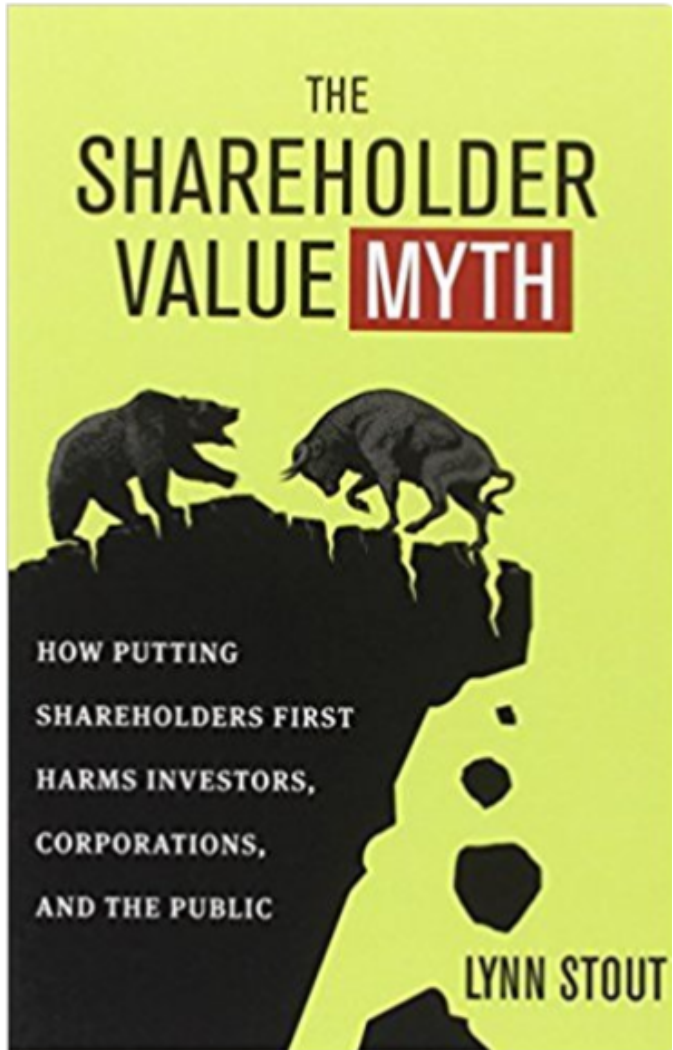
Michael C. JENSEN and William H. MECKLING*

University of Rochester, Rochester, NY 14627, U.S.A.

Received January 1976, revised version received July 1976



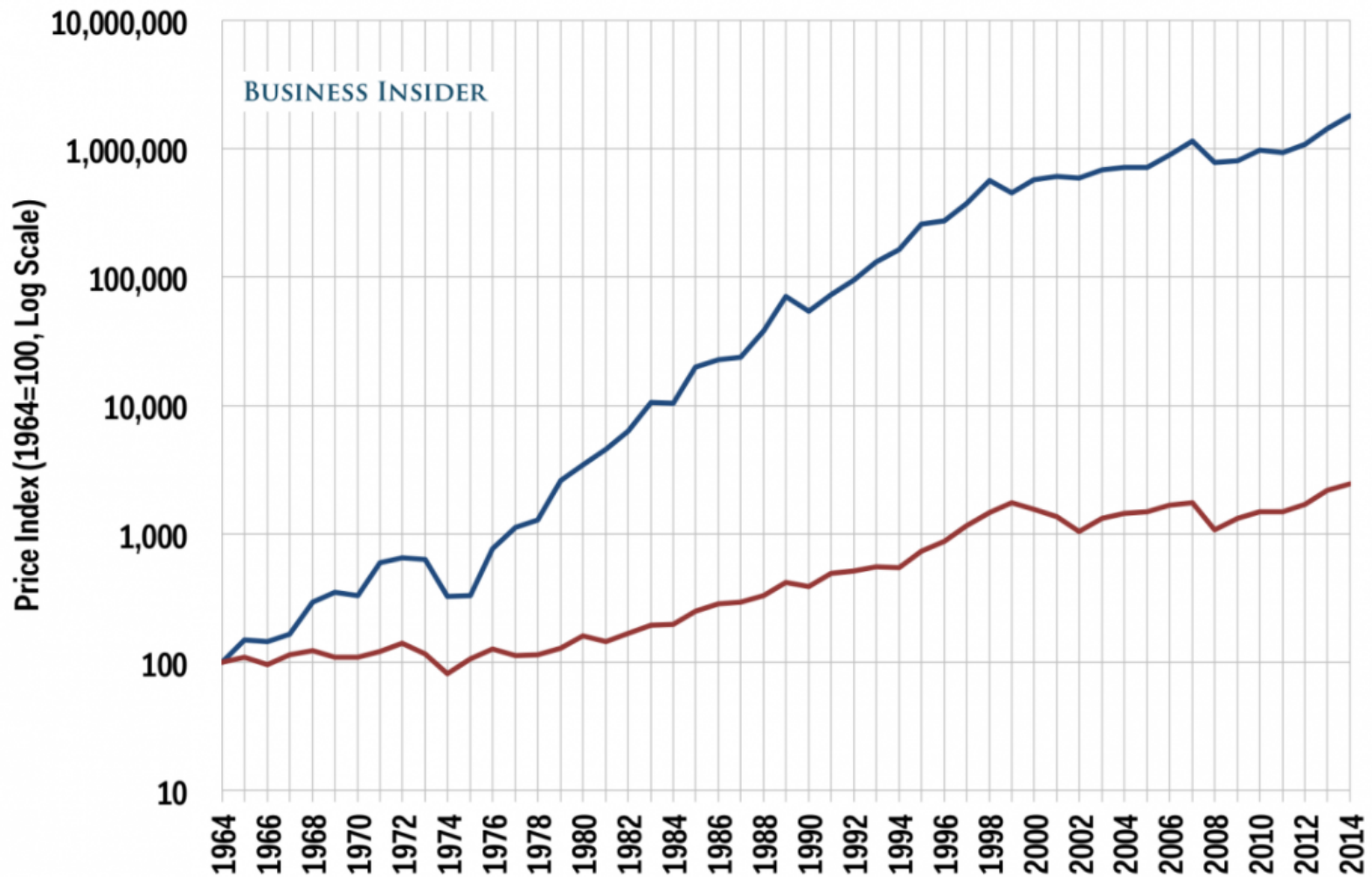
The notion that corporate law requires directors, executives, and employees to maximize shareholder value simply isn't true... **The idea is a fable.**



This does not suggest that shareholder value is not important—**it's just not the only thing that's important.**

Berkshire Hathaway vs. S&P 500

— Berkshire Hathaway — S&P 500



- Municipally-owned utilities
- Cooperative utilities
- B corporations

- No shareholders, so the focus must shift to managers
- Incentive compensation is as desirable in the nonprofit sector as in the for-profit world, but, unlike the latter, which bases incentive payments on organizational profitability, **nonprofits need to structure their systems on other performance measures.** (Frank A. Monti, CPA)
- What is essential is that the nonprofit **clearly specify—in advance of implementing the plan—the performance measures against which individual performance will be measured.** (Frank A. Monti, CPA)
- See <http://www.massnonprofit.org/expert.php?artid=2869&catid=18>



Steve Kihm

Principal and Chief Economist
Seventhwave
skihm@Seventhwave.org
608-210-7131

**For information on Berkeley Lab's Future Electric
Utility Regulation series please contact:**

Lisa Schwartz

Deputy Group Leader/Energy Efficiency Team Leader
Electricity Markets and Policy Group
Lawrence Berkeley National Laboratory
LCschwartz@lbl.gov
510-486-6315 (office)
510-926-1091 (cell)