Achieving the Required Rate of Return

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Agenda

- Challenges and Opportunities for CalPERS
- The Success Equation
- An Uncertain World – Getting the Odds on Your Side
- Achieving the Required Rate of Return
- My 180-Day Plan

Challenges and Opportunities

Challenges

- Over the 10-, 20-year periods, CalPERS did not achieve 7 percent required rate of return

- Challenges over the next 10 years
  - Declining interest rates, increasing profit margins are less likely to repeat
  - Current valuations are high
  - Slower global economic growth
  - Fewer opportunities to generate excess returns
  - Underfunded status limits options

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Opportunities

- Improved liquidity profile
- Long-term investing horizon

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The Success Equation
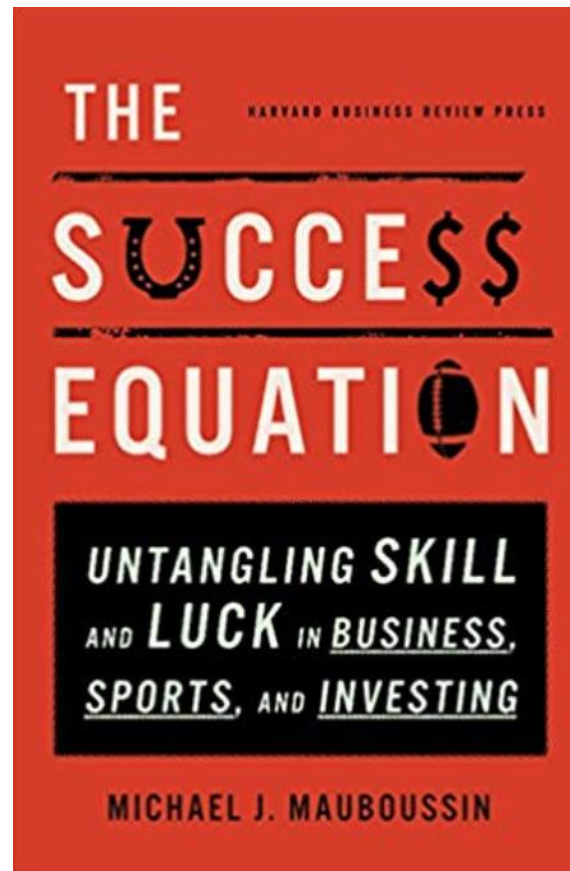
"There is no substitute for hard work"

– Thomas A. Edison

"The only sure thing about luck is that it will change."

– Bret Harte

STANDARD
& POOR'S **500**

1991-2006

2006-2011

52%

Luck is not obtainable and
possessing the skill is not knowable…

What do we do?

The Success Equation – What Does This Mean?

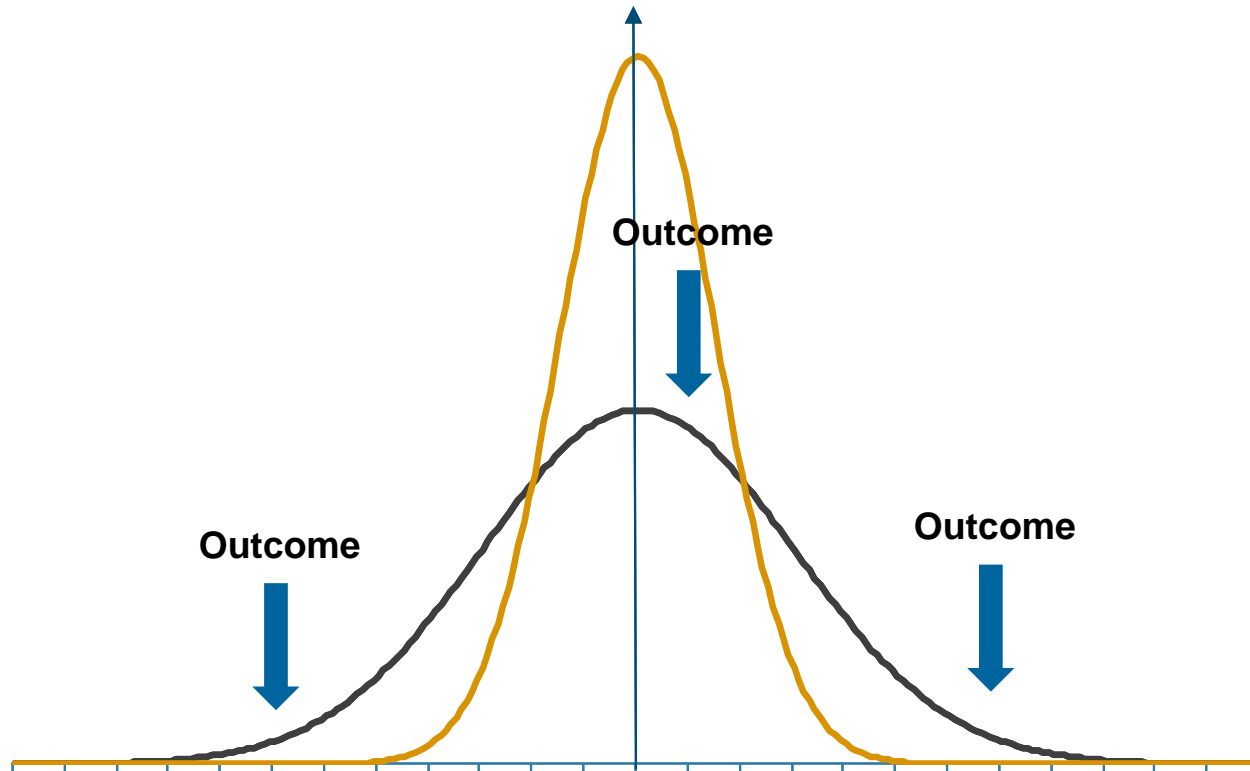Focus on investment decision making process
1. Built on our comparative advantages
2. Repeatable
3. Protected by an appropriate governance structure

What is the right mix of skill and luck?
1. Bad news - skill and luck cannot be separated
2. Good news - we do not need to
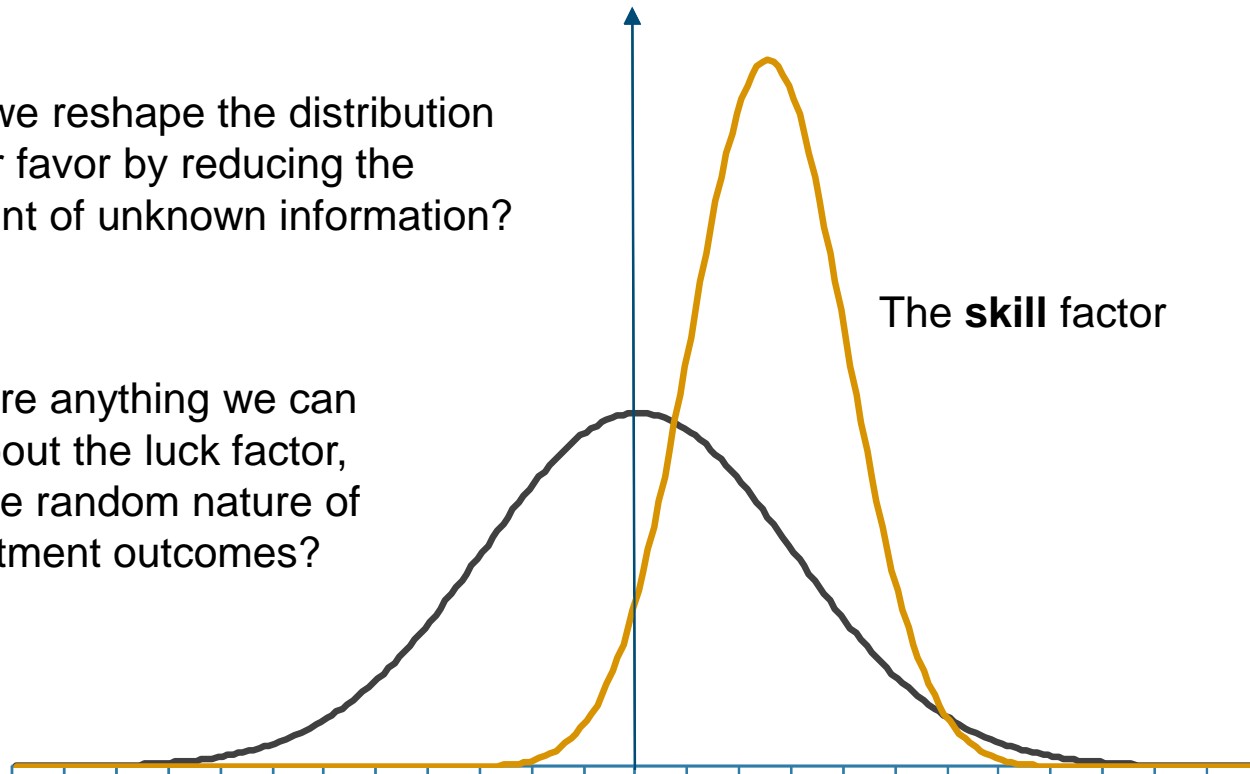3. Both matter to investment success

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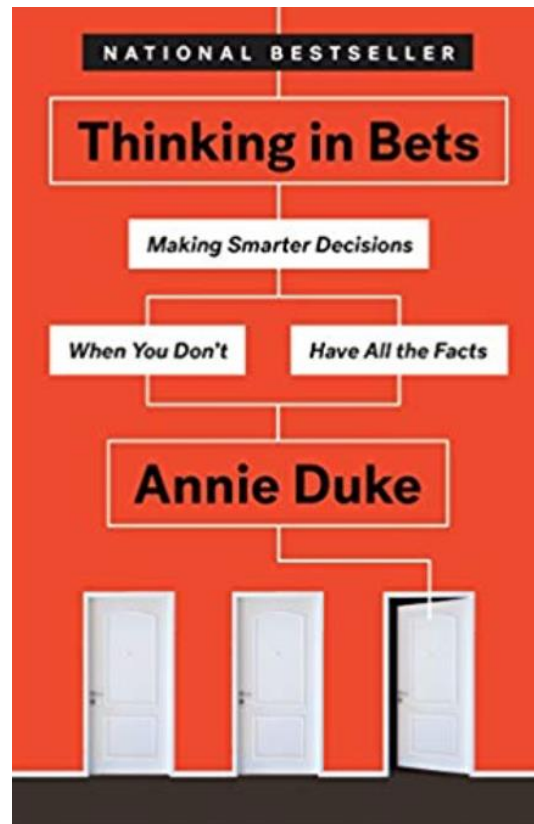
An Uncertain World – Getting the Odds on Your Side

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Can we reshape the distribution to our favor by reducing the amount of unknown information?

The **skill** factor

Is there anything we can do about the luck factor, i.e. the random nature of investment outcomes?

Achieving the
Required Rate of Return

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Shape the future return distribution
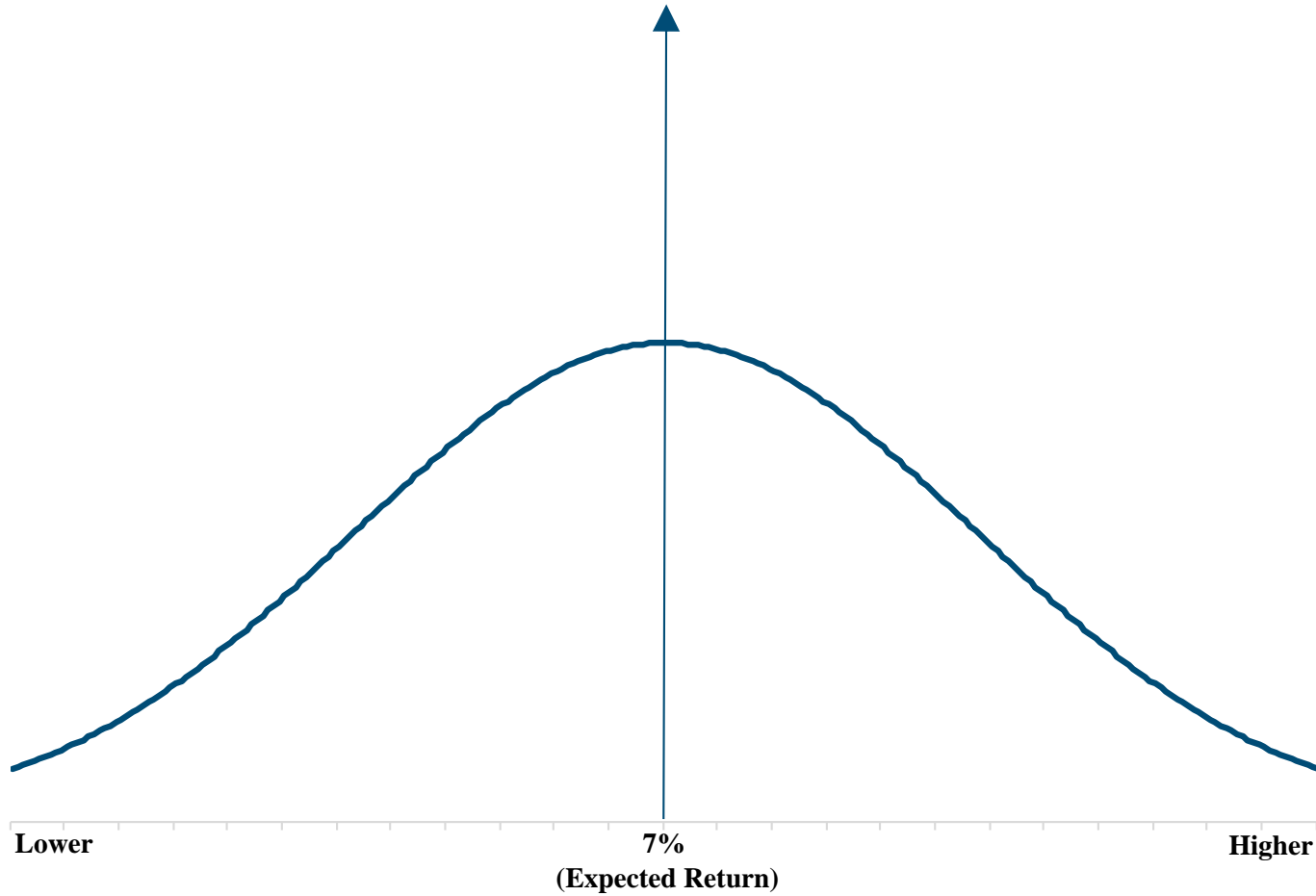to our favor – the **skill** factor

Focus #1

- Improve our investment capabilities
    - Strategic and tactical asset allocation
    - Less efficient markets
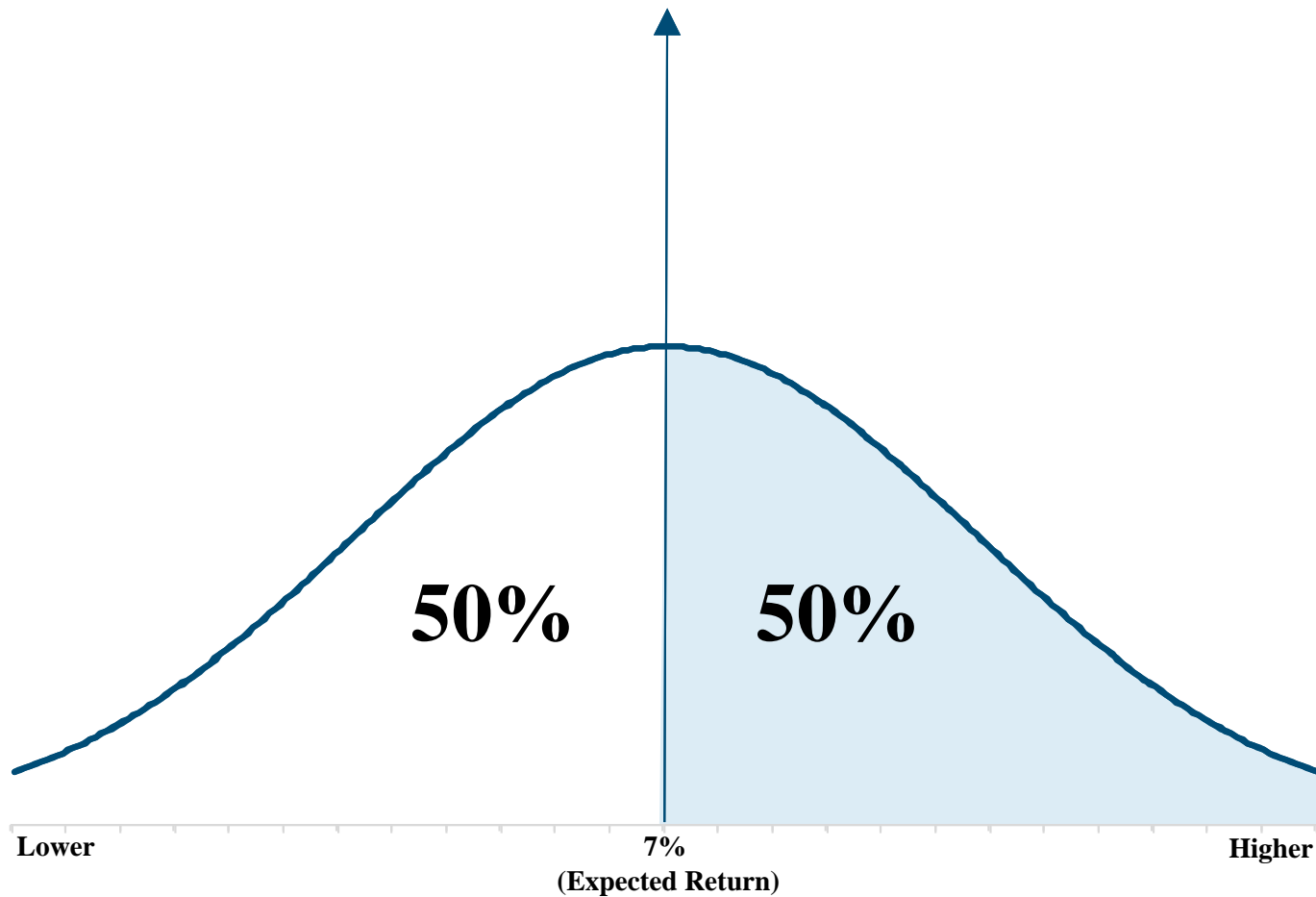   - Markets with higher growth potential

Focus #2

- Investment activities
  - Staying focused
  - Total fund approach
  - Prioritize resources

Focus #3

- Our advantages
  - Scale and brand
  - Synergies among asset classes
  - Long-term investment horizon
  - Diversity and inclusion
  - Investment beliefs
  - Innovation

Lower   **7%**   Higher

(Expected Return)

Charts are presented for illustrative purposes. Values presented are based on an assumed normal distribution with an initial expected return and volatility of 7% and 11% respectively.

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50%   50%

Lower   7%   Higher
                  (Expected Return)

Charts are presented for illustrative purposes. Values presented are based on an assumed normal distribution with an initial expected return and volatility of 7% and 11% respectively.

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Higher expected return

Lower   **7%**   Higher
(Expected Return)

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43%   **57%**

Lower   **7%**   Higher
        (Expected Return)

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Higher expected return and lower volatility

Lower   **7%**   Higher

(Expected Return)

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40% **60%**

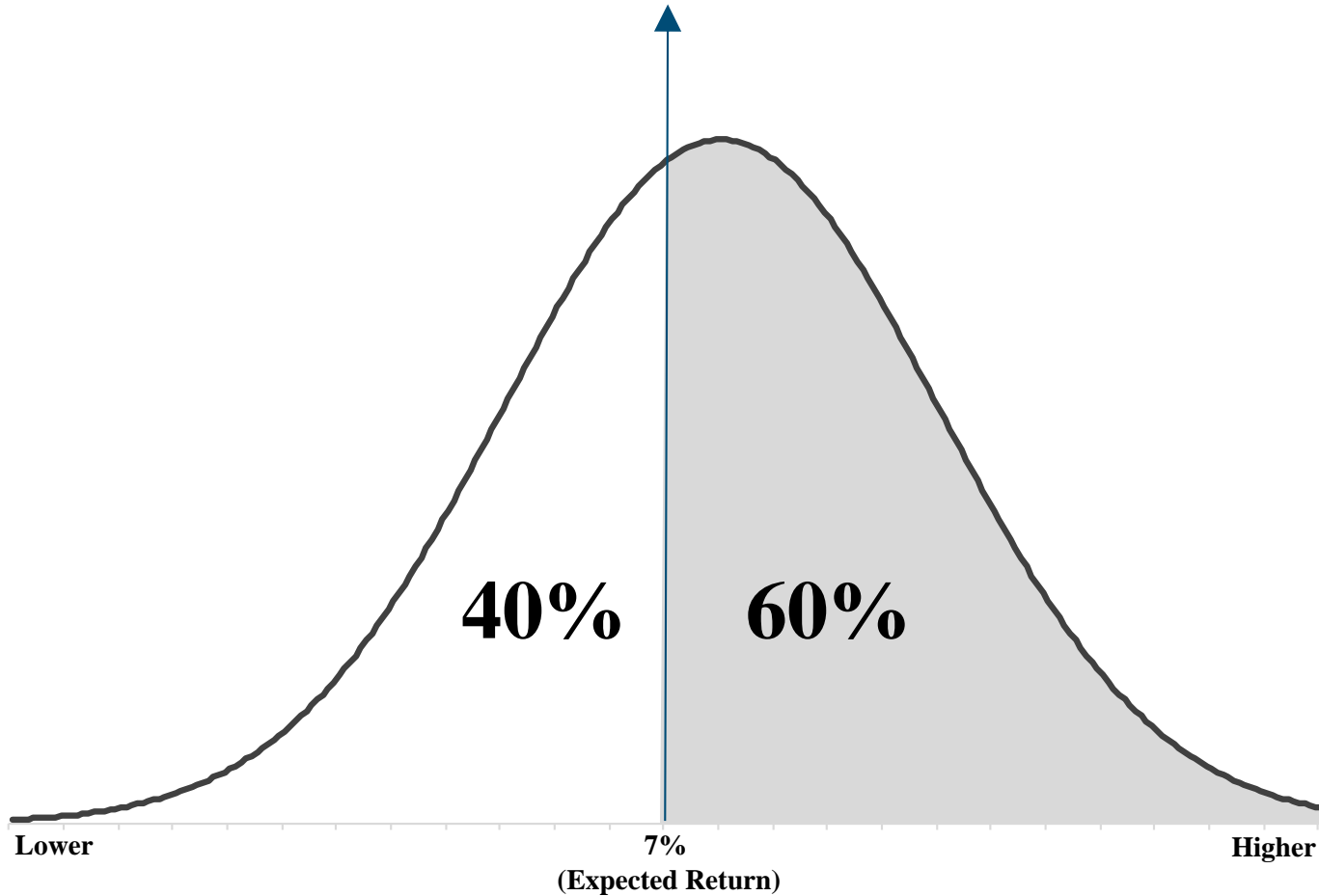Lower 7% Higher
(Expected Return)

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Focus #4

- How can we avoid "redeeming" from ourselves?
  - Focus on the long-term and do not succumb to "outcome bias"
  - When bad outcomes happen, "keep calm and carry on"
  - Carefully manage our liquidity profile
- Our improved liquidity profile
- Reducing volatility helps stabilize contribution rates

"Compound interest is the most powerful force in the universe"

– Albert Einstein

In an uncertain world, we can get the odds on our side with this Success Equation

Focus 1: Investment Capabilities
Focus 2: Investment Activities
Focus 3: Comparative Advantages

+ Focus 4: Long-Term

= **Increased chance of success**

Supporting Our Focuses

- Two commitments from you are needed
  - Support CIO/INVO's laser focus on investing to help meet our liabilities
  - Facilitate a long-term commitment from all stakeholders

The Challenge

| Incomplete Information | Uncontrollable Factors |

Uncertain Investment Outcomes

My Vision

Focus 1: Investment Capabilities

Focus 2: Investment Activities

Focus 3: Comparative Advantages

Focus 4: Long-Term

Your Commitment

Support CIO/INVO focus on Investments

Long-Term Commitment

Focus + Long-Term Commitment = A Strong Foundation for Success

The Next 180 Days

Three-Point Plan

#1 Get to know the Board's strategic priorities

- Review the ALM Process

- Develop a common understanding of our long-term commitments

- Support National Association of Corporate Directors' work with the Board

- Seek your feedback on how we can support the Board

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#2 Get to know the CEO and executive team

- Evaluate INVO's role within CalPERS and how to improve synergies

- Evaluate INVO's efforts in Diversity and Inclusion

#3 Get to know the Investment Office

- Inventory current investment activities

- Evaluate decision making process

- Develop common understanding of comparative advantages and limitations

- Determine our strategic positioning

- Identify core competencies

- Evaluate external partnerships

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The Path Ahead

- This is an ambitious 180-day plan that will require prioritization, sequencing, and pacing
    - We may not complete all the tasks in the first 180-days
- We will give you a progress update at the July offsite and will adjust our plan as we learn

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"We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard, because that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win."

– John F. Kennedy

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Thank you.

Q & A

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"This is a quote from my mother, who used to say:

He who knows not, and knows not he knows not, is a fool… shun him.

He who knows not, but knows he knows not, is hungry… teach him.

He who knows, but knows not that he knows, is sleeping… wake him.

He who knows, and knows he knows, is wise… follow him."

– Howard Marks

Appendix

Appendix I

For a manager with an information ratio (IR) of 0.5 (~top quartile), how many years of returns are needed for you to be confident that the manager really has the skill to generate positive alpha? To be 95% confident[a]

$$1.96 \leq \frac{(R_P - R_B)}{\left(\frac{TE}{\sqrt{T}}\right)} = \frac{R_P - R_B}{TE} \cdot \sqrt{T} = IR \cdot \sqrt{T}$$

$$1.96 \leq (0.5) \cdot \sqrt{T}$$

$$T \geq 15.4 \ years$$

Where
$R_P = Portfolio \ Return$
$R_B = Benchmark \ Return$
$T = Number \ of \ years$
$TE = Tracking \ Error$

Assume annual data are used

Therefore, you will need at least 15 years of performance history to be 95% confident of his skill (as opposed to luck).

[a] The value of 1.96 represents the threshold to determine if a value is statistically significant at the 95% confidence level assuming a normal distribution. A value greater than or equal to this threshold is statistically significant at the confidence level.

Appendix II

A 1% reduction in the volatility is expected to increase geometric return by 0.1% given the current geometric return and volatility are 7% and 11%, respectively. This can be estimated by the following:

Let A = Arithmetic Return; G = Geometric Return; σ = Volatility

$$G = [(1 + A)^2 - \sigma^2]^{\frac{1}{2}} - 1$$

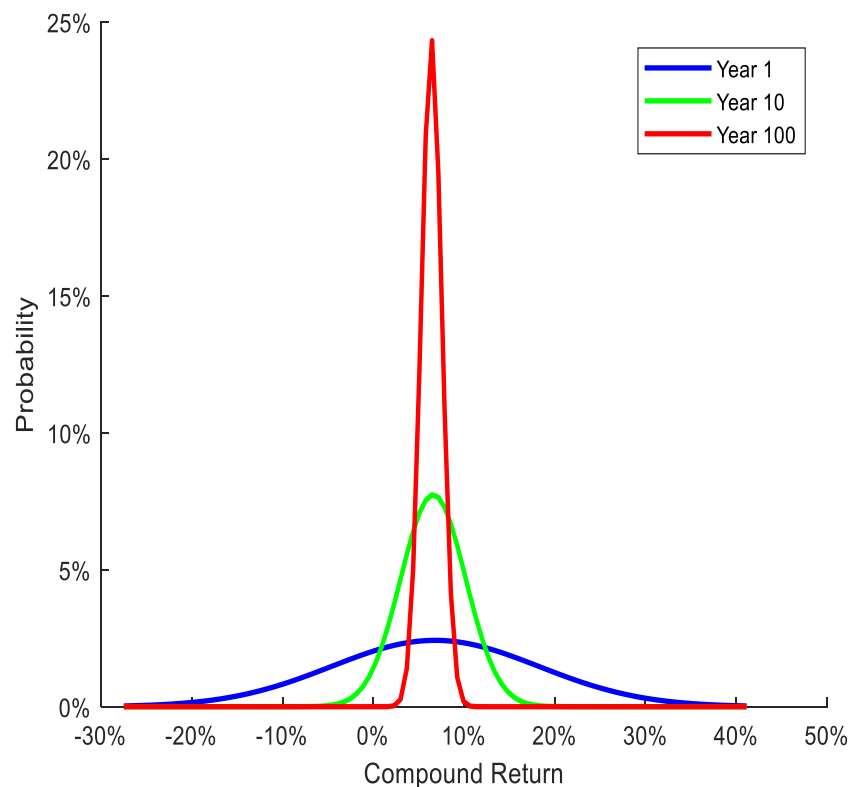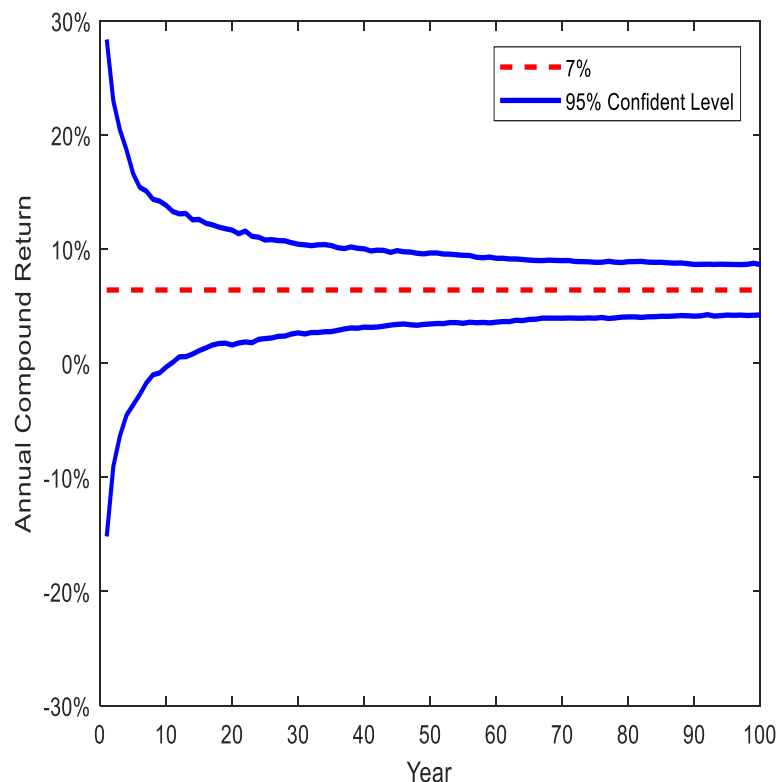$$\frac{dG}{d\sigma} = -\frac{\sigma}{1 + G}$$

$$dG = -\frac{\sigma}{1 + G} \cdot d\sigma$$

$$0.1\% = -\frac{11\%}{1 + 7\%} \cdot (-1\%)$$

(a) Formula for the conversion from arithmetic to geometric mean is the same formula used in the CalPERS ALM Workshop (2013 and 2017) where $(1 + G)^2 = (1 + A)^2 - \sigma^2$

Appendix III

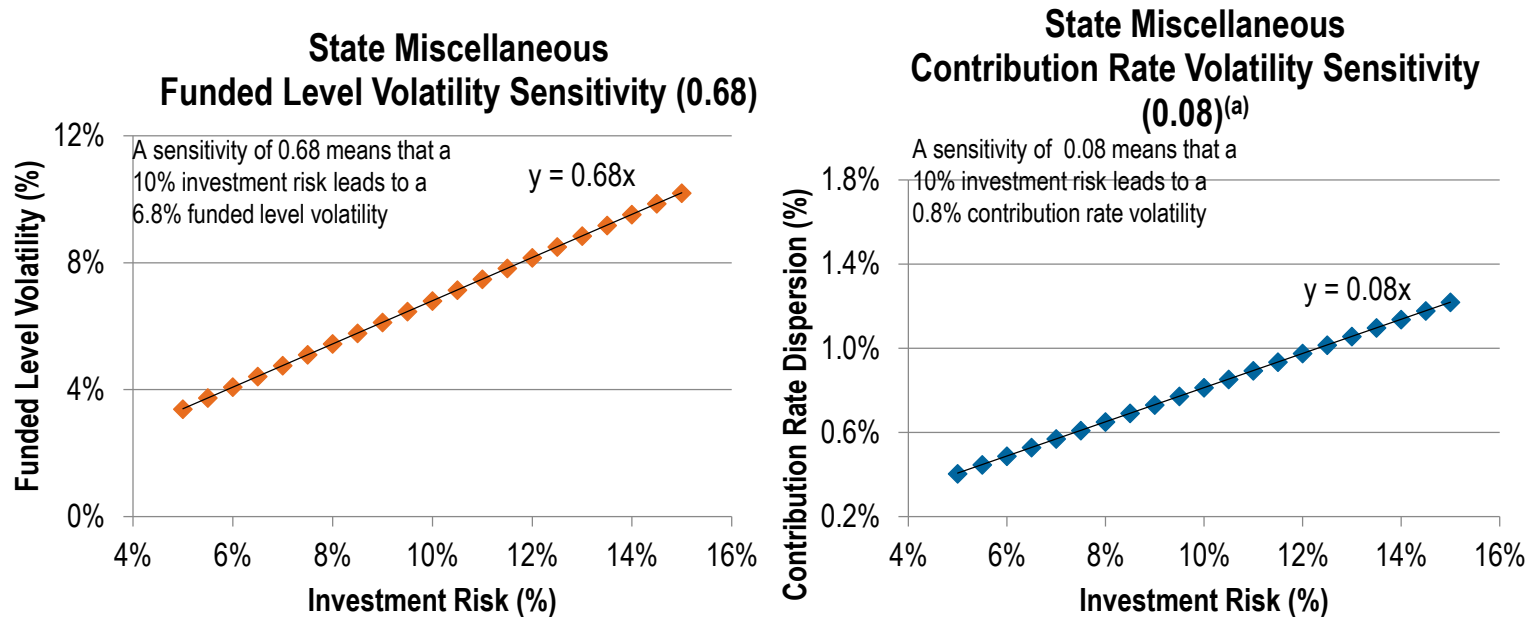With the power of compounding, the uncertainty (volatility) is reduced…

For illustrative purposes only; Path dependent simulations are conducted by assuming returns follow normal distribution with a 7% expected return and 11% volatility

Appendix III

From the 2013 ALM, we showed a strong linear relationship between investment volatility and Funded Level volatility as well as Contribution Rate volatility.

- – Therefore, a reduction in the investment volatility translates into a reduction in both the Funded Level and Contribution Rate volatility

**State Miscellaneous
Funded Level Volatility Sensitivity (0.68)**

A sensitivity of 0.68 means that a 10% investment risk leads to a 6.8% funded level volatility

$y = 0.68x$

Funded Level Volatility (%) / Investment Risk (%)

**State Miscellaneous
Contribution Rate Volatility Sensitivity (0.08)[a]**

A sensitivity of 0.08 means that a 10% investment risk leads to a 0.8% contribution rate volatility

$y = 0.08x$

Contribution Rate Dispersion (%) / Investment Risk (%)

(a)   The funded level volatility is defined as the standard deviation of changes of funded level. The first year simulation data from ACTO was used to illustrate the relationship between funded level volatility and investment risk.

(b)   This estimation is only for the first year where the smoothing effect only accounts for 20% of obligation (5-year smoothing). By the fifth year, the impact will be five times this estimated value.

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