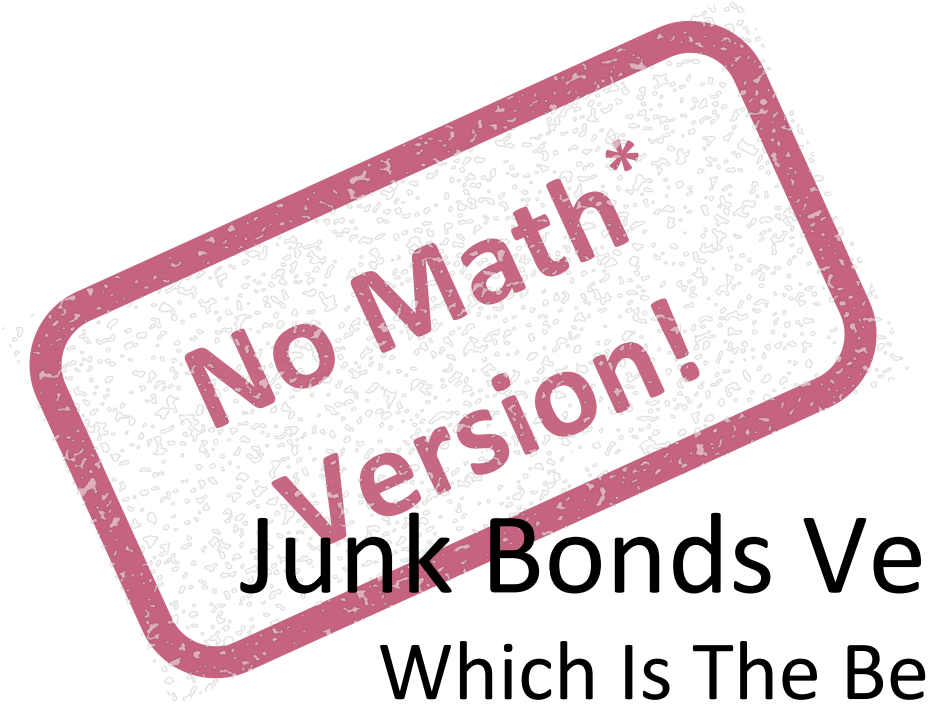


Junk Bonds Versus IT Projects

Which Is The Better Investment?

John Helm

JHelm Associates, LLC
www.JHelmAssociates.com

Executive Timeslice, LLC
www.ExecutiveTimeslice.com

*Almost…

First Of A Series

- Junk Bonds versus IT Projects
  - Which is the better investment?
- Project Lessons From Space Shuttle Disasters
  - Fool me twice, shame on me!
- Beyond Good and Agile
  - Breaking free of the hypecycle

Denver Airport Baggage System

Loss: $620,000,000 Just In Direct Costs

Estimated Airport Cost: $2.8Bn
Actual Airport Cost: $4.8Bn

Cumulative Loss $500,000,000

United Airlines Loss $120,000,000

Planned Opening Date Oct 31, 1993

$1,000,000/Day

Actual Opening Date Feb 28, 1995

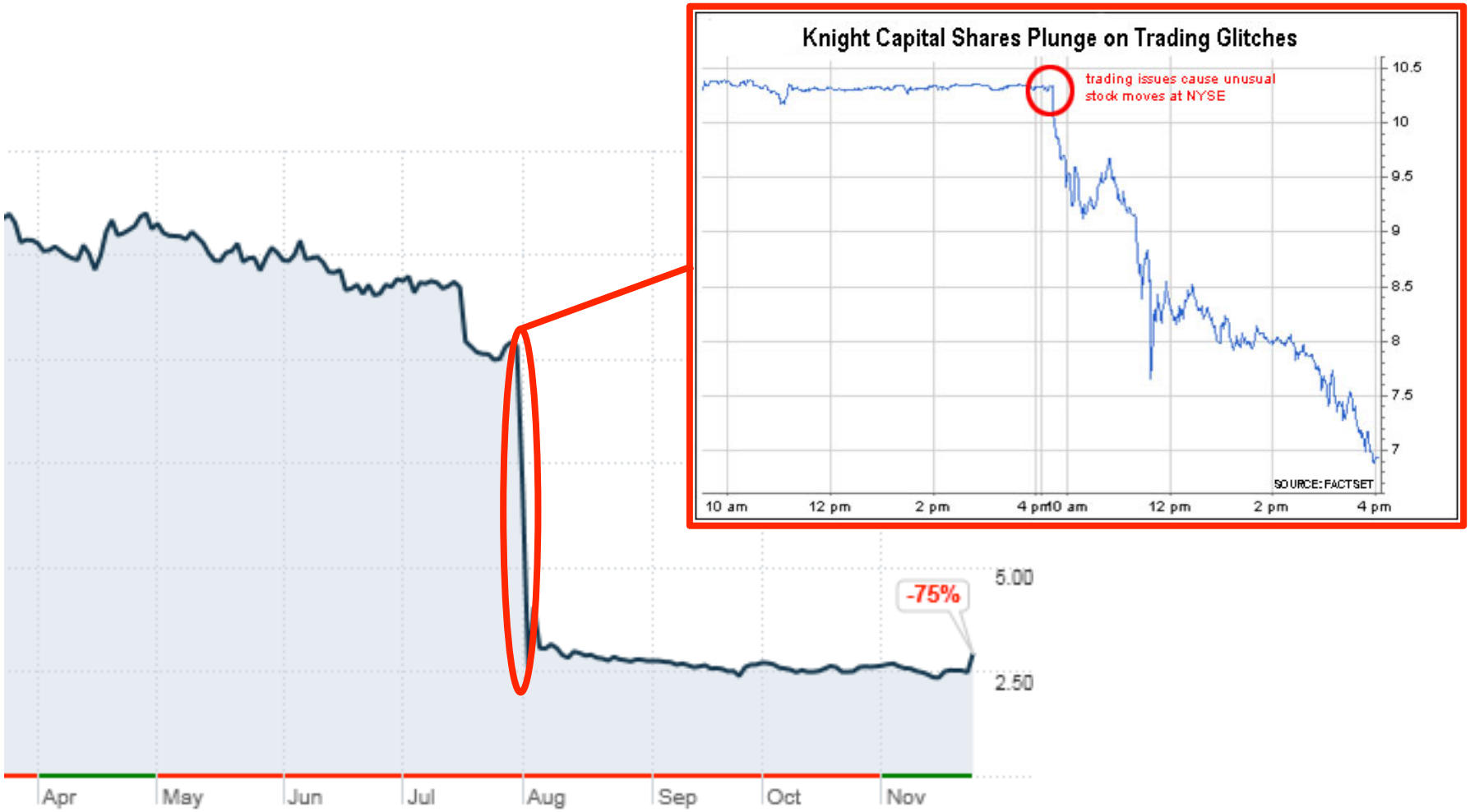
$1,000,000/Mo

Euthanasia Date Aug, 2005

Say "Good Knight"

Loss: $10,000,000/Minute For 46 Minutes

$460 Million Loss, 4 x previous year's income



For more, see: SEC (2013). Administrative Proceeding, File No. 3-15570, http://www.sec.gov/litigation/admin/2013/34-70694.pdf

It’s Not Just IT Projects Either

Perhaps Fictitious, But Not Overly So….

How Long Ago Was This Published?

"It seems almost automatic that software is never produced on time, never meets specification, and always exceeds its estimated cost. This conference is in fact predicated on this alarming situation."

The statements on the previous slide were published in

1968

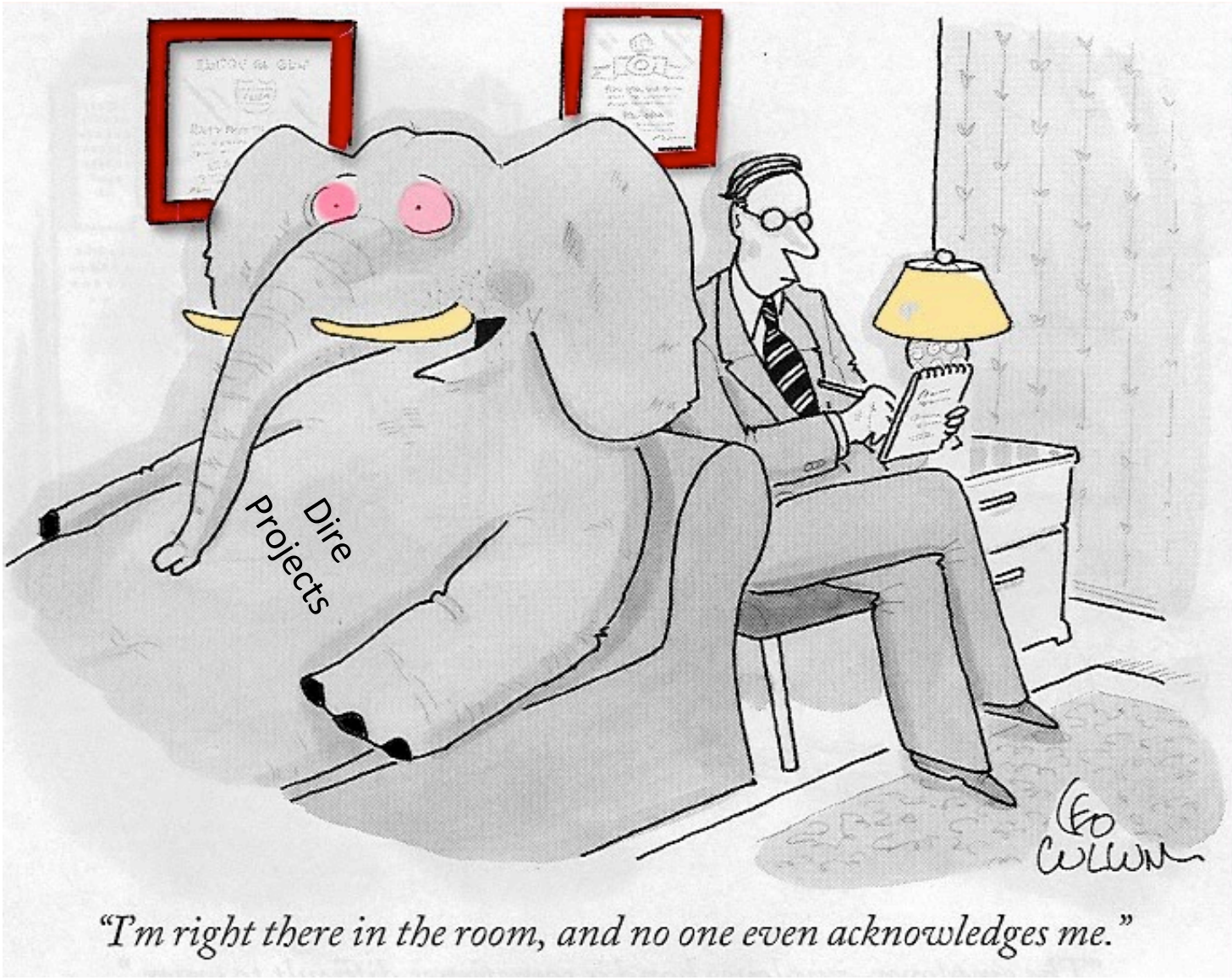
Software Engineering: A Report on a conference sponsored by the NATO Science Committee. Garmisch, Germany. 07-11 Oct 1968. Peter Naur and Brian Randell, Eds.

With Whom Shall We Empathize?

It's Only Been 45 Years Since The NATO Conference

With Whom Shall We Empathize?

Secretly, I'm DAMN Glad I'm Not The Elephant…



Our Journey So Far

1. IT Project performance poor for 45 years

Projects Are Investments

How Do We Choose Which To Do?

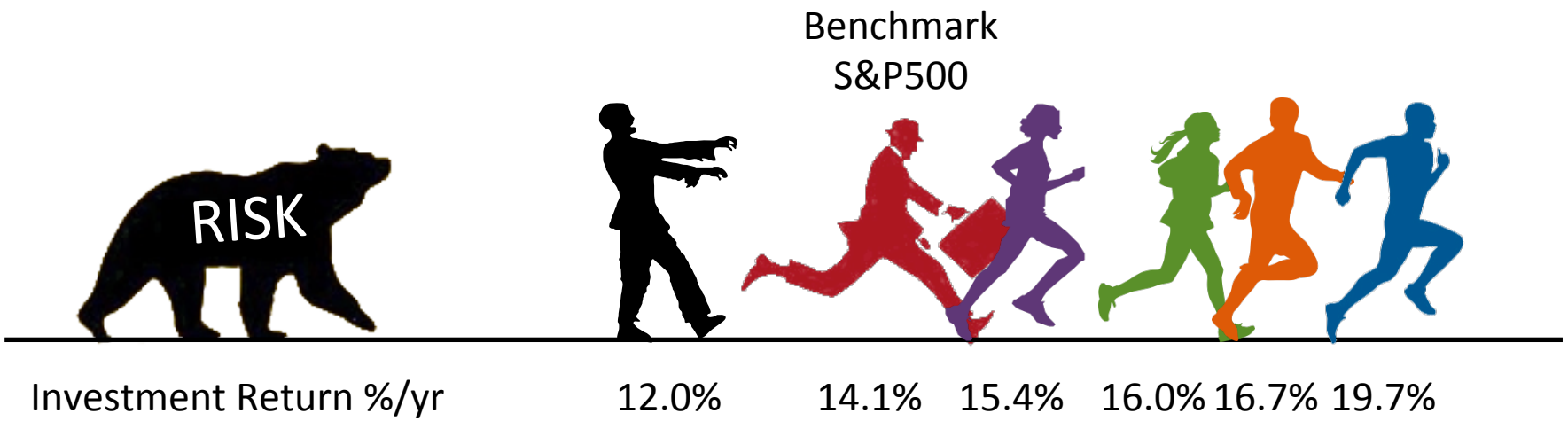
- (Almost all) projects are business investments
- Funding based on ROI (or CAGR or Breakeven)

Project Return %/yr	14.0%	16.9%	17.3%	20.9%	44.4%

Mutual Funds Are Investments

How Do We Choose Which To Do?

- Can it *BEAT THE MARKET* (Benchmark)
- Will it beat the market (RISK)



Risk Adjustment 101

Risk Versus Return

- Take a Risk Free night or invest in an adventure?

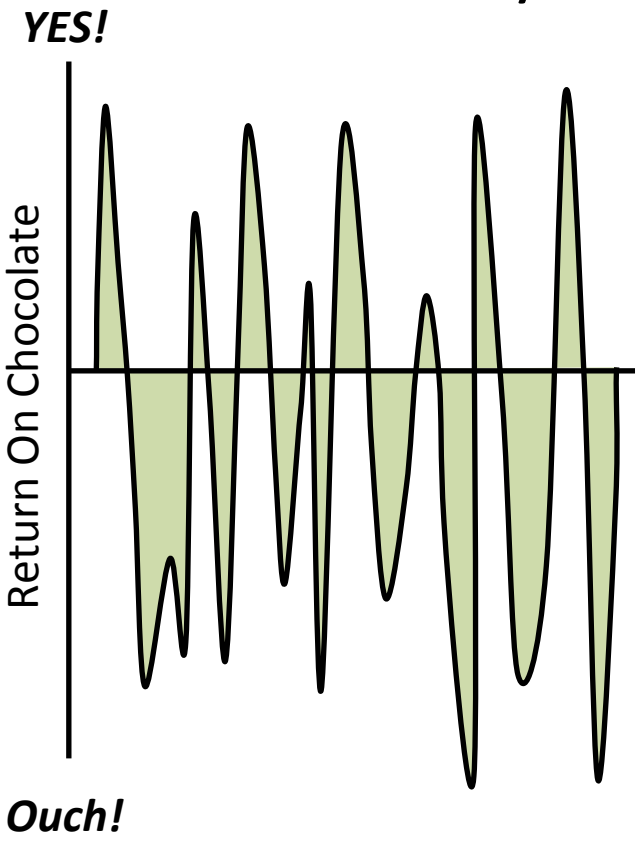
- Investing in Fritos for a risk Free “Fritos Night”

- Buying some chocolate truffle “call options”
  - But what option?

Risk Adjustment 101

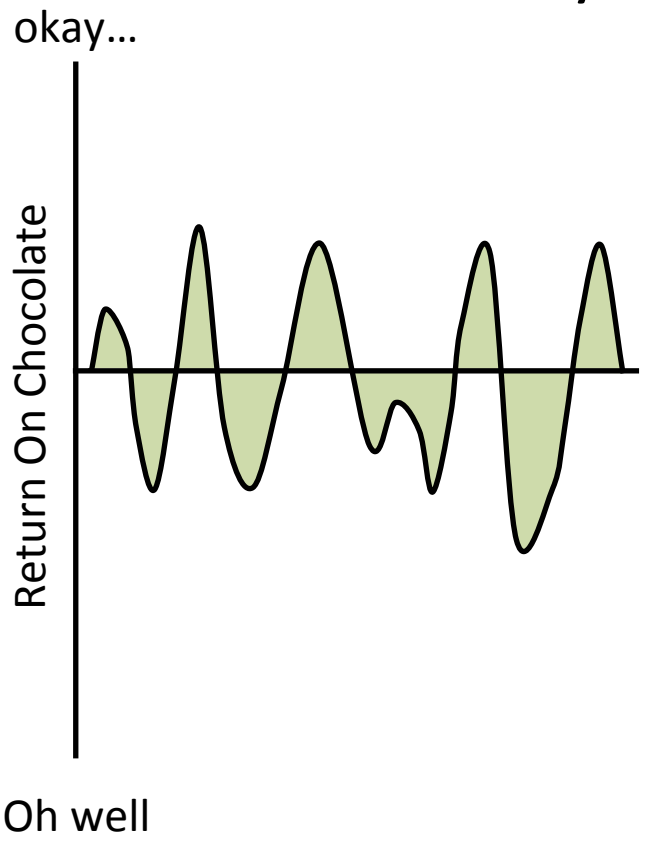
Basics: Volatility As Measure Of Risk

Hi Volatility



Highly volatile w/ high return

Low Volatility



Not too volatile w/ modest return

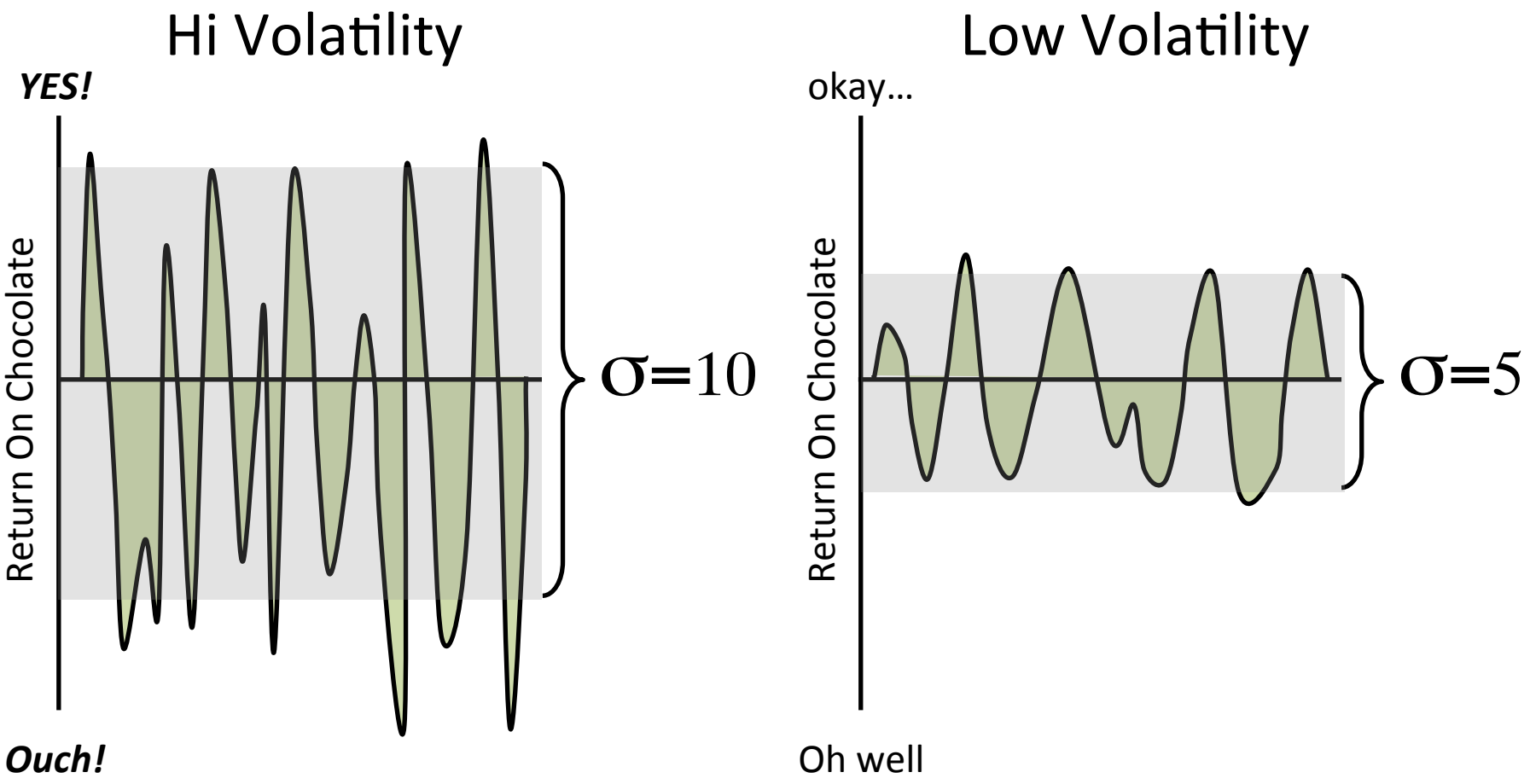
Risk Adjustment 101

Basics: Volatility As Measure Of Risk

- The first risk measure was Standard Deviation
  - σ is the symbol Standard Deviation
  - Markowitz introduced in Modern Portfolio Theory
- Standard Deviation still a key measure of risk in financial services
  - Fundamental to Option Pricing (Black-Scholes)
- Not perfect
- Fancier approaches hard to justify

Risk Adjustment 101

Basics: Volatility As Measure Of Risk



We'll call this the "Benchmark"

Risk Adjustment 101

Basics: Risk Free Rate

- How Tall was Louis XIV?
  - 5’8”?
- NO!
  - 5’4” = 5’8”– 4” high heals…

- Heals gave 4” of risk free height
- A special investment exists, considered to be risk free
- r_f is the “Risk Free Rate”

Louis XIV wearing his trademark heels in a 1701 portrait by Hyacinthe Rigaud

Risk Adjustment 101

Basics: Excess Return

Believe it or not….

US Treasury debt is considered RISK FREE!!!

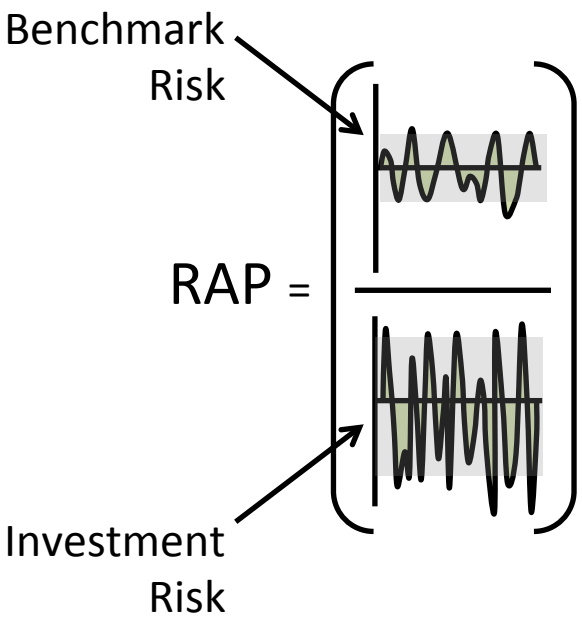
r_f is the "risk free rate" of U.S. Debt [%/yr]

$r_i - r_f$ is "excess return" of the investment i

Risk Adjustment 101

Risk Adjusted Performance (RAP)

- RAP expressed as adjusted return (CAGR)
- Adjusts excess return by risk ratio

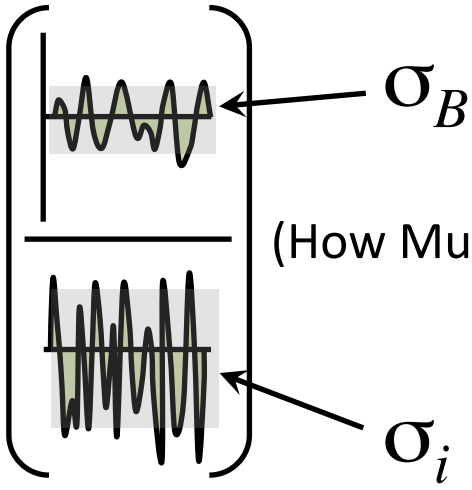


Risk Free Investment

(How Much Better than Fritos) + How good Fritos are

Risk Adjustment 101

Risk Adjusted Performance (RAP)

RAP = 

(How Much Better than Fritos) + How good Fritos are

$(r_i - r_f)$ r_f

$$\text{RAP} = \frac{\sigma_B}{\sigma_i}(r_i - r_f) + r_f$$

$$\text{RAP} = \frac{5}{10}(20 - 4) + 4 = 12,$$ versus 4 for the Fritos!!!

Risk Adjustment 101

Summary Risk Adjusted Performance (RAP)*

- RAP expressed as adjusted return (CAGR)

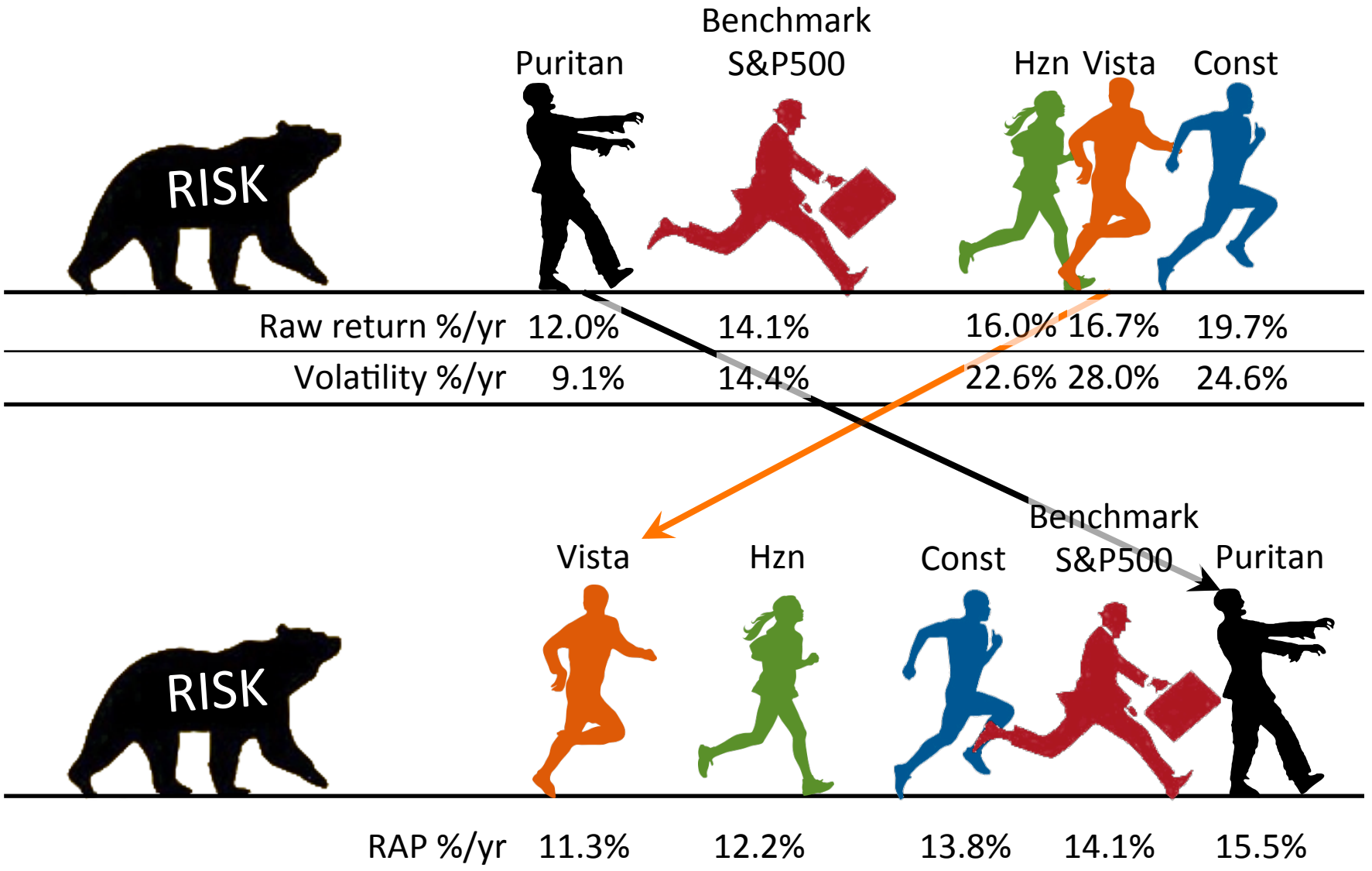
$$\mathrm{RAP} = (r_i - r_f)\frac{\sigma_B}{\sigma_i} + r_f$$

r_f	risk free rate [%/yr]
$r_i - r_f$	excess return of the investment i
σ_i	quantifies risk [%/yr] for investment i
σ_B	quantifies risk [%/yr] for benchmark

*Modigliani and Modigliani (1997). Risk-Adjusted Performance. Journal of Portfolio Management., Winter 1997. 45—54.

Mutual Funds

How Much Does Accounting For Risk Change Things?



Our Journey So Far

1. IT Project performance poor for 45 years
2. Accounting for risk can make large adjustments

Basics

How To Do RAP For Projects

1. Set up project model
2. Define benchmark
3. Obtain price and risk data
4. Don the green visor (and calculate)

Detailed Example

1 – Set Up Project Model

- Example Project
  - Project goal: create $8,000/yr perpetual cash flow
    - Four project milestones
    - Each establishes a cash stream of $1,000/6 months
  - $10,000 capital outlay, 10 yr recovery
- Perfect execution (at 0% inflation for 10 years)
  - NPV $54,000
  - CAGR 20.4%/yr

Detailed Example

2 – Define Benchmark Portfolio

- Identify a plausibly comparable investment for same amount of capital
  - Choose debt over equity
  - *Challenged bonds resemble challenged projects*
  - Choose "safer" high yield bond for best return
- Buy and hold a non-callable bond to maturity
  - 10yr Corporate B-Bond Yield=7.25%, CAGR=5.60%
    5yr Corporate B-Bond Yield=5.50%, CAGR=4.98%
  - Real bonds auctioned in May 2013
- Risk free rate in May 2013
  - 2% for 10 yr Treasury Note
  - 0.63% for a 5 yr Treasury Note

Basics

Expected Returns

- With Bonds you are a creditor
- After default you can recover some money

$E(r_{bond})$ = yield (1-[default rate(1-recovery rate)])

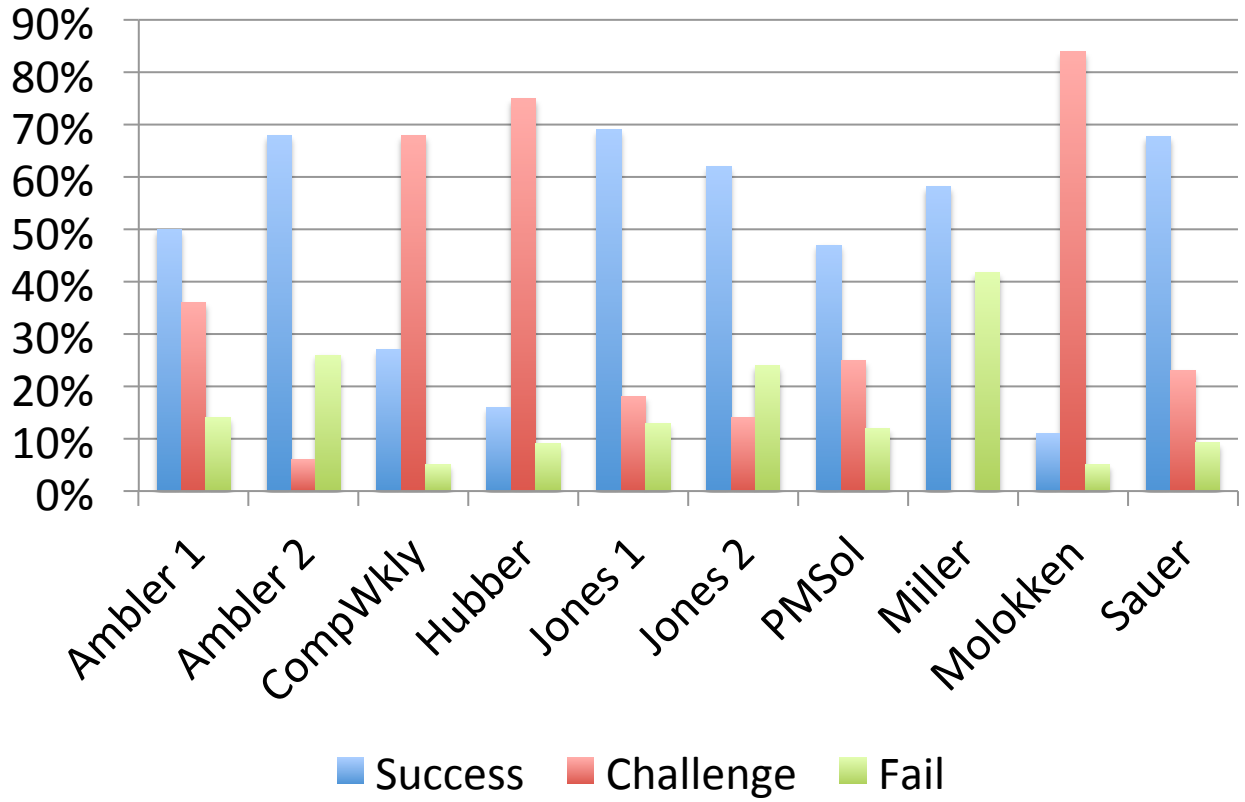
$E(r_{bond})$ = yield (1-loss rate)

Source	Ave Loss Rate	σ_B
Fitch (1990-2012)	2.88%	3.44%
Moody's (1982-2010)	2.78%	2.18%

- We'll use the Fitch values because σ_B larger

Detailed Example

3 – Obtain Price And Risk Data: Project Default Rates



Ave Failure Rate = 15%

σ_{fail} = 12%

Ave Failure rate is equivalent to the Default Rate for bonds

Ave Challenge Rate = 40%

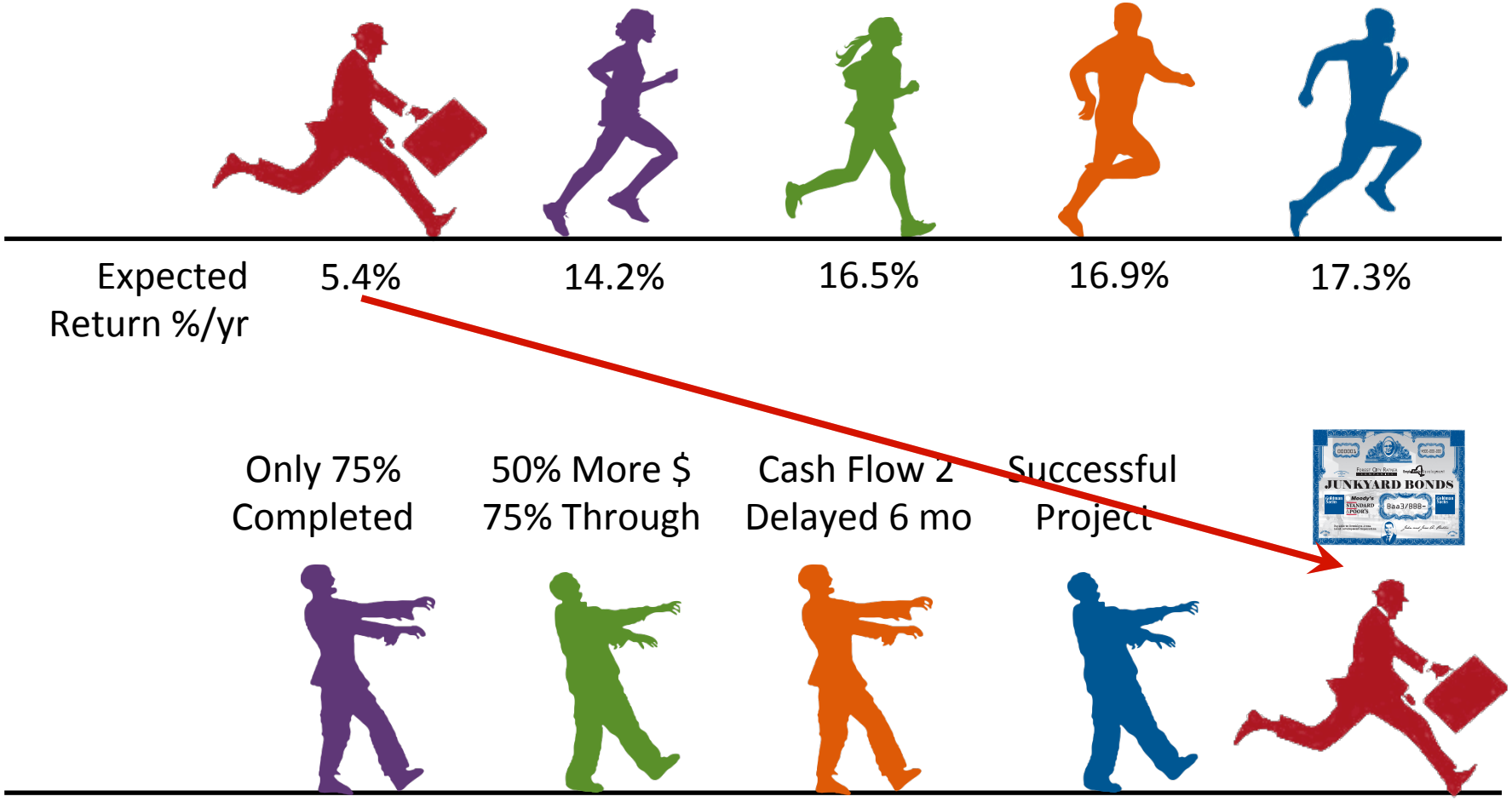
σ_{proj} = 25%

The standard deviation of the Challenge Rate will be our estimate for project volatility

Example 1

4 – Calculate: $10,000 Capital Outlay; 10 Yr Recovery

	Benchmark 10yr B-Bond	Only 75% Completed	50% More $ 75% Through	Cash Flow 2 Delayed 6 mo	Successful Project
Expected Return %/yr	5.4%	14.2%	16.5%	16.9%	17.3%
Risk Adjusted Performance %/yr	3.4%	4.0%	4.0%	4.1%	5.4%



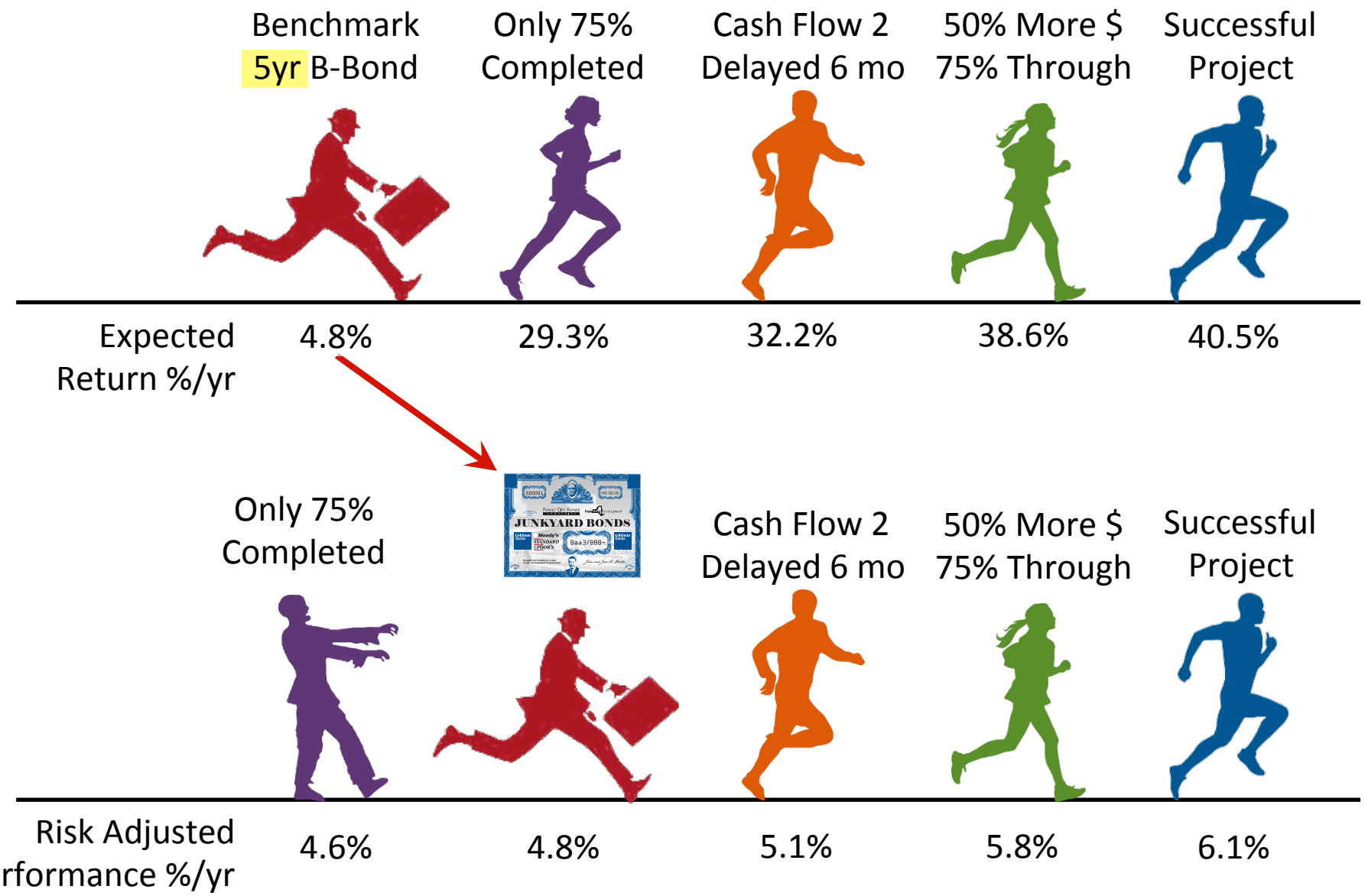
Example 2

4 – Calculate: $10,000 Capital Outlay; 5 Yr Recovery

	Benchmark 5yr B-Bond	Only 75% Completed	Cash Flow 2 Delayed 6 mo	50% More $ 75% Through	Successful Project
Expected Return %/yr	4.8%	9.5%	14.0%	17.1%	20.9%
Risk Adjusted Performance %/yr	1.9%	2.4%	2.9%	3.41%	4.8%

Example 3

4 – Calculate: $5,000 Capital Outlay; 5 Yr Recovery



Our Journey So Far

1. IT Project performance poor for 45 years
2. Accounting for risk can make large adjustments
3. As investments, projects underperform relative to junk bonds when adjusted for risk

So What?

It's my fervent hope, Mr. Sheehan,

that these are meaningless statistics.

Models and Measures of Risk

Risk Models Especially Challenging

- Categorically, σ is a very poor *measure* of risk
  - Widely accepted doesn't mean it's right
  - It's really a ***heuristic*** introduced by Markowitz*

  "… that the investor does (or should) consider expected return a desirable thing and variance of return an undesirable thing. (p 77)"

- Using σ assumes an underlying distribution
- Project and bond risk is asymmetric, σ isn't

* Markowitz, H.M. (1952). "Portfolio Selection". *Journal of Finance*, 7(1) (March), 77-91.

Models and Measures of Risk

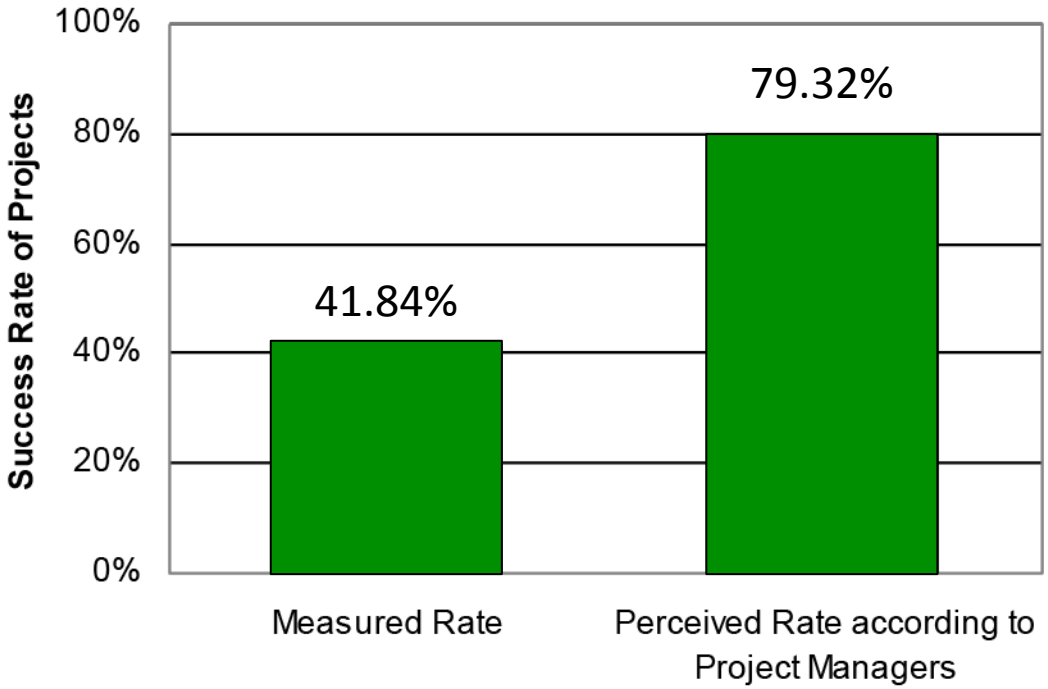
How Accurate And Useful Are The Models?

- Issue is ***unpredictability***, of which ***risk*** is part
  - Risk: known unknowns, can estimate probability
  - Uncertainty: unknown unknowns, estimate what?
  - Bias: systematic errors in thinking or measurements

- Model difficulties are significant and pervasive
  - Always simplifications of real world
  - Premised on assumptions, estimates and guesses
  - Only can model what one can think of

Models and Measures of Risk

Attribution Bias In Data Reporting?



The measured success rate (10% allowances) compared to how the project managers perceived their projects

Matthew G. Miller, Ray J. Dawson, Kieran B. Miller, Malcolm Bradley (2008). *New Insights into IT Project Failure & How to Avoid It*. Presented at 22nd IPMA World Congress - Rome (Italy) November 9-11, 2008, in Stream 6. As of May 2013, self published at http://www.mgmiller.co.uk/files/paper.pdf.

Models and Measures of Risk

How Does One Manage Emergent Behaviors?

Ring Road Traffic Simulation, 10 and then 11 vehicles/km-lane

Models and Measures of Risk

How Does One Manage Emergent Behaviors (24)?

Ring Road Traffic Simulation, 24 vehicles/km-lane

Emergent Complexity

- YouTube Ring Road Phantom Traffic Jam
  - http://www.youtube.com/watch?v=Suugn-p5C1M

- NYSE Crash(?), 1989
- Flash Crash, 2010
- BATS Debacle, Mar 2012
- NASDAQ Facebook IPO, May 2012
- Goldman Sachs, Aug 20, 2013

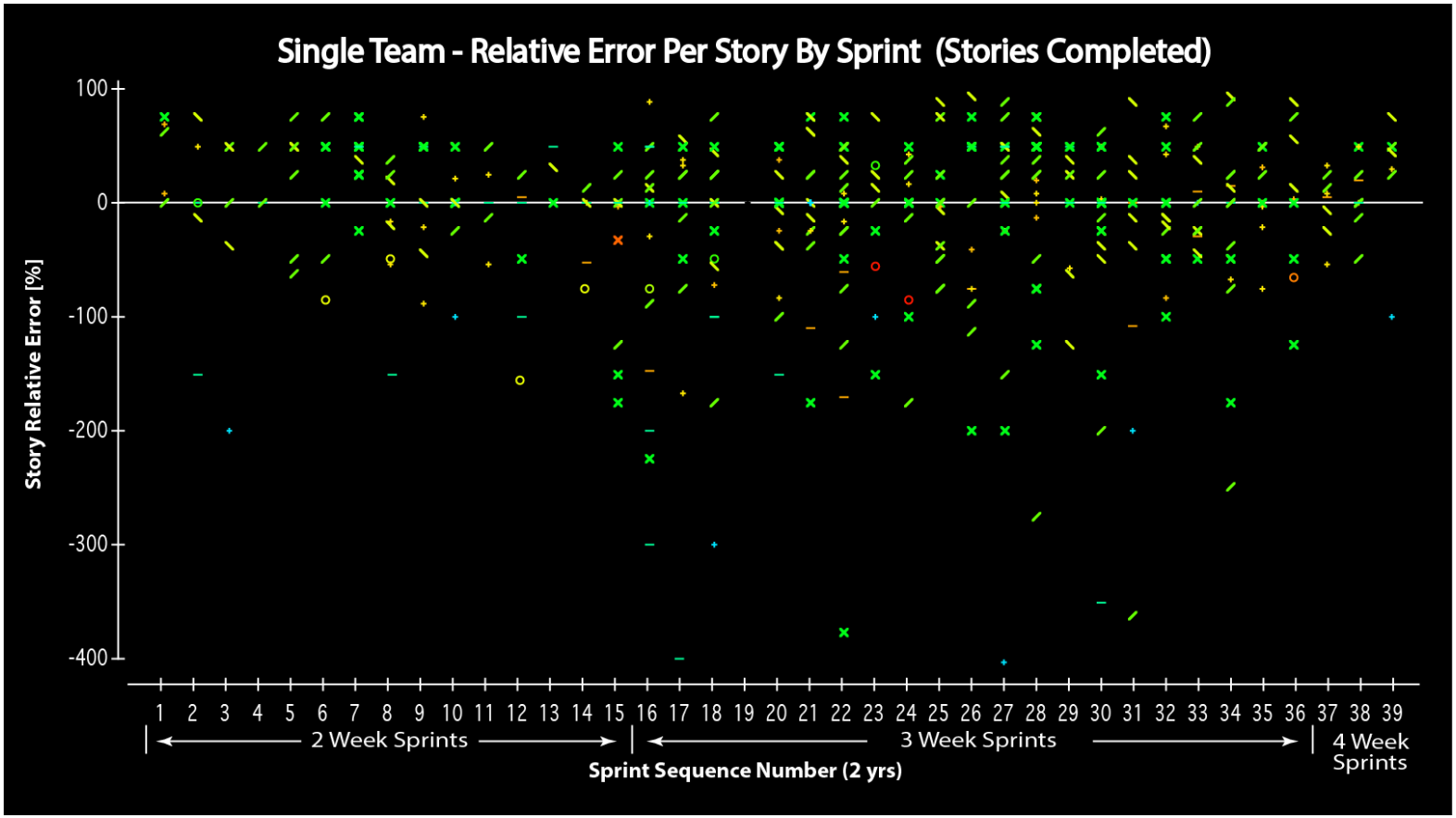
Our Journey So Far

1. IT Project performance poor for 45 years
2. Accounting for risk can make large adjustments
3. As investments, projects underperform relative to junk bonds when adjusted for risk
4. Emergent, unpredictable behavior may be more common than we think

Measure Unpredictability

Easier To Observe Than To Predict

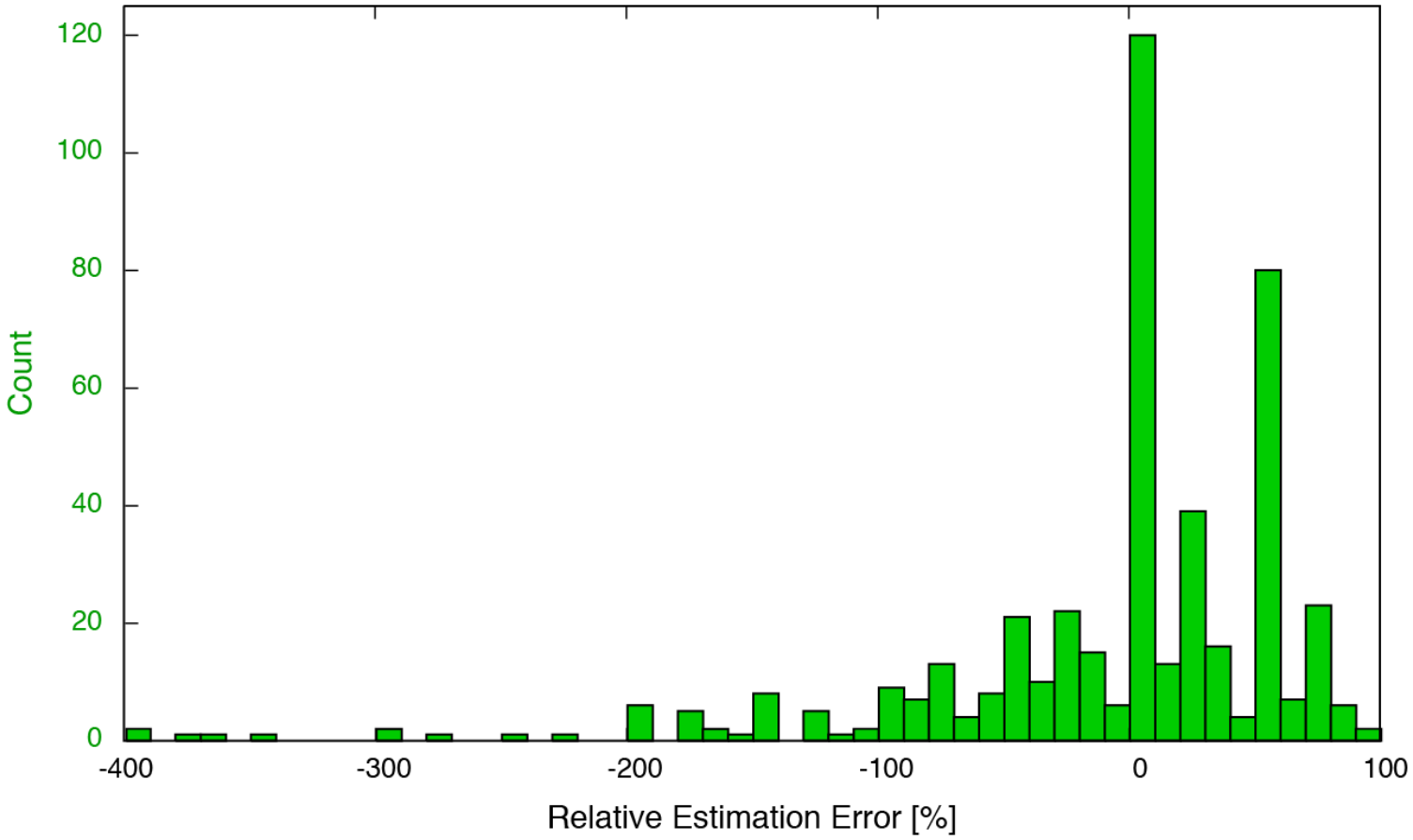
- You can't manage what you don't measure
- Track $$Relative\,Estimation\,Error\ [\%] = 100\frac{Est - Actual}{Est}$$



Measure Unpredictability

σ Underrepresents Long-Tail Risks

Example Estimation Accuracy “Distribution”

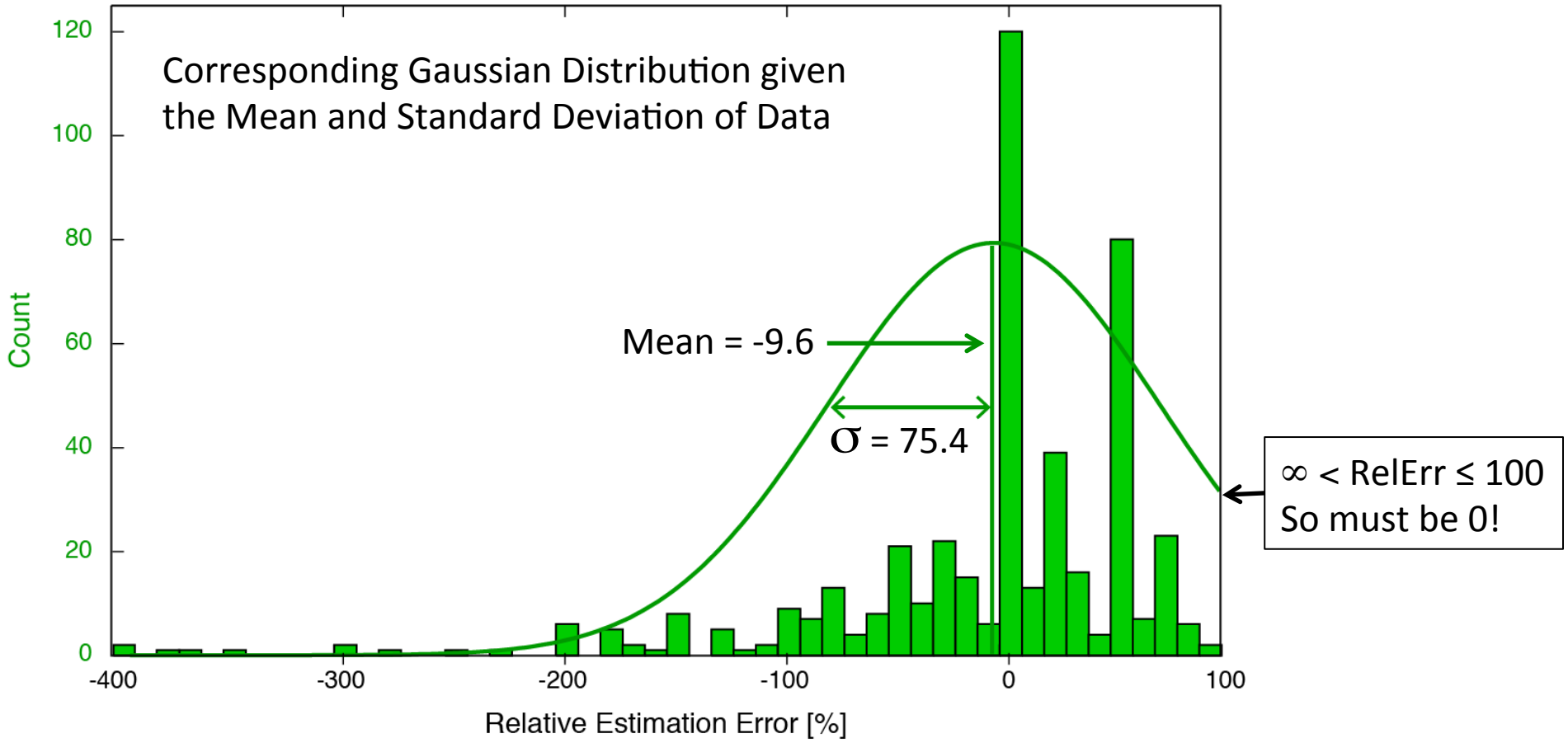


Notes: 465 User Stories; Single Scrum Team; 39 sprints in 2 yrs

Measure Unpredictability

σ Underrepresents Long-Tail Risks

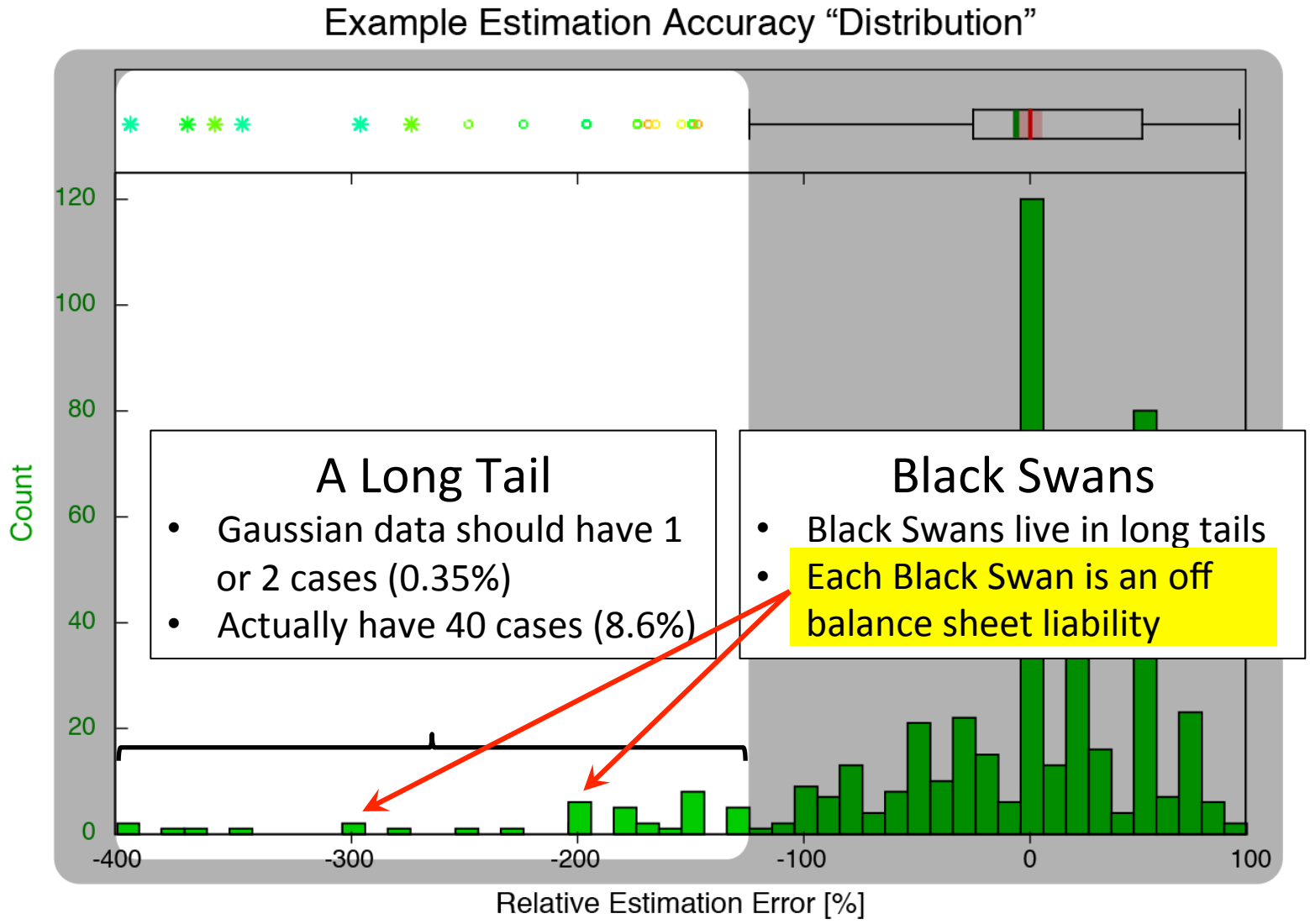
Example Estimation Accuracy "Distribution"



Notes: 465 User Stories; Single Scrum Team; 39 sprints in 2 yrs

Measure Unpredictability

σ Underrepresents Long-Tail Risks



Notes: 465 User Stories; Single Scrum Team; 39 sprints in 2 yrs

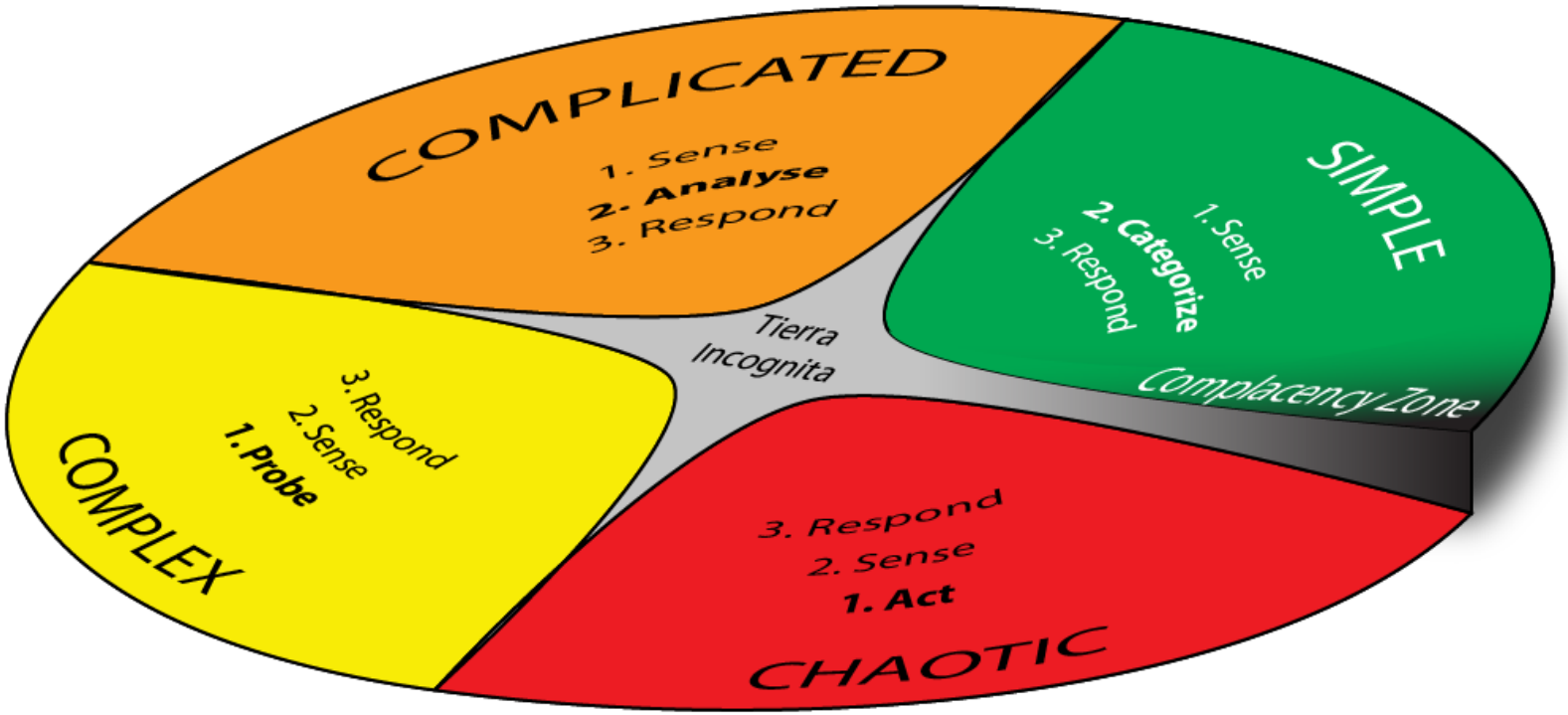
Our Journey So Far

1. IT Project performance poor for 45 years
2. Accounting for risk can make large adjustments
3. As investments, projects underperform relative to junk bonds when adjusted for risk
4. Emergent, unpredictable Black Swans pose significant project risk

Quantitative Unpredictability Management

Cynefin Decision Making Framework

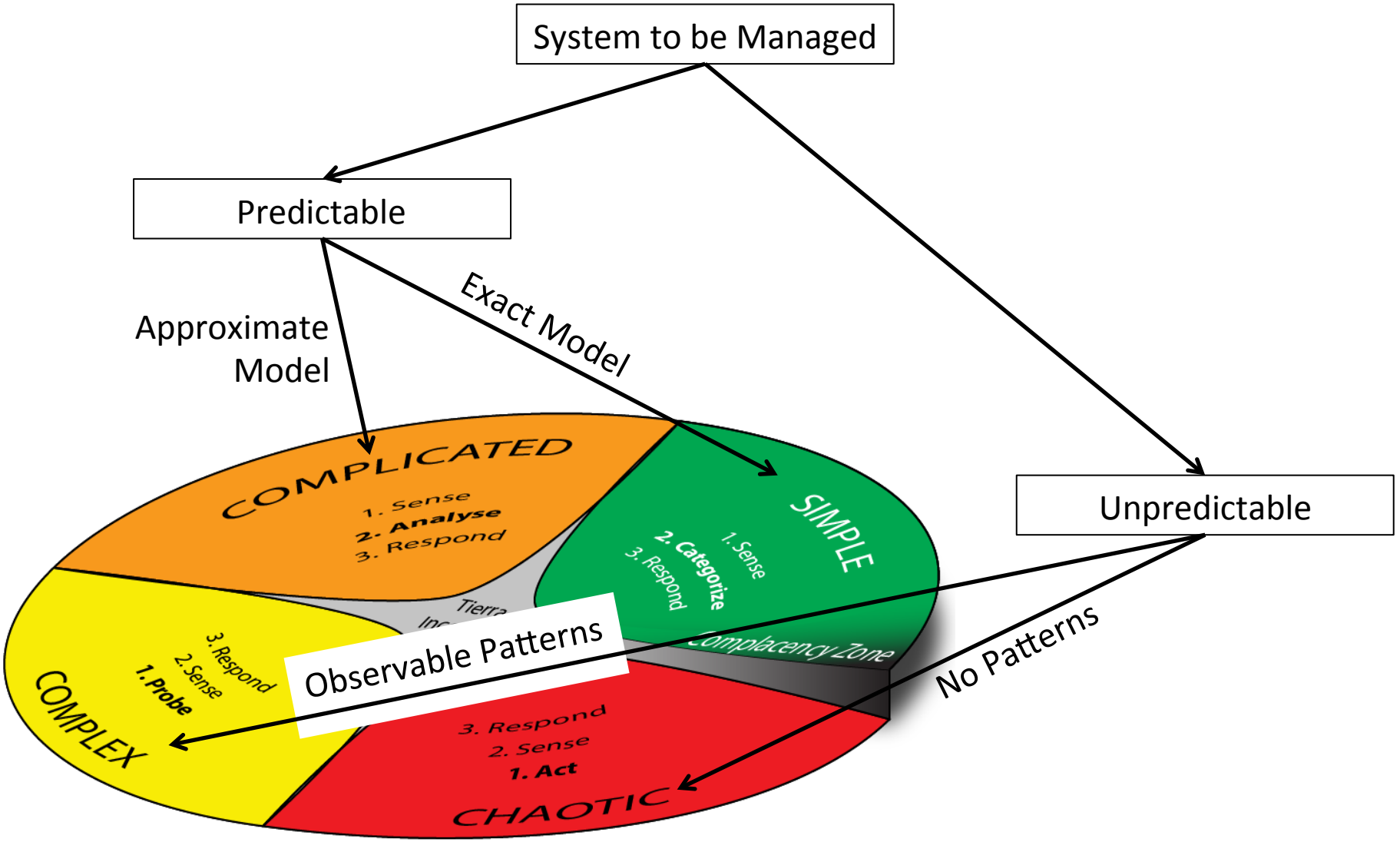
Am I doomed if I can't pronounce Cynefin?



Snowden and Boone (2007). "A Leader's Framework For Decision Making". *Harvard Business Review*. **85**(11), Nov.2007, 68—76; Reprint R0711C.

Quantitative Unpredictability Management

Cynefin Decision Making Framework

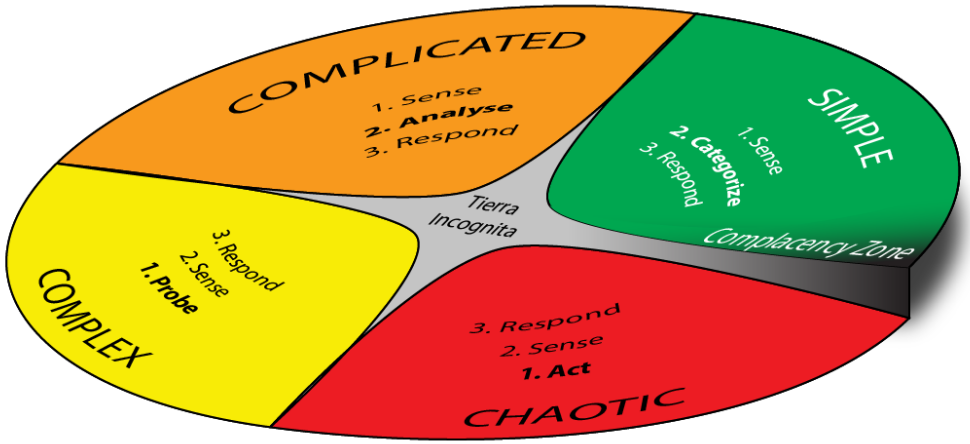


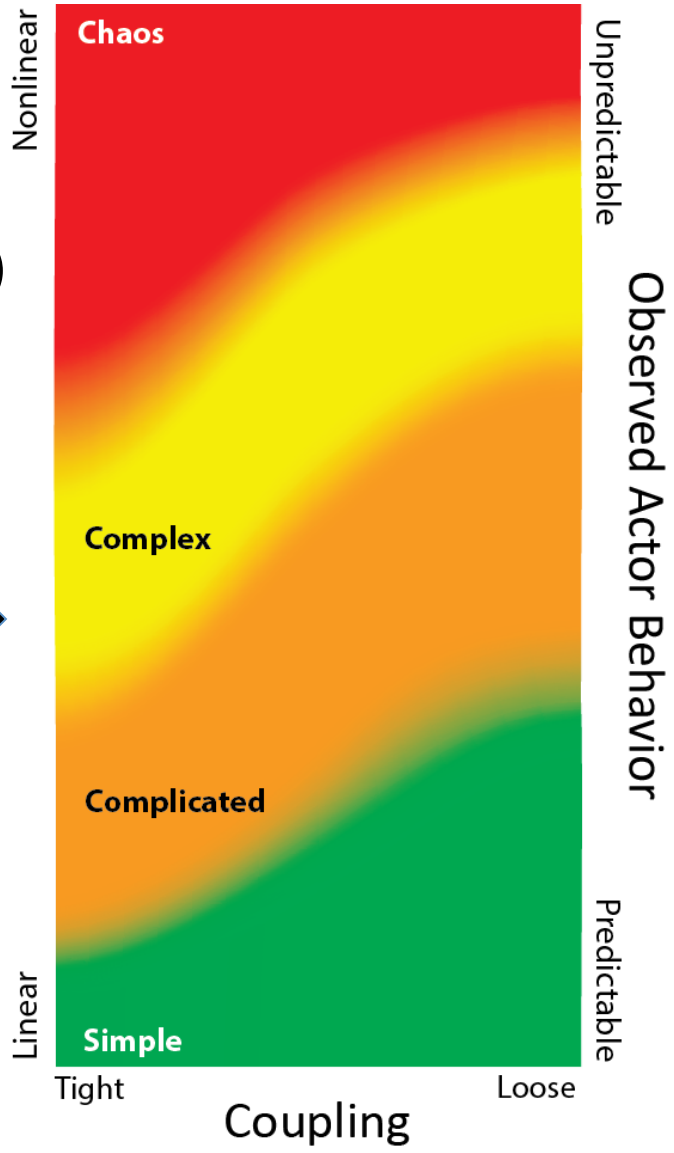
Quantitative Unpredictability Management

Extended Cynefin Framework

Based on

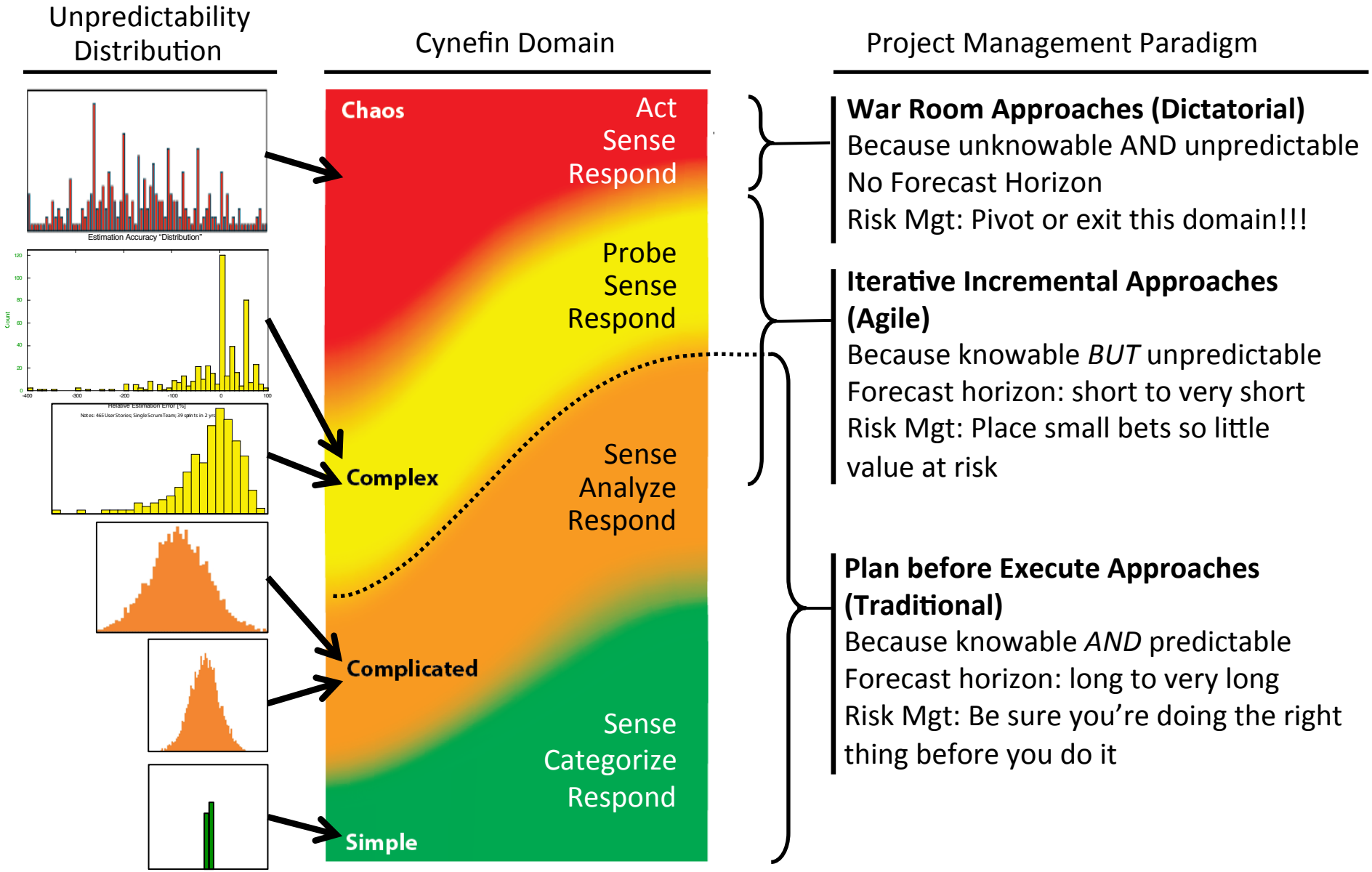
- Normal Accident Theory (Charles Perrow)
- Complex Systems Theory (many)





Matching Approach to Nature Of Risk

ONE SIZE DOES NOT FIT ALL



Our Journey

1. IT Project performance poor for 45 years
2. Accounting for risk can make large adjustments
3. As investments, projects underperform relative to junk bonds when adjusted for risk
4. Emergent, unpredictable Black Swans pose significant project risk
5. Mitigate Black Swan risks by
    - 5.1 Measuring Unpredictability
    - 5.2 Choose an apt project management method

Compliance or Results?

Pick Your Poison

- Pick the wrong process…
  - – Compliance leads to costly failures, or
  - – Noncompliance becomes culture
- Following a process IS NOT THE GOAL
  - – Overemphasize process

⇒Focus *shifts* from ***results*** to ***compliance***

Consider Aircraft Carriers:

Work is ‘‘neither standardized across ships nor, in fact, written down Systematically and formally anywhere’’. Yet naval air-craft carriers—with inherent high-risk operations—have a remarkable safety record…

Sydney Decker (2003). “Failure to adapt or adaptations that fail: contrasting models on procedures and safety”. *Applied Ergonomics* **34** (2003) 233–238.

Summary

- Customary project evaluation ignores risk
- Risk adjustment shows junk bonks often better
- Key problem is unacknowledged “long tails”
- Time to address this explicitly
  - Include risk adjustment in project evaluation
  - Measure unpredictability
  - Select management practices that match
- Presentation Copies:
  - This talk: http://jhelmassociates.com/resources.html?item=junkProjNoMath
  - More Math version: http://jhelmassociates.com/resources.html?item=junkProj

Questions?

Appendix

- Detailed RAP Calculations Results
- Risk Anomaly (counter heuristic)

Basics

Quick Example From RAP's Developers*

- Compare mutual funds to S&P 500 circa Sep 1996
- Recall $(r_i - r_f)$ is excess return, the benefit for risk exposure σ_i

$$\text{RAP} = \sigma_B \left(\frac{r_i - r_f}{\sigma_i} \right) + r_f \quad \Rightarrow \quad \text{RAP} = 14.4 \left(\frac{r_i - 5.5}{\sigma_i} \right) + 5.5$$

	Return %/yr	Excess Return %/yr	Volatility %/yr	Sharpe Ratio	RAP %/yr
S&P500 (Benchmark)	r_B = 14.1	$(r_B - r_f)$ = 8.6	σ_B = 14.4	0.60	14.10
AIM Constellation	r_i = 19.7	$(r_i - r_f)$ = 14.2	σ_i = 24.6	0.58	13.81
20th Century New Vista	r_i = 16.7	$(r_i - r_f)$ = 11.2	σ_i = 28.0	0.40	11.26
T. Rowe Price New Hzn	r_i = 16.0	$(r_i - r_f)$ = 10.5	σ_i = 22.6	0.46	12.19
Fidelity Magellan	r_i = 15.4	$(r_i - r_f)$ = 9.9	σ_i = 17.2	0.58	13.79
Fidelity Puritan	r_i = 12.0	$(r_i - r_f)$ = 6.5	σ_i = 9.4	0.69	15.46

Risk free rate, r_f = 5.5%/yr (T-Bill)

*Modigliani and Modigliani (1997). Risk-Adjusted Performance. Journal of Portfolio Management., Winter 1997. 45—54.

Basics

Expected Return

- Expected return versus raw return
  - Roll a die 10 time, 5 or 6 pays $10, else 0, what's the expected return?
    - 1/3 x $10 x 10 + 2/3 x 0 x 10 = $33
  - For 10 bonds that pay $1000 ea, default rate is 33%
    - 1/3 x $1000 x 10 + 2/3 x 0 x 10 = $3,333
  - But wait! As a creditor, you can recover some money

    $E(r_{bond})$ = yield (1-[default rate(1-recovery rate)])

    $E(r_{bond})$ = yield (1-loss rate)

Source	Ave Loss Rate	σ_B
Fitch (1990-2012)	2.88%	3.44%
Moody's (1982-2010)	2.78%	2.18%

  - We'll use the Fitch values because σ_B larger

Example 1

4 – Calculate!

Project Investment					
Capital Outlay	$10,000	Project Duration	2 yr	Recovery Schedule	10 yr
Junk Bond Benchmark					
Risk Free Rate	2.00%	Inflation	0.00%	10yr B-Bond Yield	7.25%
Ave Loss Rate	2.88%	Risk σ_B	3.44%	Bond E(CAGR), r_B	5.44%
Project Performance					
Raw Project CAGR	20.4%	Project Loss Rate	15.00%	Project Risk, σ_p	25%

Risk Adjusted Returns and Sensitivity Analysis

Scenario	Expected Return	RAP
Junk Bond	5.44%	5.44%
Successful Project	17.34%	4.11%
Cash flow 2 delayed by 6 months	16.85%	4.04%
75% of scope achieved	14.23%	3.36%
50% more capital at month 18	16.51%	3.99%

Bond RAPs better than Project's!

Risk equivalent project return, r^*_{proj} = 27.1%

Equivalent execution risk given project return, σ^*_{proj} = 15.3%

Example 2

Same Project, But 5Yr Capital Recovery

Project Investment					
Capital Outlay	$10,000	Project Duration	2 yr	Recovery Schedule	5 yr
Junk Bond Benchmark					
Risk Free Rate	0.63%	Inflation	0.00%	5yr B-Bond Yield	5.50%
Ave Loss Rate	2.88%	Risk σ_B	3.44%	Bond E(CAGR), r_B	4.48%
Project Performance					
Raw Project CAGR	24.57%	Project Loss Rate	15.00%	Project Risk, σ_p	25%

Risk Adjusted Returns and Sensitivity Analysis

Scenario	Expected Return	RAP
Junk Bond	4.84%	4.84%
Successful Project	20.89%	3.41%
Cash flow 2 delayed by 6 months	14.08%	2.41%
75% of scope achieved	9.52%	1.85%
50% more capital at month 18	17.10%	2.89%

Bond RAPs better than Project's!

Risk equivalent project return, r^*_{proj} = 31.3%

Equivalent execution risk given project return, σ^*_{proj} = 16.6%

Example 3

Same Project, But Half The Capital Outlay Recovered in 5 Yrs

Project Investment					
Capital Outlay	$5,000	Project Duration	2 yr	Recovery Schedule	5 yr
Junk Bond Benchmark					
Risk Free Rate	0.63%	Inflation	0.00%	5yr B-Bond Yield	5.50%
Ave Loss Rate	2.88%	Risk σ_B	3.44%	Bond E(CAGR), r_B	4.84%
Project Performance					
Raw Project CAGR	47.58%	Project Loss Rate	15.00%	Project Risk, σ_p	25%

Risk Adjusted Returns and Sensitivity Analysis

Scenario	Expected Return	RAP
Junk Bond	4.84%	4.84%
Successful Project	40.44%	6.10%
Cash flow 2 delayed by 6 months	33.20%	5.10%
75% of scope achieved	29.32%	4.57%
50% more capital at month 18	38.60%	5.84%

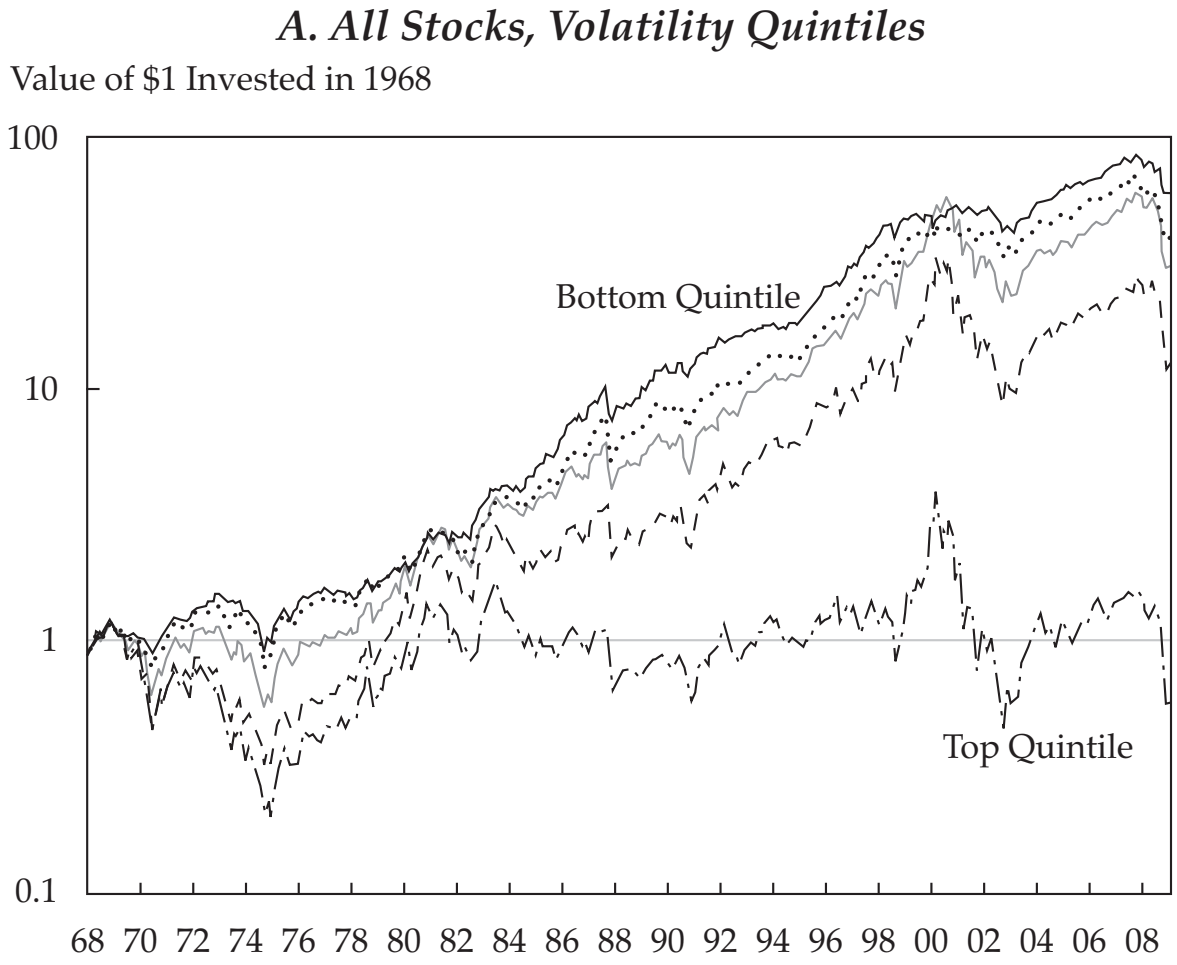
Project RAPs better than Bond's (as long as it makes sense to finish)!

Risk equivalent project return, r^*_{proj} = 31.3%

Equivalent execution risk given project return, σ^*_{proj} = 32.5%

Tangent: The "Risk Premium"

Does It Exist?



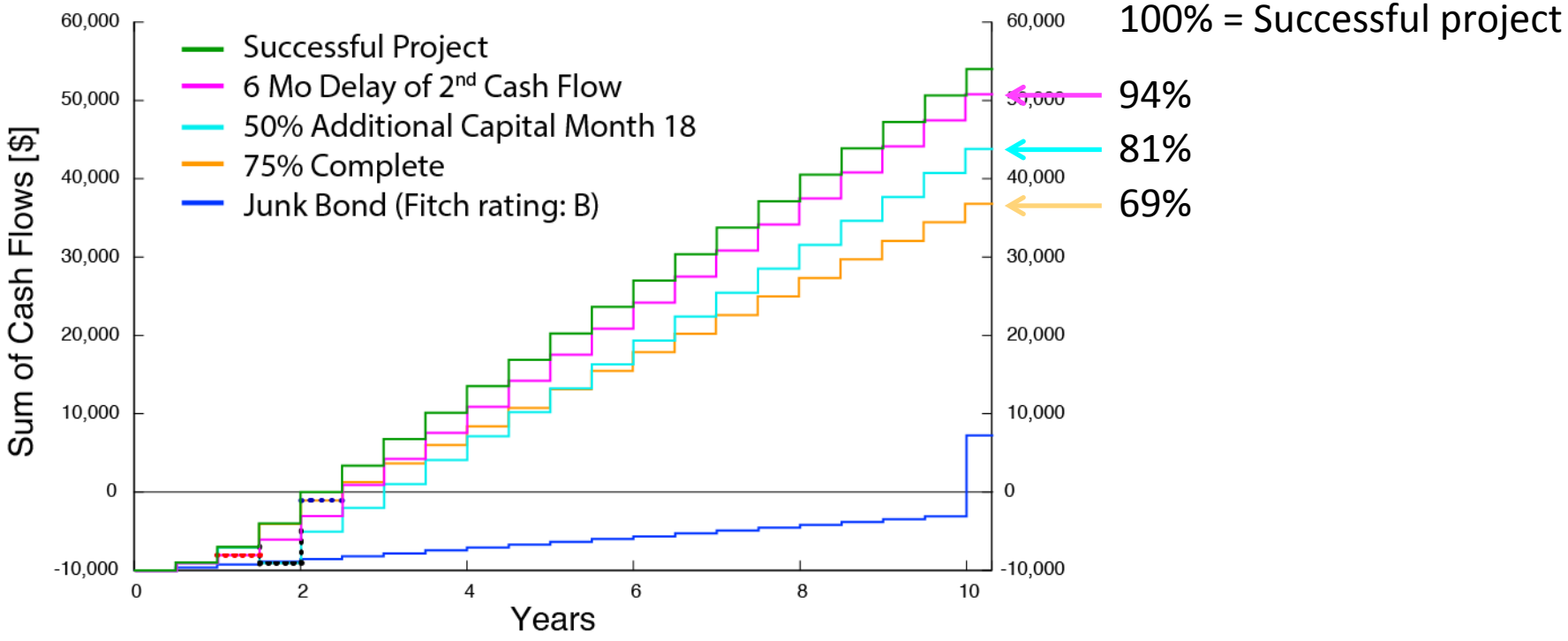
M. Baker, B. Bradley, and J. Wurgler (2011). "Benchmarks as Limits to Arbitrage: Understanding the Low-Volatility Anomaly". Financial Analysts Journal, **67**(1) CFA Institute, 40—54.

Random Goodies

Conclusions and Recommendations

Recommendations

- Use project models for RAPs and sensitivity analysis

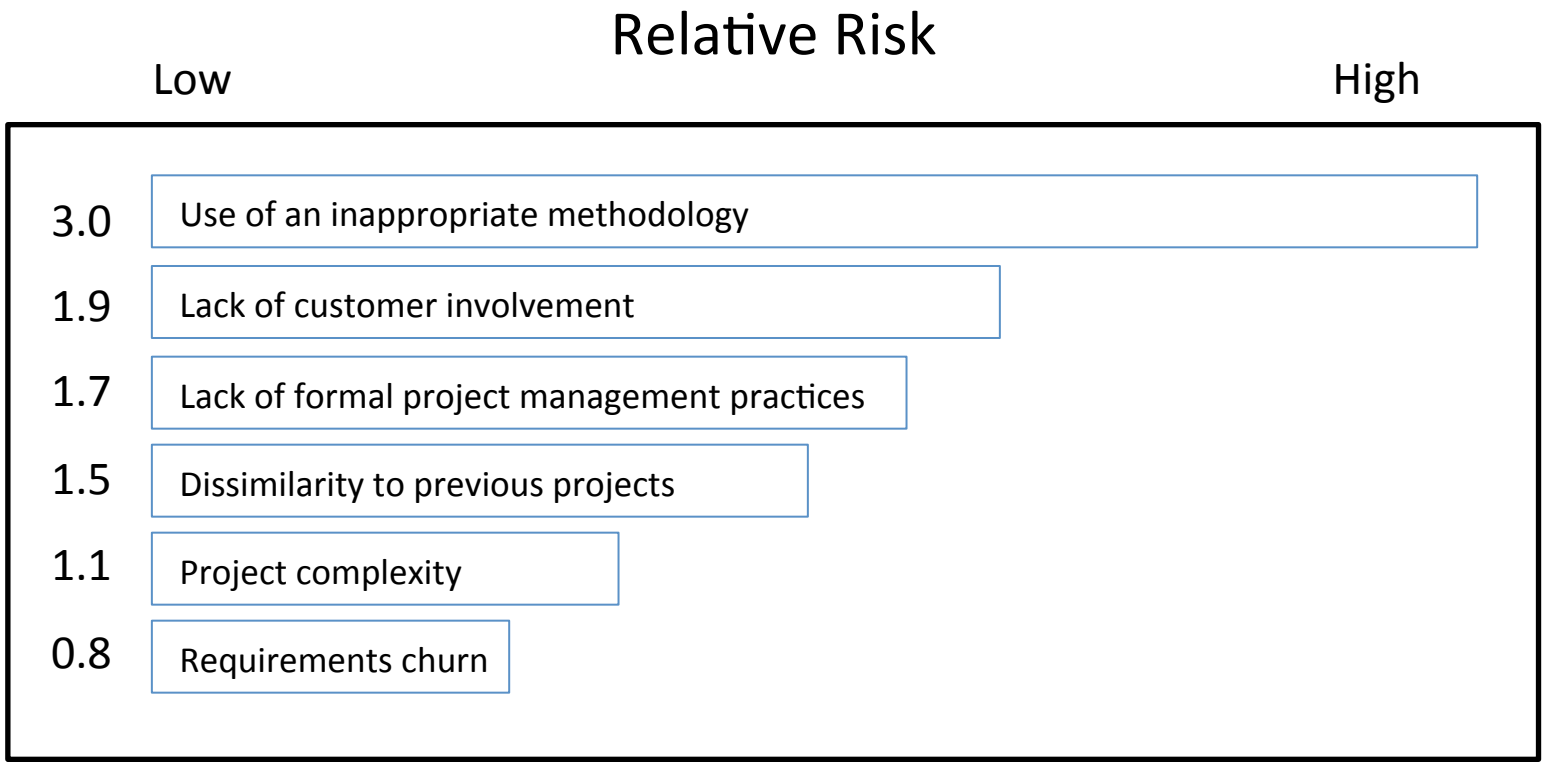


Notes: No inflation, no risk, benchmark data obtained on 2 May 2013

Conclusions and Recommendations

Recommendations

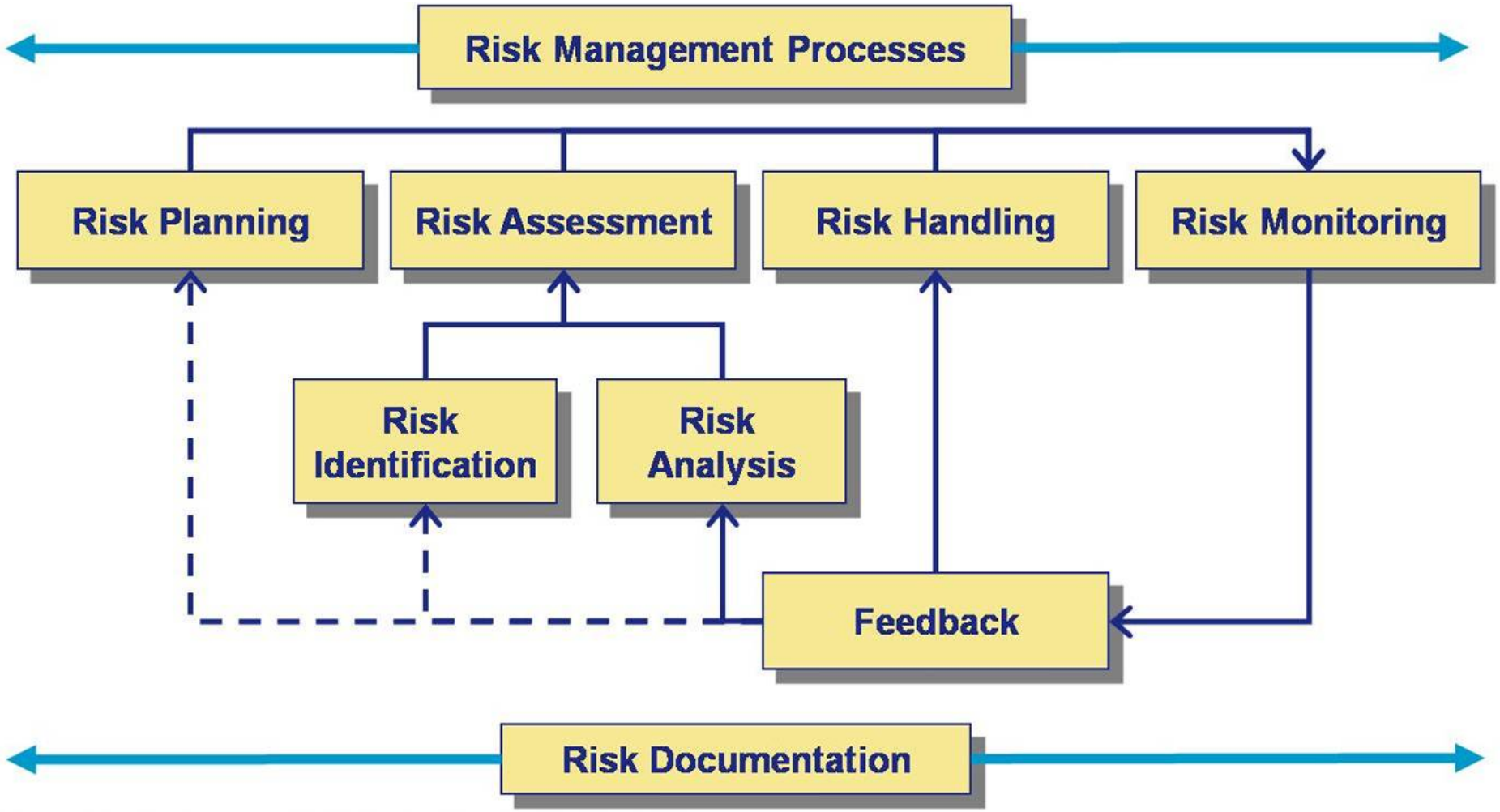
- Mismatched management approach: #1 risk
- Use quantified unpredictability with Cynefin Framework to select appropriate project management approach



Tiwana and Keil (2004). "The One-Minute Risk Assessment Tool". *Communications of the ACM,* 47(11) 73-77.

Doesn't Work Well For Complex Systems

Long Tails and Unknown-Unknowns Are a Fundamental Problem



† *RISK MANAGEMENT GUIDE FOR DOD ACQUISITION*, Fifth Edition (Version 2.0), June 2003, US Department of Defense, Defense Acquisition University

12 Infamous Project Failures

- State of Texas partnered with IBM to consolidate data centers across the state
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- The ambitious plan to arm U.S. Census Bureau employees with handheld computers to compile and transmit 2010 census information to headquarters was mostly scrapped after almost two years of work. $595 Million taxpayer loss.
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- A rocky ERP initiative by firetruck-maker American La France set off enough inventory problems at the company to cause shortages in parts and disruption in production of new trucks. Out of business.
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- The Denver-based retail jewelry outfit Shane Co. experienced such a troubled ERP upgrade that costs ballooned from an estimated $10 million to over $36 million, causing major inventory problems in the process. Filed for Bankruptcy
- See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf

12 Infamous Project Failures

- Difficulties merging commission-payment systems at Sprint and Nextel following their merger prevented thousands of employees from being paid their cut of sales for years. Class action lawsuit for $5 Million
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- A botched $95 million payroll system upgrade to SAP triggered errors on paychecks of thousands of LA Unified School District employees for months on end in 2007. More than $35 Million over budget + angry teachers
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- Hardware malfunctions in a decades-old core processing system at HSBC bank in August 2008 caused a close to a week of banking disruption for US-based customers. (Not too different than Knight Capital)
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- The London Stock Exchange went down for almost an entire day on Sept. 8, 2008 due to network connectivity issues associated with its computerized trading platform. Brokers lost millions of pounds in commissions
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf

12 Infamous Project Failures

- Poor information management and system migration procedures at the Kaiser Kidney Transplant Center delayed hundreds of patients from receiving life-saving transplant surgeries. Less than two years after opening, Kaiser was forced to close its transplant center, amid a regulatory crackdown and exposure by a whistle-blowing former employee.
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- A software calibration problem in 2005-2008 Ford Mustangs inflated airbags forcefully enough to cause serious injury to small females not wearing seatbelts. 500,000 vehicles recalled.
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- Inadequate security at the credit card processor Heartland Payment Systems allowed hackers to steal sensitive information from more than 100 million credit card accounts. Faces sanctions & lawsuits for millions
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf
- The ticketing system built to handle public sales for the 2008 Summer Olympics broke two times in the run-up to the event. Dir of Tkting lost job
  - See more at: http://www.baselinemag.com/c/a/IT-Management/Dirty-Dozen-Inside-12-IT-Disasters-874085/#sthash.jPXsasDn.dpuf

Bonus Infamous Project Failure

State of Washington License Application Mitigation Project (LAMP).

Begun in 1990, LAMP was supposed to cost $16 million over five years and automate the state's vehicle registration and license renewal processes. By 1992, the projected cost had grown to $41.8 million; a year later, $51 million; by 1997, $67.5 million. Finally, it became apparent that not only was the cost of installing the system out of control, but it would also cost six times as much to run every year as the system it was replacing. Result: plug pulled, with $40 million spent for nothing.

Say "Good Knight"

Loss: $10,000,000/Minute For 46 Minutes

- Deployed new software that woke up old testing harness

- Irony: Thomas Joyce, CEO
  - Vocal critic of Facebook public offering (May, 2012)
  - Company trades delayed by NASDAQ for hours.
  - Knight suffered $35.4 million in losses