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Risk Budgeting at CPPIB: a Case Study

Reorienting Retirement Risk Management
Wharton School of Business

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May 1, 2009

Outline

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2. CPP Primer
3. CPPIB Risk Return Accountability Framework
4. Risk Budgeting: Beliefs vs. Reality
5. Risk Budgeting at CPPIB
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1. Key Messages

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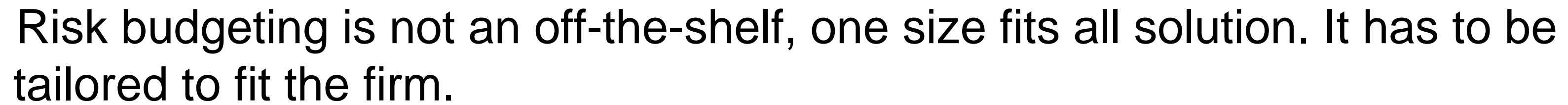

Risk budgeting is not an off-the-shelf, one size fits all solution. It has to be tailored to fit the firm.

Risk budgeting reinforces the alignment of active investment decisions with total portfolio objectives

Implementing risk budgeting challenges an organization to quantify its risk beliefs

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2. A CPP Primer

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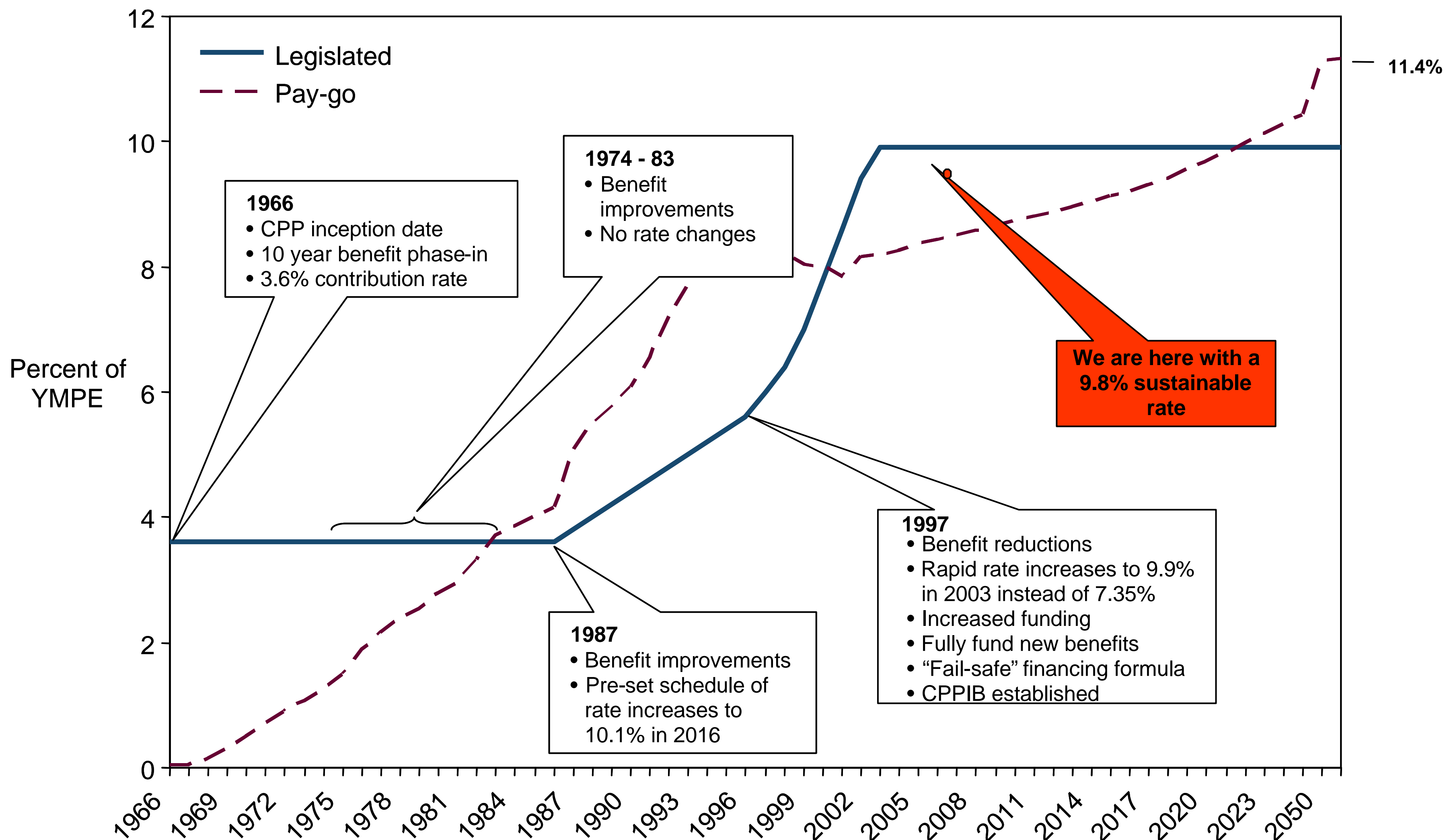
CPP has evolved in response to demographic and economic realities



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CPP Reforms of 1997 created the CPPIB

Reform principles: inter-generational fairness, affordability and Sustainability

Results of broad consultations:

- Canadians adamant that CPP should be permanently “fixed”
- Willing to shoulder the burden through higher contributions
- In return, insisted that there be no government involvement with CPP Assets

Government responded with a series of reforms to ensure the longterm sustainability of the CPP:

- Modest reduction in benefits
- Dramatically higher contribution rates – 80% increase over 6 years
- CPP assets were segregated from government assets and revenues
- CPP Investment Board (CPPIB) was created to manage the assets
- Fail-safe mechanism created to ensure long-term sustainability

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3. CPPIB Risk/Return Accountability Framework

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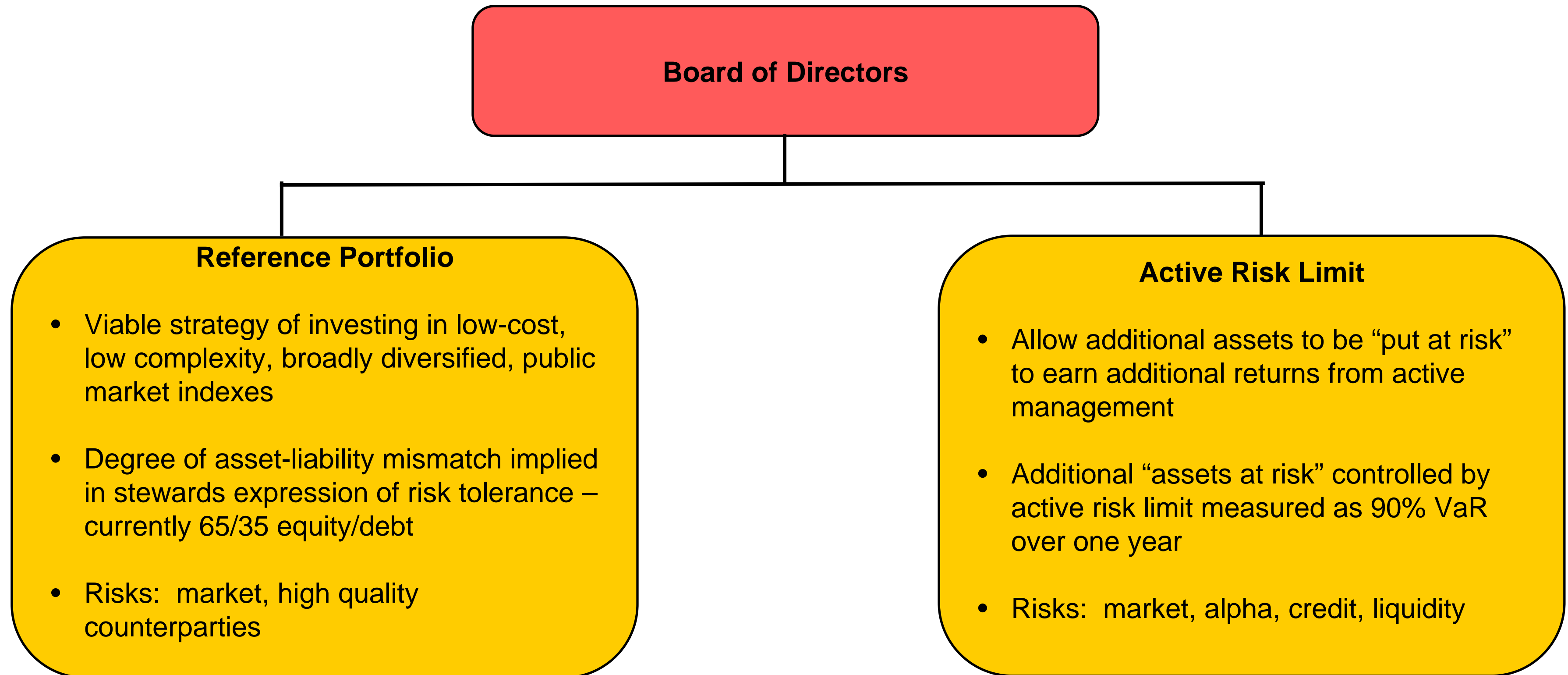
CPPIB: Accountability for risk starts with the Board of Directors, which uses two levers for governing CPPIB strategic risk-taking



These two levers represent the two biggest investment decisions made by the Board of Directors.

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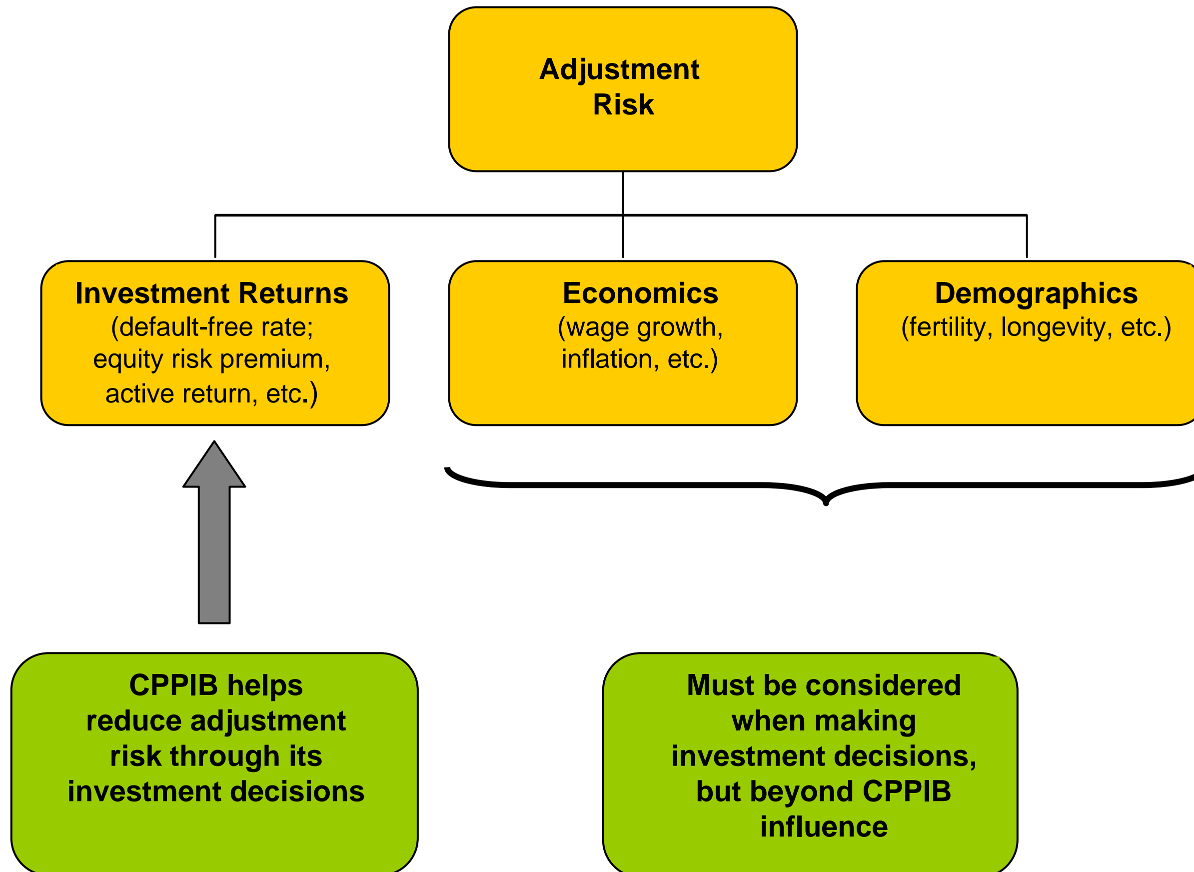
CPPIB's biggest risk: Adjustment Risk



Most factors driving a firm's biggest risk – at CPPIB that's adjustment risk -- are beyond the firm's control.

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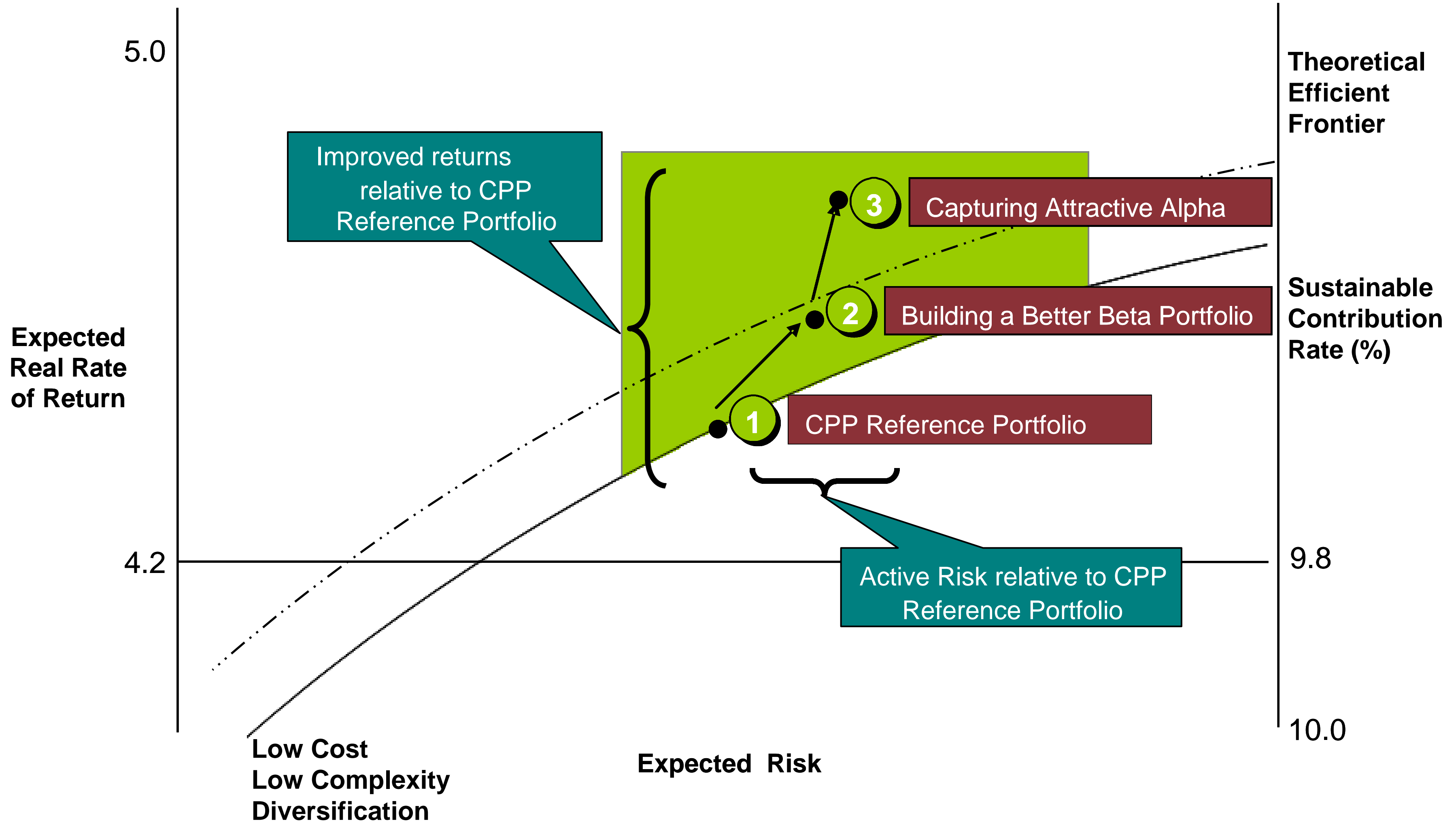
CPPIB investment strategy seeks to add value by harvesting better beta and earning alpha.

Illustrative (Not to Scale)



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Risk budgeting assumes…

Most risk budgeting frameworks are based on idealized risk budgeting beliefs that assume:

- risk can be measured and monitored regularly for each business line
- each business line can maintain target risk level by adjusting portfolio
- risks are comparable across business lines
- people are incented to abide by their risk budgets

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Three challenges to applying a risk budgeting framework to a heterogeneous portfolio.

Investment portfolios can be a mixture of very different strategies.

- Overlay manager operating transparently on balance sheet
  - High frequency and high quality public market data provides firm basis for quantifying risk
  - Short term investment horizon
- Pooled manager reports risk once a month
  - Pooled fund assessed infrequently but relatively accurately
  - Medium term investment horizon
- Portfolio of infrastructure positions valued annually
  - Private equity risk exceedingly difficult to measure directly
  - Long term investment horizon

Ability to measure risk varies greatly

- Measure of total portfolio risk cannot be better than weakest link (on a weighted basis)
- Most risk budgeting methodologies rely on availability of high frequency, high quality data to monitor risk usage
- High frequency, high quality proxies often used for ‘problem’ assets.
- Accuracy of proxy to mimic asset varies significantly
- Character of risk can vary with investment horizon.

Fair allocation and attribution of risk

- Fair comparisons across business lines presume such data exists for all opportunities
- Acceptance and use of proxies results in risk budgeting to proxies, not actual assets
- Risk investment horizon needs to be relevant to all asset classes

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Some examples where reality can shatter idealized risk beliefs

	Hoped for idealization	*Reality*	*Examples*
Return Distributions	Normally distributed	Fat tails, skews, time varying	Credit has asymmetric payoff
Price transparency	Perfect, frictionless markets	Illiquid assets with infrequent valuation	Infrastructure
Risk measurement	Perfect	Limited sample sizes, use of proxies	Large errors in estimating extreme percentiles
Availability of information	Frequent and accurate for all assets	Quality and frequency varies across asset classes	Some pooled funds report infrequently
Portfolio management	Maintain risk profile	Difficult to rebalance illiquid portfolios	Infrastructure portfolios
Incentives	Emphasis on paying for successful risk taking	Emphasis on returns since returns are precise while risk is fuzzy	Most of us

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Risk Budgeting is appropriate if you believe …

- Investors must take risk to have any expectation of earning excess returns
- Risk is a constrained resource and its use needs to be efficiently managed
- Compensation should be linked to risk adjusted return, not rates of return
- Risk can be allocated and attributed fairly

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Risk budgeting supports alignment of management and investment objectives

- Accountability – explicit statement of income and risk expectations in performance contracts
- Transparency – outcome of investment decisions must be seen in order to be compared with expectations
- Comparability – invest choices informed by risk means risk is comparable and reconcilable across business lines
- Efficiency – total excess returns should be earned with as little total active risk as possible.

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CPPIB is implementing risk budgeting as part of its risk return accountability framework

Risk budgets are part of the annual business planning process,

- Achieving long run excess return target requires taking active risk
- Set expectations for amount of risk needed to achieve return targets
- Allocate risk to departments.
- Effective diversification leads to total risk budget being significantly less than the sum of departmental risk budgets
- Iterative process balancing capabilities and objectives
- Integral part of performance contract
- Set risk budgets where appropriate (discussed later)

Regular monitoring of risk utilization vs. risk budgets can help avoid pathological behaviour related to compensation cycle

- Success early in compensation cycle could lead to reduction in risk to preserve compensation
- Failure late in compensation cycle could lead to excessive risk taking in attempt to double down

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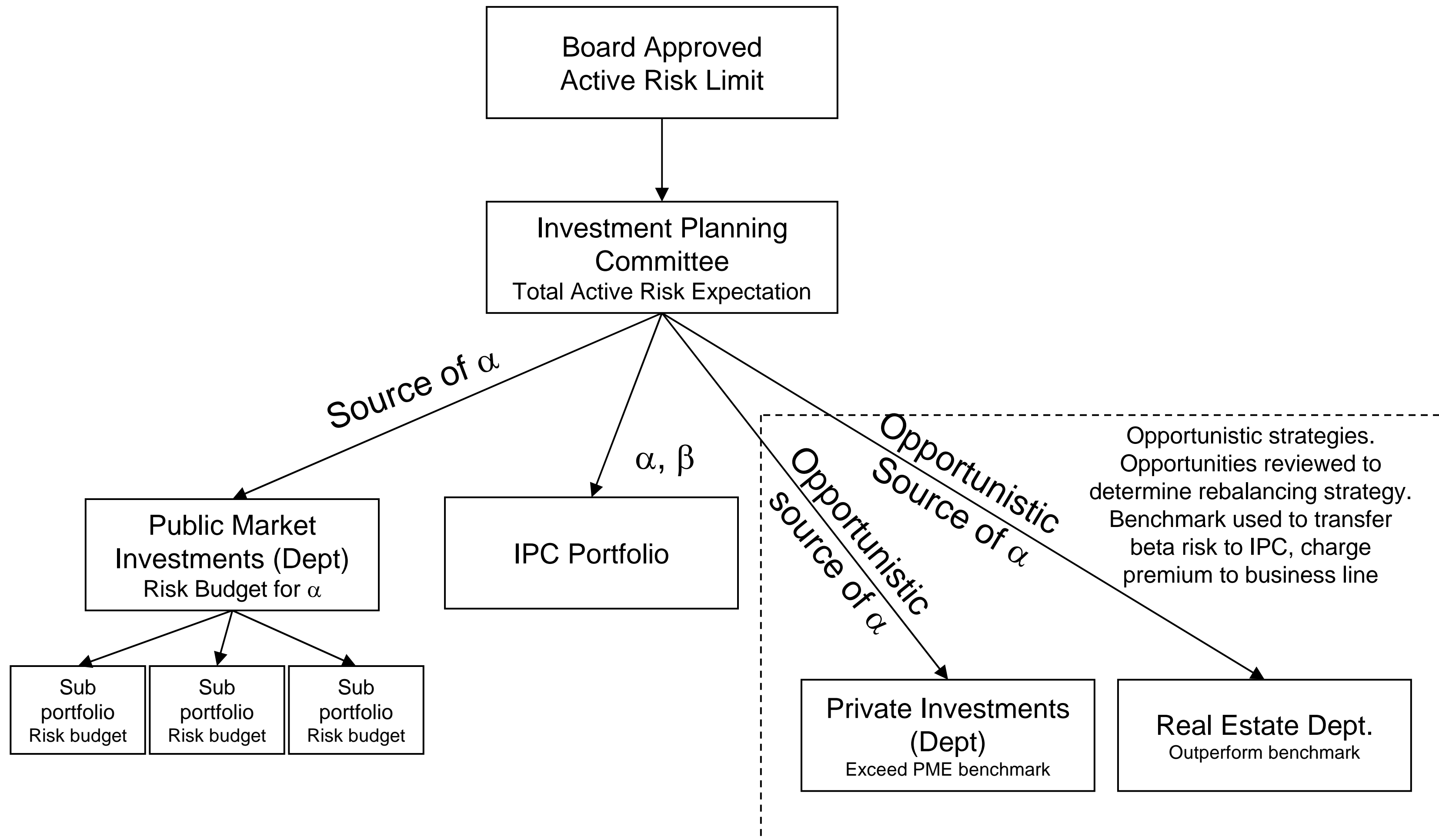
CPPIB currently sets a risk budget for Public Market alpha sources, and communicates risk expectations for other opportunistic investments.



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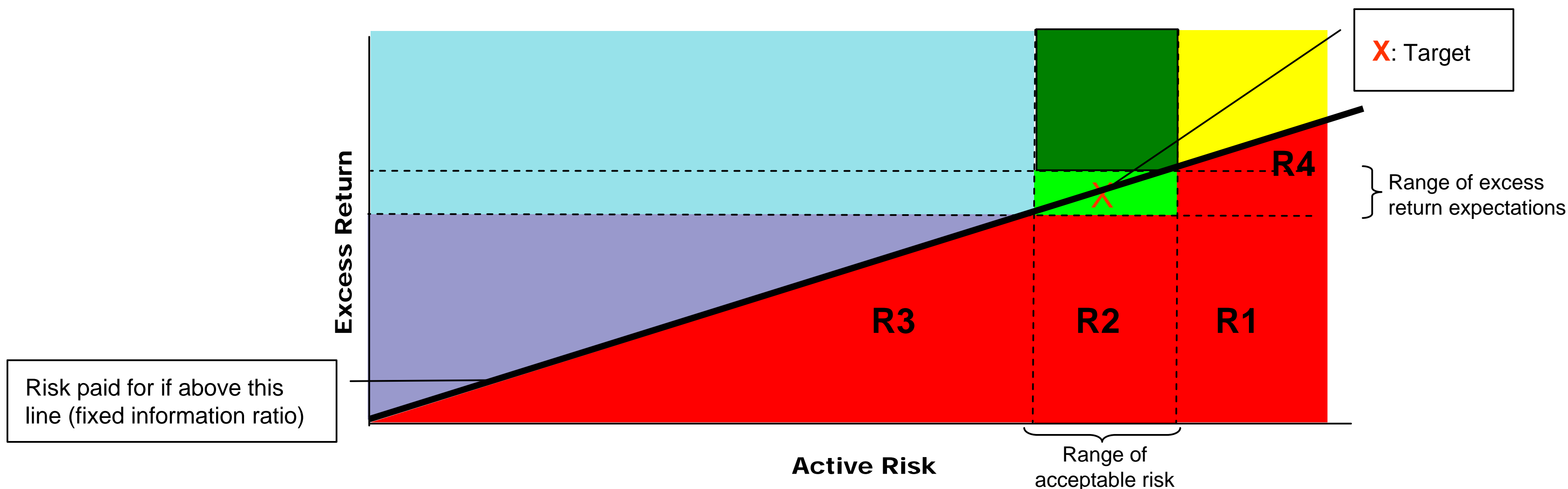
Risk budgeting requires performance contracts to consider acceptable risk/return tradeoffs.



	Return expectations	Risk Budget Utilization	Paid for risk	Action required
Green	Met	Met	Yes	None required
Dark Green	Over	Met	Yes	Review assumptions
Blue	Met/over	Under	Yes	Review assumptions
purple	Under	Under	Yes	Review assumptions
Yellow	Met/over	Over	Yes	
Red 4	Over	Over	No	*Reduce risk or gain*
Red 1	Under	Over	No	*approval of increased risk*
Red 2	Under	Met	No	*budget*
Red 3	Under	Under	No	

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6. The One Minute Summary

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- Risk budgeting is a tool for reinforcing alignment of investment decisions with fund objectives
- Risk budgets link expectations of returns with levels of risk accepted as necessary to earn those returns
- Risk budgeting at CPPIB is a work in progress
- Implementing a risk budgeting framework is challenging, and the quality of the result is unlikely to be any better than your least understood risk
- CPPIB believes implementing and maintaining our risk budgeting framework is a good way of continuously improving our understanding of risks

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Risk Budgeting at CPPIB: a Case Study

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About the CPP Investment Board

The CPP Investment Board invests the funds not needed by the Canada Pension Plan to pay current benefits on behalf of 17 million Canadian contributors and beneficiaries. In order to build a diversified portfolio of CPP assets, the CPP Investment Board is investing in publicly-traded stocks, private equities, real estate, inflation-linked bonds, infrastructure and fixed income.

Based in Toronto, the CPP Investment Board is governed and managed independently of the Canada Pension Plan and at arm's length from governments. At March 31, 2008 the CPP Fund totaled C$122.7 billion.

Sterling Gunn

Sterling Gunn leads CPPIB's Portfolio and Risk Analysis team, supporting CPPIB asset liability modeling, investment policies, strategic portfolio design, risk budgeting and risk measurement.

He has over fifteen years of risk management experience in capital and energy markets. Prior to joining the CPPIB in 2004, Sterling was a manager at Ontario Power Generation. Before that, Sterling worked at a major Canadian bank as a risk manager.

Sterling holds an MBA from the University of Toronto, an M. Sc. in Experimental Space Science from York University and a B Sc. in Physics and Applied Mathematics from the University of Toronto

Tracy Livingstone

Tracy is the Senior Advisor in the Investment Risk Management Group responsible for the risk policies and standards of practice that govern the investment activities of the CPP Investment Board, ensuring consistency and continued alignment with the firm's vision, mission and values, and the requirements of the Canada Pension Plan Investment Board Act and Regulations. She joined the CPP Investment Board in June 2005.

Tracy is a risk management professional with ten years experience in capital markets and energy. She spent over five years at Ontario Power Generation, working first on the trading floor in Market Risk and then in Enterprise Risk Management. Prior to that, she worked in the Risk Management Systems group at TD Securities.

Tracy holds an MBA from Wilfrid Laurier University, and a Financial Risk Manager designation from the Global Association of Risk Professionals. She has an honours BA in Economics from the University of Guelph.

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