Valter Viola

QUALIFICATIONS

Valter Viola
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EXPERIENCE ~ ¼ CENTURY

	1993 - 2000	2000 - 2005	2005+
EMPLOYMENT	ONTARIO TEACHERS' PENSION PLAN	CPP INVESTMENT BOARD	holland park
ROLES	STRATEGY: INVESTMENT PLANNING COMMITTEE MANAGEMENT: PM RRB; PM TAA RESEARCH & ECONOMICS: RESEARCH DIRECTOR; RESEARCH ANALYST	VP (EXEC), RESEARCH AND RISK MANAGEMENT	PRESIDENT/ FOUNDER
CONSTRAINTS	1. FOREIGN PROPERTY RULE 2. NON-MARKETABLE BONDS 3. RRB AUCTION RULE ("25% MAX") 4. TSX INDEXATION		
MPI RELEVANCE	**BARRIERS TO EXCELLENCE** / **RISK BUDGETING** / **FRAMEWORK** / **INVESTMENT BELIEFS** **PRUDENT AND APPROPRIATE PRINCIPLES**		

TEACHERS' CONSTRAINTS

		RELEVANCE ↓
1. FOREIGN PROPERTY RULE	• Non-marketable bonds • Derivatives swap bonds for foreign equity • Freed cash for RRBs	#12. No International Equities #14. Exclusion of Real Return Bonds #15. Effectiveness of Duration Policy
2. NON-MARKETABLE BONDS		
3. RRB AUCTION RULE ("25% MAX")	• Owned ¼ of Canada's RRBs (max allowed) • Bought US RRBs • Private placement (407 Toll Road)	

CPPIB'S CONSTRAINTS

		RELEVANCE ↓
4. TSX INDEXATION	• Canadian equity regulation: "passive" only (no active) • Regulation relaxed 50% (Aug 2000) • 1st active decision (↓ Nortel concentration) • Avoided $535 million loss	**#11. Canadian Equities' 10% Minimum Allocation**

CPP INVESTMENT BOARD

PENSION RISK BUDGETING

Pension Risk Budgeting: Something Old, Something New, Something Borrowed... [1]

The authors contend that "risk budgeting" is a new label for a management discipline made possible by software that can measure risk as frequently as return. The underlying methodology is mean-variance optimization and Value at Risk. Their slant is in judging opportunities by return on risk, instead of return on assets.

Leo de Bever

Wayne Kozun

Valter Viola

Barbara Zvan

The authors, all with the Research and Economics area of the Ontario Teachers' Pension Plan Board, in Toronto, have been working together since 1995. The group's risk management research is closely linked to its responsibilities for asset mix policy recommendations. They also play a key role in the Fund's tactical asset allocation strategy, and manage its extensive holdings of indexed linked bonds and commodities.

WHAT IS RISK BUDGETING?

"Risk capital budgeting" is old wine in new casks. At its core is the central idea of portfolio theory that, in an uncertain world, pursuing investment returns brings out its evil twin: the risk of a loss. A portfolio's "risk budget" is a measure of risk tolerance, defined as the loss one rarely expects to exceed over a specific time horizon. The portfolio's estimated "risk capital usage" must fall within this risk budget. The appropriate time horizon and the definition of "rarely" depend on the organization. Ontario Teachers' Pension Plan ("Teachers'") has a long-term focus on managing surplus (assets-liabilities) and surplus risk, so we express our "surplus risk" budget as the annual surplus loss we are prepared to absorb in the 1 in 100 worst-case outcome.

The VaR Connection

The focus on downside risk and risk limits is at the core of Value at Risk (VaR), prescribed by regulators to assess banking capital adequacy.[2] "Risk capital" is a better-packaged multiple of portfolio standard deviation, e.g. the standard deviation of surplus growth (Asset Growth-Liability Growth) in Asset-Liability (A/L) models. But standard deviation has an image problem: "We risk losing $15 billion of surplus," packs far more punch than, "The standard deviation of surplus growth is 8.5 percent."

Managing within a risk budget requires timely estimation and reporting of actual portfolio risk. Faster computers and better risk software have solved the reporting issue. One can debate whether VaR risk estimates include all relevant risks, or whether we have enough information to calculate reliable 1% estimates. Fair comment, but let's maintain perspective.

VaR has standardized and simplified the measurement and comparison of risk across asset classes. Emphasizing its faults is like being in the Stone Age, discovering iron, and complaining about rust. Rust and all, VaR-based risk budgeting has probably moved us from a 20% to a 60% risk solution. That has less to do with precise risk estimates than with frequent risk reporting and the discipline it brings to risk-return discussions. Risk budgeting is a tool, not a miracle.

Surplus risk predominantly arises because the risk-return characteristics of the policy asset mix do not match those of the liabilities. The small remainder comes from active risk, created when managers hold portfolios dif-

PORTFOLIO MANAGER, RRB + TAA (TACTICAL ASSET ALLOCATION)

R&E had 12% ($34.5M/$300M) of net value added target, mostly in **Viola's TAA (tactical asset allocation) portfolio**. (Colleague had FX.)

Table 1

	Assets Mill$	Risk/Assets %	Risk Mill$	1st Q Gross VA Mill$	Tracking + Costs Mill$	1st Q Net VA Mill$
Fixed Income	8000	3%	250	25.0	10	15.0
Active Equities	11000	11%	1225	122.5	25	97.5
Indexed Equities - CDN	13000	3%	325	32.5	12	20.5
Indexed Int'l Equities	12000	1%	140	14.0	43	-29.0
Private Capital	2500	30%	750	75.0	6	69.0
Real Estate	2000	28%	550	55.0	7	48.0
Swap Warehouse	6000		0	0.0	0	0.0
Research and Economics	4500	9%	425	42.5	8	34.5
Foreign Exchange			175	17.5	17	0.5
Rebalancing - Overlay	1000	96%	960	96.0	52	44.0
Sum of Assets			4800	480.0	180	300.0
Total Fund	60000	3.2%	1920	0.80% of Assets	0.30% of Assets	0.50% of Assets

Source: Pension Risk Budgeting Paper (data before Dec 2000)

RRB PORTFOLIO: 13% OF AUM IN 2000 ($9.5B/$72.0B)

1999: $650M corporate RRB (407 toll road)
Teachers' largest single transaction
$722M by 2000 (> banks)

2000: > $5B increase
(including ~ $4B in US)

Source: Teachers' 2000 Report to Members →
2000 Annual Report
↓

Left Teachers'
(Joined CPPIB)

Top 40 Investments

AS AT DECEMBER 31, 2000

Security Name	(Millions) Shares	($ Billions) Fair Value
Government of Canada Bonds		$9.3
Cadillac Fairview Corporation (real estate subsidiary)		6.2
Real return Canada bonds (plus inflation)		3.1
Canadian T-bills		1.8
Nortel Networks Corporation	37.8	1.8
		($ Millions)
Nexen Inc.	21.4	791.4
Hwy 407 Real-return corporate bonds		722.0
Power Corp Convertible Debentures		529.8
Royal Bank of Canada	9.4	476.7
Toronto-Dominion Bank, The	8.4	366.4
Encal Energy Ltd.	31.1	331.6
Bank of Montreal	4.2	328.4
BCE Inc.	7.6	328.1
Bank of Nova Scotia, The	7.5	326.1
Manulife Financial Corporation	6.8	317.8

Security Name
Alcan Aluminium Lin
Canadian Pacific Lim
Petro-Canada
WestJet Airlines Ltd.
Alberta Energy Comp
Celestica Inc.
Talisman Energy Inc.
Bombardier Inc.
Barrick Gold Corpora
Thomson Corporatio
Suncor Energy Inc.
Gulf Canada Resourc
Canadian National R
TELUS Corporation
TransCanada PipeLin
HSBC Holdings
Total Fina SA
Ballard Power System

($ Millions)	**2000**	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990
– Real Rate Products	**9,545**	4,239	3,019	1,597	1,066	1,064	653	548	457	16	—
Net Investments	**72,043**	67,092	58,106	52,948	46,332	39,003	33,413	33,270	26,385	23,809	19,456

RISK BUDGETING: 5 QUESTIONS

INVESTMENTS

a

PRACTICAL alternative

Plan sponsors need to consider risk-based budgeting as a way to weather economic and stock market turbulence.

By Valter Viola

In 2000, Nortel Networks represented an 'index-distorting' one-third of the TSE 300 Index, creating undue risk for many funds. Some funds managed this risk by underweighting Nortel, which created active risk relative to their policy portfolio. Others chose a policy response, adopting a capped index that limited how much could be invested in a single stock. Both the active management and policy responses were band-aid solutions that treated the symptom of undue risk, but not the problem. The underlying problem was that asset-based processes—those that set target weights and minimum/maximum position limits, although simple, had become less effective in dealing with today's complicated and evolving portfolios.

A more effective and timely way to deal with the Nortel problem would have been to adopt a risk-based approach to portfolio management. Such an approach would have involved measuring risk more frequently, setting limits on risk and rebalancing the portfolio based on risk/return assessments rather than asset mix targets. In its 2001 annual report, the Canada Pension Plan Investment Board described how it avoided more than $500 million in potential losses, on average assets of $5 billion, related to Nortel through a "risk management initiative" that moved the fund from passive to "partially active" investing. It's remarkable how uncommon this approach was at the time, and still is, but that's about to change.

THE PROCESS

Risk budgeting is the process of allocating risk in an explicit way. Like all budgeting processes, it allocates a scarce resource (risk) to meet an objective (maximize returns). It has the same goal as asset-based processes, but that's where the similarities end. In risk budgeting, the focus is on risk and return, and the asset mix is a by-product. For asset-based processes, it's the other way around—the focus is on assets and returns.

Companies that define their processes in terms of "why" (objectives) rather than "how" (means) are more likely to evolve with changing times. That's why XEROX calls itself a document management company—not a company that makes photocopiers. It's also why risk budgeting is better than asset-based processes. Risk budgeting acknowledges that a constant asset mix has a changing risk profile (as the Nortel example illustrates) and that rebalancing should be based on risk and return assessments, rather than asset weights.

Another costly asset-based constraint is the "long-only" constraint, which imposes a minimum (0%) and maximum (100%) allocation to assets. The constraint is designed to mitigate potentially large losses from short selling. The large cost of the constraint, which is widely acknowledged, could be reduced if risks were controlled directly using risk-based limits.

The popular 50% currency hedge ratio represents a further asset-based constraint that may impose a cost. If

1. What risks should we manage?

2. How much return do we need for risks that we take?

3. How much risk is too much?

4. Where should we take risk?

5. Did we get paid enough for the risks we took?