

Pension Reform in Russia: From Legislation to Implementation

Management of Investment Risk
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A Primer of Risk Management Practice

Why is risk management important to the modern investment process?

- » All returns are risky, because they are in the future. Even guaranteed returns are risky.
- » You can only out-perform through skill.
- » You will under-perform because of inefficiency, ignorance and arrogance.

The purpose of risk management is to improve performance by identifying skill and by reducing inefficiency and ignorance.

Higher performance and lower losses will decrease the burden of funding pension liabilities.

Investment Risk

Investment risk is the uncertainty that future asset values will match present expectations.

- » Expectations Risk: unrealistic forecasts, bad benchmarks, political and organizational bias
- » Market Risk: volatile market values
- » Credit Risk: changing credit qualities
- » Spread Risk: uncertain cost of credit
- » Liquidity Risk: transacting at non-market equilibrium
- » Operational risk: potential loss due to process failure

Expectations risks are the largest risk factors, the least quantifiable, and the most overlooked.

Risk Measurement

Risk measurement attempts to measure the risk factors of the investments.

- » Positions: all investments must be recorded and reported
- » Valuations: independent valuations by mark-to-market or mark-to-model for unlisted holdings
- » Sensitivities: detailed sensitivity of value to changes in market factors – interest rates, credit spreads, prices, volatilities, currencies
- » Stress Tests: potential impact of extreme market moves
- » Risk: stochastic models of value-at-risk or tracking error
- » Back-testing: comparing realized returns with expected returns to validate the process
- » Attribution: attribution of risks to the investment process such as strategy/tactics/execution, market/style/selection, currency/price/interest/spread

Risk Management

Risk measurement is neither accurate nor objective so you must have an active risk management process.

- » Risk management is not a risk measurement system
- » Risk management is asking all of the questions and believing none of the answers
- » Risk management is a culture, a discipline and a common language of opportunity and risk
- » Risk management is the responsibility of everyone not just the risk managers
- » Risk management is an on-going process that takes time

Investment Management

Investment management uses risk management as quality assurance for the investment process.

- » Specifying the expected return distribution:
Benchmarks, risk budget, credit quality, etc.
- » Managing the asset selection:
Asset selection based on expected return and risk on an individual asset and portfolio basis
- » Validating the actual returns:
How were returns generated? Did higher risks produce higher returns? Were returns diversified?

Investment management is a production process not an artistic expression.

Risk Budgeting

Best practice investment management now includes risk budgeting within the investment process:

- » Investments exist to produce returns
- » Risk factors determine the uncertainty of returns
- » Managers are more or less efficient at generating returns from risks
- » Allocations of risks should be made to the efficient managers and rewarding risks
- » Allocations should be managed within budgets adjusted for realized returns
- » Risk, diversification and return should be aggregated across all portfolios

Expected Excess Return:

$(\text{Risk Budget} \times \text{Information Ratio}) + \text{Realized Excess Return}$

Conclusion

Risk management is a natural part of a disciplined investment manufacturing process. Investment manufacturing may be less glamorous than investment management, but it is more sustainable. Increased investment choices can create increased opportunities for returns, but only if the quality assurance disciplines of risk management are set firmly in place.

Risk Budgeting – Product Definition

Canadian Equity

- » Active portfolio with equities, index swaps, floating rate notes, corporate bonds, commercial paper
- » Benchmark – TSE 60

International Equity

- » Active portfolio of EAFE stocks
- » Benchmark – EAFE

US Equity

- » Enhanced index portfolio
- » Benchmark – S&P 500

Risk Budgeting – Risk Measurement

Tracking Error

Portfolio	NAV	Allocation	Tracking Error
Total Equity	4,796,276,902	100%	283
Canadian Equity	2,658,618,602	55%	486
International Equity	693,099,200	14%	414
US Index Plus	1,444,559,100	30%	66
Diversification Benefit			683

Notes: NAV in CAD

Tracking Error in annualized basis points, 2 standard deviations, five years of weekly data

Risk Budgeting – Risk Budget

Risk Budget

Portfolio	NAV	Allocation	Objective	Info. Ratio	Expect T.E.	Real T.E.	T.E. Range	Actual T.E.
Total Equity	4,796,276,902	100%	0.66%	0.25	2.64%	0.53%	3.57% - 5.95%	2.83%
Canadian Equity	2,658,618,602	55%	0.85%	0.25	3.40%	-0.12%	2.19% - 3.65%	4.86%
International Equity	693,099,200	14%	1.00%	0.25	4.00%	0.60%	4.80% - 8.00%	4.14%
US Index Plus	1,444,559,100	30%	0.15%	0.25	0.60%	0.05%	0.60% - 1.00%	0.66%

Note: Objective is the excess return over the benchmark expected from active management

Information ratio is the manager's expected ratio of return for risk - typically low!

Expected tracking error is the tracking error the manager must be allocated to obtain the expected excess return given the information ratio

Realized tracking error is the actual excess return generated so far in this period

Tracking error range is an acceptable limit for the remainder of this period (objective + realized) / Info Ratio +/- 25%

Actual tracking error is the measured expected tracking error of the current portfolio