"HOW WE INVEST" WHITE PAPER

MANAGING INVESTMENT RISK AND LIQUIDITY

By David Iverson

31 AUGUST 2015

www.**nzsuperfund**.co.nz
email:enquiries@**nzsuperfund**.co.nz

NZSUPERFUND
Te Kaitiaki Tāhua Penihana Kaumatua ō Aotearoa

INTRODUCTION

This paper provides a brief summary of how we manage investment risk and liquidity in the context of the New Zealand Superannuation Fund's (the "Fund's") portfolio. It distinguishes between investment risk and liquidity risk, and discusses associated risks that arise when differing investment instruments are employed to implement financial exposures, such as the use of physical holdings and derivative instruments. We illustrate these distinctions using some of the Fund's investment activities as examples.

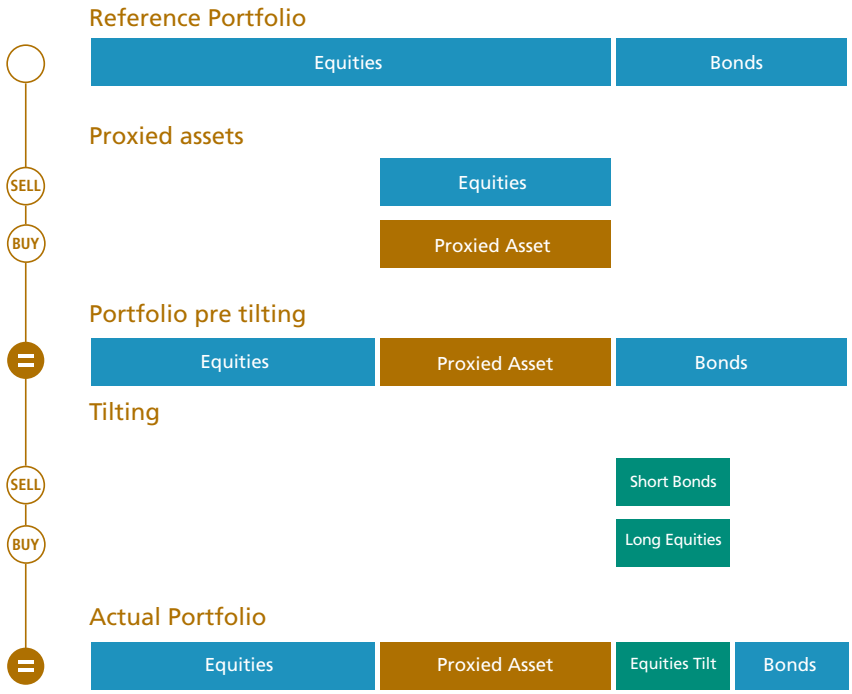
FIND OUT MORE AT:
www.nzsuperfund.co.nz/publications/papers-reports-reviews

FROM BENCHMARK TO ACTUAL PORTFOLIO

The reference portfolio is the Fund's benchmark and its default portfolio. It is the portfolio against which we assess the performance of the actual portfolio.

The diagram below provides a high-level and stylised overview of how we move from the reference portfolio to the actual portfolio.

FIGURE 1 – BUILDING THE ACTUAL PORTFOLIO



The key elements to building the Fund's actual portfolio is described below.

- **Reference portfolio.** This is a simple, low-cost and passive portfolio that contains traditional asset classes (i.e. global equities, global bonds and NZ equities). The reference portfolio expresses the Board's risk tolerance with a high allocation to growth (or equity-like) assets in line with our mandate: maximise return without undue risk. The Reference Portfolio is fully hedged into NZ dollars.
- **Proxied value-add opportunities.** When seeking to add value, we may want to invest in assets outside the reference portfolio. In doing so, reference portfolio assets (essentially equities and bonds) will need to be sold to fund the purchase of the new assets. The mix of equities and bonds sold is determined by the Fund's proxy system.
- **Tilting.** Strategic tilting is an overlay program that seeks to add value by altering the Fund's asset class and currency exposures based on long-term valuations; buying relatively cheap assets and selling relatively expensive assets.
- **Actual portfolio.** The portfolio that the Fund actually holds. In addition to all value-add opportunities described above, it may also have active management of some reference portfolio assets (the reference portfolio is passively invested by default), exposures implemented via derivatives and positions arising from our direct arbitrage strategies.

We discuss investment risk management and liquidity risk management in the context of the Fund's portfolio construction approach discussed above.

INVESTMENT RISK MANAGEMENT

Investment risk arises when investment outcomes differ from the expected outcome. Under the reference portfolio approach, there are two sources of investment risk. The first source of investment risk arises from the Board's decision to set the Reference Portfolio at 80% growth assets and 20% fixed income assets. The second source of risk arises when the actual portfolio returns differ from the reference portfolio returns. The magnitude of this second source of risk is determined by our choice of value add activities.

The management of the Fund's investment risk encompasses three key activities:

- **Managing absolute risk.** When we invest in value-add opportunities, we change the distribution of future investment outcomes (*absolute risk*) of the Fund from that established by the reference portfolio. The proxy system, which swaps reference portfolio assets for assets in our value-add opportunities, operates to keep the target absolute risk of the fund roughly the same.[1]
- **Managing active risk.** When we invest in value-add opportunities, the returns of the actual portfolio will differ from the reference portfolio. This leads to *active risk*. We manage active risk through our risk budgeting approach, which is governed by an explicit Fund level risk budget and active risk limit set by the Board. The risk budget sets expectations around the ***average*** level of active risk we can undertake in all of our active investment activities, while the risk limit sets a ***maximum*** level of active risk that can be taken at any given point in time.[2]
- **Rebalancing.** Our rebalancing activities ensure that the actual portfolio's risk is within the predefined tolerances around the rebalancing target. This requires us to adjust exposures that have moved out-of-line with the rebalancing target, due to performance differences between growth and income assets.

LIQUIDITY RISK MANAGEMENT

Liquidity management is necessary to ensure that the Fund can make all required cash payments when markets decline precipitously, or over a prolonged period of time. These payments include collateral against our NZD hedging contracts; collateral against our equities exposure implemented via derivative contracts; and calls on our commitments from unlisted managers who are looking to fund new investments.

The Fund's liquidity management framework covers both immediate (within days) and near-term (within months) potential liquidity requirements. The Fund's current liquidity position is assessed against different extreme market stress scenarios. Replenishment of liquid assets will be required should liquidity fall below certain trigger points under those scenarios.

1 Absolute risk is measured by the annualised volatility of returns.

2 Active risk, also commonly known as tracking error, refers to the volatility of an active strategy's returns relative to its benchmark's return. Active risk will generally add to the absolute risk of the reference portfolio, leading to a higher absolute risk for the actual portfolio. The extent to which active strategies will add to the absolute risk of the reference portfolio will depend on (i) how correlated the active strategies returns are to the reference portfolio's returns (after proxy adjustments) and (ii) the size of the active strategies exposures. The Fund's absolute risk is also subject to an absolute risk limit set by the Board.

SPECIFIC INVESTMENT ACTIVITIES

To further explore how we manage risk and liquidity in respect of different investment activities, we provide examples for key investment activities in the table below. We review whether the activities have an impact on the Fund's absolute risk, active risk and liquidity risk.

We also comment on whether the activity creates a 'leverage effect'. We note that the Act governing the Fund does not mention leverage or prohibit its application, The Act does prohibit borrowing by the Fund without the approval of the Minister of Finance. In the following table, we use leverage to mean that the Fund has more investment exposure in NZD terms than the size of the Fund. We believe that leverage is not a particularly useful concept in terms of our management of the Fund – any concern about leverage is ultimately a concern about risk. This is why our focus is on the management of investment and liquidity risks as outlined below. We include leverage in the table as there is often some confusion about what leverage might mean for the Fund.

TABLE 1: INVESTMENT ACTIVITIES AND IMPACT ON DIFFERENT TYPES OF RISK WE MANAGE

Activity	Exposure	Investment risk impact	Liquidity risk impact	Comments
1. Reference portfolio – physical investment	Equities / Bonds	No active risk impact. Physical instruments provide the (absolute) investment risk set by the Board.	None.	–
2. Reference portfolio – derivative instrument	Derivative equities / Derivative Bonds Cash collateral	No active risk impact. Derivative instruments provide the (absolute) investment risk set by the Board.	None. All of the cash not invested in physical equities or bonds is available to meet calls on derivative positions.	Derivative exposures are fully backed by cash collateral. No leverage effect arises. The use of derivatives introduces counterparty risk. The credit worthiness of counterparties are governed by limits and constraints set and managed by the Fund's risk and compliance framework.
3. Reference portfolio – currency hedging	Exposures expressed in New Zealand Dollar (NZD) Equities / Bonds	Reduces absolute risk compared to unhedged. No active risk impact as size of derivatives exposure matches the reference portfolio exposure.	Minimal impact as reference portfolio assets are sufficiently liquid to meet currency hedge calls, i.e., equities and/or bonds can be sold quickly to meet cash requirements. Rebalancing ensures the size of the hedge is reset to asset values at regular intervals to avoid any significant mismatch between the currency hedge and the underlying exposure due to market movements.	Whether asset exposures are implemented in derivative or physical form, no leverage effect arises.

TABLE 1: INVESTMENT ACTIVITIES AND IMPACT ON DIFFERENT TYPES OF RISK WE MANAGE

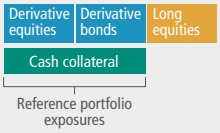
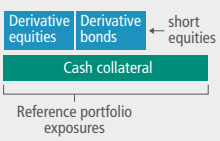
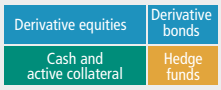
Activity	Exposure	Investment risk impact	Liquidity risk impact	Comments
4. Investing in proxied assets	Timber assets, for example 	No impact on the absolute risk of the Fund when investing in assets that are funded by a proxy. The proxy system ensures that the risk of the actual portfolio is unaffected by selling down an appropriate mix of growth and income assets. Will add active risk and use part of the Fund's active risk budget.	Proxied assets are funded from sell down of reference portfolio exposures. Potential liquidity impact from currency hedging of illiquid proxied assets (see 5 below).	–
5. Currency hedging of illiquid proxied assets	Exposures expressed in NZD with timber assets, for example 	Reduces absolute risk compared to unhedged. No active risk impact as this is matching the reference portfolio currency hedging approach.	Will impact liquidity when currency hedging losses are met from selling liquid assets. Managed via liquidity framework.	No issues of leverage effect arise. Illiquid assets are funded by their proxies.
6. Tilting	Tilting positions are implemented using derivatives (futures, swaps, credit default swaps and currency forwards). They are unfunded but supported by cash collateral held by the Fund. Exposure depends on actual tilt positions. Examples: *Long equities*  *Short equities* 	May increase or decrease absolute risk at any point in time. Will introduce active risk in accordance with the size of the strategic tilting strategy's risk budget over time.	Requires sufficient collateral (equities, bonds or their cash collateral equivalent) to meet mark-to-market calls. Managed via liquidity framework.	Leverage effect introduced when tilt positions lead to higher absolute risk e.g. long equities. No leverage effect arises otherwise, e.g. short equities.

TABLE 1: INVESTMENT ACTIVITIES AND IMPACT ON DIFFERENT TYPES OF RISK WE MANAGE

Activity	Exposure	Investment risk impact	Liquidity risk impact	Comments
7. Reinvestment of fund-wide collateral – via hedge funds and active collateral management		Will add active risk in accordance with the size of each mandate's risk budget over time. The additional investment risk we take on is managed via respective investment mandates and governed by the Fund's risk budget system, subject to Board-approved total active risk limits. Slight increase in absolute risk; will depend on the risk characteristics of assets introduced with the rest of the portfolio.	Requires sufficient collateral (equities, bonds or their cash collateral equivalent) to meet mark-to-market. While each activity consumes liquidity (e.g. investment in a market-neutral hedge fund), the liquidity required is managed under the Fund's liquidity framework.	Leverage effect introduced to the extent that some of the cash backing derivative exposures is used to back additional risk exposures, e.g. credit.

Use of Derivatives – Derivative instruments are instruments used to obtain investment exposures by way of contract, rather than physical ownership of shares or bonds, e.g. futures, forward contracts and total return swaps. We use derivatives for two key reasons:

- They have a highly competitive and transparent pricing structure which allows large volumes to be transacted at very low costs.
- They provide liquidity to the Fund which supports some of the Fund's value add strategies such as strategic tilting.

We manage the liquidity requirements arising from the use of derivatives according to the Fund's liquidity management framework. This framework ensures that sufficient highly liquid collateral is held against the Fund's derivative exposures.

SUMMARY

This paper discusses our approach to managing investment and liquidity risk. We ensure that: (i) new investments made by the Fund do not materially alter the total/absolute risk of the Fund; (ii) the average and maximum amount of active risk taken are in accordance with the Board's risk appetite and explicit risk budget/limits; and (iii) illiquid investments do not impair our capacity to meet potential cash calls on the Fund. Some of the Fund's investment activities can add risk and may lead to a leverage effect. However, it is the management of investment and liquidity risk that is our primary focus. All the risks that we take in moving from the reference portfolio to the actual portfolio are accounted for and monitored against the risk framework agreed with the Board. These risks are managed through our risk budgeting approach, liquidity management framework and guided by the risk appetite expressed in limits set by the Board.