"HOW WE INVEST" WHITE PAPER

2015 REFERENCE PORTFOLIO

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THE 2015 REFERENCE PORTFOLIO

The Guardians of New Zealand Superannuation (Guardians), the investment manager of the New Zealand Superannuation Fund (NZSF or the Fund), has adopted a reference portfolio approach since 2010. A reference portfolio approach is first and foremost a governance construct designed to facilitate clear decision making and accountability of decisions. The Guardians has undertaken to review the composition of the Fund's Reference Portfolio at least once every five years and concluded such a review in the first half of the 2015 calendar year. This paper provides a summary of the 2015 Reference Portfolio review.

THE FULL REVIEW DOUMENT IS AVAILABLE AT:
www.nzsuperfund.co.nz/publications/papers-reports-reviews

WHAT IS THE DIFFERENCE BETWEEN THE REFERENCE PORTFOLIO & STRATEGIC ASSET ALLOCATION?

The Strategic Asset Allocation (SAA) approach is the most common portfolio construction framework used by institutional investors. An SAA is designed to be the most appropriate portfolio for an investor and usually contains alternatives (e.g. private equity) as well as traditional asset classes. The SAA also provides the design for the overall portfolio structure and tends to be static, in that the allocation to each asset class remains unchanged until the next review.

NZSF's Reference Portfolio differs from the SAA in two key aspects. First, the Reference Portfolio is a simple, low-cost and passive portfolio that contains only traditional asset classes. Decisions about the composition of the Reference Portfolio are made by the Guardians' Board. Second, while the Reference Portfolio is static, it acts as a benchmark for the Fund's actual portfolio. The actual portfolio can deviate substantially from, and is more dynamic in nature than, the allocations in the Reference Portfolio. The decisions to deviate from the Reference Portfolio are delegated to the Fund's management, subject to a clear set of risk limits and guidelines. The Reference Portfolio construct provides the governance structure for making these decisions.

DESIGN PRINCIPLES OF NZSF'S REFERENCE PORTFOLIO

The Fund is a long-term and growth-oriented global investment fund which assists the New Zealand (NZ) Government in smoothing the future tax burden of superannuation payments. The Government sets aside some assets now that can be drawn down later, while earning a risk premium by investing these assets in capital markets. The Guardians' mandate is to invest the Fund so as to maximise return without undue risk, while employing best practice portfolio management and avoiding prejudice to NZ's reputation as a responsible member of the world community.

The design principles for NZSF's Reference Portfolio are set out in the table below:

NZSF REFERENCE PORTFOLIO DESIGN PRINCIPLES

The Reference Portfolio should
→ Be a simple and low cost portfolio that could be implemented passively;
→ Be diversified;
→ Reflect an appropriate risk level for the Fund, given its purpose;
→ Be relevant to a New Zealand-based investor;
→ Be an equilibrium construct.

These design principles lead to a portfolio which combines very broad market exposures to global equities and global bonds. The compositions of NZSF's Reference Portfolio in 2010 and in 2015, together with our estimates of their expected return and risk, are shown below. As a result of the change in the composition of the Reference Portfolio, the Fund's performance expectation is now NZ Treasury Bills plus 2.7% p.a. compared to NZ Treasury Bills plus 2.5% p.a. previously. Box 1 sets out the historic performance of the Fund's benchmark versus our long-run expectations of that performance. Box 2 provides more detail on these long-run performance expectations.

NZSF REFERENCE PORTFOLIO ALLOCATIONS

	2010 Reference Portfolio	2015 Reference Portfolio
Developed Market Equities	70%	65%
Emerging Market Equities		10%
NZ Equities	5%	5%
Global Listed Properties	5%	-
Global Fixed Income	20%	20%
Expected Return above Cash	2.5%	2.7%
Long-run Risk (Volatility, p.a.)	13.2%	13.5%

In choosing the Reference Portfolio, the NZSF Board considered the following:

→ What level of risk and return is appropriate given the Fund's purpose?

→ What currency hedging is appropriate?

→ What are the markets that should be represented in the Reference Portfolio?

→ Should we hedge inflation risk?

→ How do we choose benchmark indices?

We provide a brief discussion of each of these issues in the following sections.

LEVEL OF RISK & RETURN

Since the inception of the Fund in 2003, the Guardians' Boards have regarded a high, but not total, exposure to growth (or equity-like) assets as best fulfilling the mandate of maximising return without undue risk. The 2015 review endorsed this decision and retained the existing Reference Portfolio allocation of 80% to growth assets and 20% to income assets. The Fund's endowment of being a long-term investor with no direct liabilities implies a greater tolerance for equity risk than the typical investor. Furthermore, an allocation to bonds in the Reference portfolio is seen as desirable for diversification reasons.

CURRENCY HEDGE RATIO

Historically, we have observed a persistent interest rate differential between the New Zealand dollar (NZD) and a basket of developed market currencies, that is, there is a risk premium for hedging the currency risk of offshore assets to the NZD. The premium is often assumed to reflect risks associated with NZ's narrow export base and high foreign debt.

Our analysis suggests that, in the presence of this NZD currency risk premium, foreign investments should be fully hedged. Even if we were to ignore this risk premium and just consider the impact of currency hedging on the risk of the Reference Portfolio, currency hedging has very limited ability to lower risk. For example, the volatility of the Reference Portfolio would only drop from 13.5% to 13.2% if the hedge ratio were lowered from 100% to the minimum risk point of 75%. Therefore, a relatively small risk premium can easily outweigh the benefit of such a small risk reduction.

Other considerations that are often raised in the hedging decision include the potential for risk of regret, peer risk, concerns regarding the impact on liquidity and cash flows and liability matching. On balance, we believe that all foreign currency exposures in the Reference Portfolio should be fully hedged to the NZD.

REPRESENTATION

In the 2010 Reference Portfolio review, we considered all investable forms of asset class exposures as the starting point for constructing the Reference Portfolio and sought to represent them at their global capitalisation weights, provided there were liquid vehicles for doing so. We decided that Global Listed Property was sufficiently representative of investable Unlisted Property and, as a result, allocated 5% to Global Listed Property in the 2010 Reference Portfolio.

In this review, our starting point is not the full investable market (including unlisted assets). Rather, we adhere to the simple and low-cost design principle and start with the listed/liquid universe. As a result we no longer recommend a separate allocation to Global Listed Property in the Reference Portfolio.

Another representation issue that we have considered in the 2015 Reference Portfolio review is the lack of benchmark indices that are constructed to reflect full market capitalisation. Most benchmark indices use free-float adjustments in their index construction methodology. Our starting point is full market capitalisation representation. When we use these standard indices to implement the Reference Portfolio, we are trading off full representation and investability.

A full market capitalisation index is more complete while a free-float index is more investable. Pragmatic considerations will dictate how we navigate between completeness and investability in constructing the Reference Portfolio.

The proportions of developed market (DM) and emerging market (EM) in global equities is one key area where full market capitalisation weights can materially differ from free-float weights. To get us closer to full market capitalisation weights for the DM and EM segments of the equity market, we continue to use the free-float equity indices, but we set allocations to each based on current full market capitalisation weights. In other words, to address the issue that EM is under-represented in free-float indices, we increase the allocation to EM by about 3% in the Reference Portfolio to better reflect the current full market capitalisation weight of EM. We recognise that this is an approximation to get to full market capitalisation. Our approach reflects a preference for pragmatism and operational simplicity.

A third representation issue to consider is the weight to NZ equities in the Reference Portfolio. The Fund operates with a ministerial directive that "… opportunities that would enable the Guardians to increase the allocation of New Zealand assets in the Fund should be appropriately identified and considered by the Guardians." In deciding a "fit for purpose" passive Reference Portfolio, this directive must be weighed against the principle of diversification and the liquidity constraints associated with the Fund being a sizable participant in NZ capital markets. On balance, and as was the case in 2010, a 5% exposure to NZ equities is seen to be appropriate for the Reference Portfolio. We should also note that the active investments in the Fund's actual portfolio have typically resulted in an aggregate exposure to NZ which is significantly greater than 5%.

INFLATION RISK

Investors should be concerned about inflation risk and we are not an exception to this general rule. We are concerned about NZ inflation risk. However, we would be unable to meet our objective to maximise returns by holding a great deal of NZ inflation-linked bonds. On the other hand, we do have a 20% allocation to fixed income assets in the Reference Portfolio and we need to consider whether our fixed income allocation should be exposed to just real or nominal interest rates.

If we were highly averse to NZ inflation risk, and if inflation hedging instruments were available in sufficient quantities, we could choose to pay for NZ inflation risk protection. However, long-dated NZ inflation linked bonds do not meet the 'simple' and 'low cost' Reference Portfolio design principles. NZ inflation linked bonds issued by the NZ Government are illiquid and the amount available is small relative to the size of the Fund. While global inflation-link products are available, they do not generally provide a good hedge to NZ inflation risk.

We note that even though our investment decisions are separate from the NZ Government's, purchasing long-dated inflation-linked bonds entirely issued by the Government does not address at all the issue of inflation hedging from the whole-of-Government perspective.

CHOICE OF BENCHMARK INDICES

NZSF's Reference Portfolio is an implementable portfolio. Once benchmark indices are assigned to the asset classes of the Reference Portfolio, we implement the allocations via physical and/or synthetic index portfolios. Therefore, it is important that we take implementation considerations into account when multiple indices are available for benchmarking. We outline five desirable characteristics that help guide our choice of benchmark indices for the Reference Portfolio:

DESIRABLE CHARACTERISTICS OF A BENCHMARK INDEX

Characteristic	Description
Objective selection criteria	Published rules and subject to a transparent governance structure.
Completeness	Should reflect the complete investable universe and should not selectively exclude assets based on some subjective criteria
Replicability	An investor should be able to closely replicate the index performance, e.g. if the index is calculated using gross dividends but investors must pay withholding tax, any investor would have difficulty replicating the index returns.
Investability	An investor can readily trade the constituent stocks with minimum market impact and transaction costs.
Acceptance by investors	Well recognised and widely used and that derivatives based on the index are traded in liquid markets.

Based on the characteristics outlined above, the benchmark indices shown below are chosen for asset classes in the Reference Portfolio.

BENCHMARK INDICES

Asset class	Proposed index
DM Equities	MSCI World Investable Market Index hedged to NZD
EM Equities	MSCI Emerging Market Investable Market Index hedged to NZD
NZ Equities	NZX 50 Gross Index
Global Fixed Income	Barclays Capital Global Aggregate Index hedged to NZD

For pragmatic reasons, we have also applied a materiality threshold to exclude the smaller segments in the Global Fixed Income benchmark such as inflation-linked bonds, high yield debt and EM local currency debt. The associated fees and operational costs (both internal and external) of implementing small exposures outweigh the benefits of their inclusion.

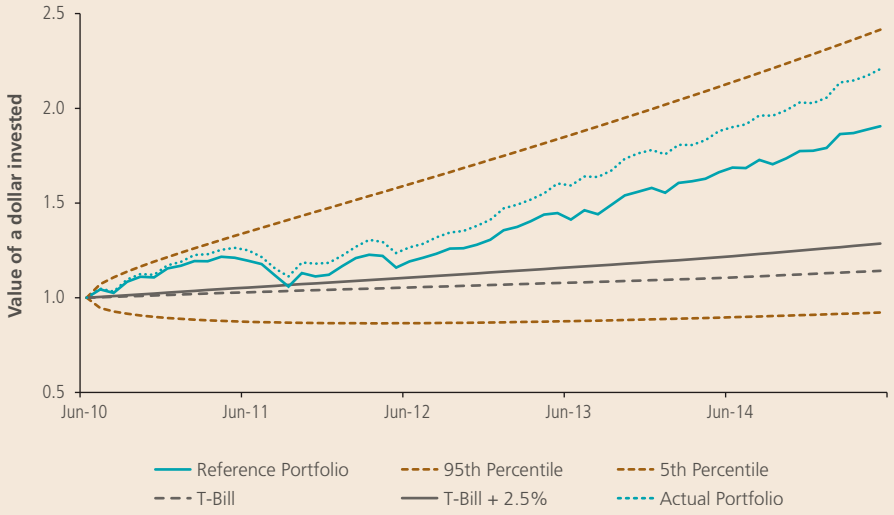
SUMMARY

NZSF has undertaken its first 5-year review of the Fund's Reference Portfolio. We have outlined our reference portfolio approach and its design principles, changes that the Board has made to the composition of the Reference Portfolio and key considerations in making the final decision. These considerations include the currency hedging decision, tradeoff between investability and full market capitalisation representation, inflation risk hedging, and the choice of benchmark indices. For a full discussion of these and other issues that we have considered in NZSF's 2015 Reference Portfolio review, as well as technical details on our capital market assumptions and results from our simulation analysis, we refer readers to our website **www.nzsuperfund.co.nz/publications/papers-reports-reviews** for the full report.

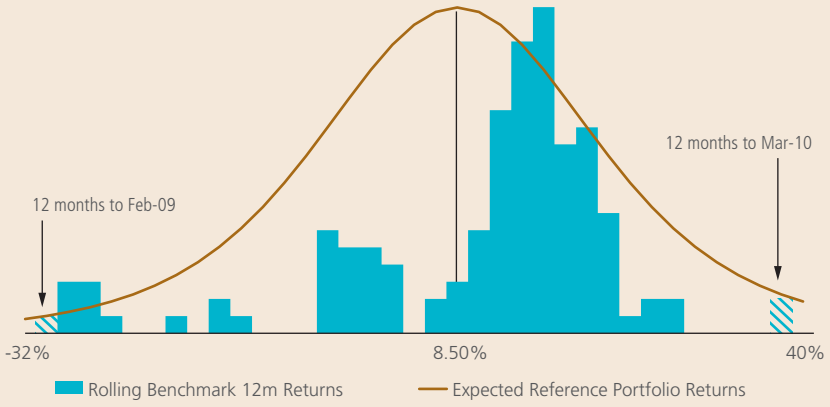
BOX 1: HOW HAS THE REFERENCE PORTFOLIO PERFORMED AGAINST EXPECTATIONS?

The figures below show: 1) the performance of the 2010 Reference Portfolio against our performance expectations, and 2) the distribution we used in the 2010 reference portfolio review to depict expected Reference Portfolio returns, along with the last 11 years of historic benchmark returns.

PERFORMANCE OF THE 2010 REFERENCE PORTFOLIO



EXPECTED AND ACTUAL BENCHMARK RETURNS



The Fund has seen high returns over recent years, in part due to the performance of the Reference Portfolio and in part due to value-adding investments in the actual portfolio (as shown in the first figure). The five year performance of the Reference Portfolio has been around 14% p.a., considerably above our long term expectations in 2010 of 8.5%, and reflecting a favourable market for growth assets – the five year return is in the 85th percentile of our expectations. Along with these abnormally good periods, we also expect that there will be periods of abnormally low returns and we remain focused on the Fund's returns *over the long-term*.

BOX 2: LONG-RUN PERFORMANCE EXPECTATIONS

In 2015 our long run expectation of returns for the reference portfolio is 7.7% p.a., comprising a risk-free rate of 5% (down from 6% in 2010) and a return of 2.7% (from 2.5% in 2010) for the market risk in the Reference Portfolio versus this risk-free rate, as set out below.

Component of Return	Risk-Free Rate	Excess Return After Costs	Reward for Value-Adding Activities	
	5% +	**2.7%** (which is the reward for taking market risk above cash or the Risk-Free Rate)	+ **1%**	= **8.7%**
Explaination	Our estimate of the equilibrium return on 90-day Treasury Bills.	We define the reward for market risk as the margin between the risk-free rate and the return that would be generated on the Reference Portfolio (after assumed costs of 0.25%). Although the estimates of market risk vary over time, we provide the equilibrium, or long term, expectation of the rewards for market risk on the Reference Portfolio. Our estimate of the reward for market risk has a very wide range over a one-year horizon, although this range tightens over longer horizons.	Our estimate of the return from the investment activities we undertake to add value.	The mid-point of our estimated range for the actual portfolio return is 8.7%.

The lower expectation of the long-run NZ risk-free rate largely reflects a lower growth forecast for NZ by organisations such as the OECD and UN. Also 5% interest rates are in line with the revised equilibrium rate expectations of other groups (like the Reserve Bank of NZ), and is consistent with the pricing of long-term bonds in NZ.

The higher expectation of excess returns after costs results from the removal of some rounding in 2010 (0.09%), slightly higher exposure to riskier emerging markets (0.06%), and a slightly lower estimate of the costs of running the reference portfolio (0.05%); this lower cost results from a general movement down in passive management fees and our expectation that this will be maintained going forward.

We also estimate a 1.0% reward for investments in the actual portfolio that are designed to be value-adding to the Reference Portfolio. This estimate is unchanged.