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Retirement Income Policy and National Savings

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Retirement Income Policy and National Savings

David Law

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Access to some of the data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the authors, not Statistics New Zealand.

Abstract

This paper examines the implications for national savings of three retirement income policy options, designed to improve the fiscal sustainability of New Zealand Superannuation (NZS). A simple model is developed that employs population and longevity projections allowing estimation of the contributions that many overlapping age cohorts might make to national savings in response to policy change. Government contributions to national savings, resulting primarily from reduced NZS payments, are also considered. Results suggest that even seemingly modest changes to retirement income policies could lead to substantial cumulative changes in national savings by 2061.

JEL CLASSIFICATION

E21: Consumption; Saving
D10: Household behaviour
D91: Intertemporal choice and saving

KEYWORDS

National Savings; Household Saving; Fiscal Saving; Retirement Income; New Zealand Superannuation; New Zealand

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Retirement Income Policy and National Savings

1 Introduction

A central part of retirement income policy in New Zealand is New Zealand Superannuation (NZS), a universal government-funded pension intended to insure a basic standard of living for the elderly. The costs of NZS are met out of general taxation, and were approximately 4.3% of GDP in 2010. If the parameters of NZS remain unchanged the share of national income devoted to meeting these costs is projected to rise to 7.9% of GDP by 2060 due in large part to improvements in longevity (Treasury, 2013).

This paper outlines analysis of the effect of three retirement income policy options on national savings in each year between 2013 and 2061. Designed to reduce the future costs of NZS and canvas a broad (but by no means exhaustive) range of approaches, these policies are to:

- 1 raise the age of eligibility for NZS by two years (from 65 to 67)
- 2 index NZS payments by the average of wages and the general price level (currently NZS payments are indexed only to wage growth), and
- 3 introduce compulsory private saving and use those accumulations to reduce NZS entitlements.

In each case the policy is assumed to be announced in 2013 and implemented in 2020. The first two options maintain the universality of NZS. The third option does not. NZS would no longer necessarily be received by everyone in this case and those who would receive NZS would each be entitled to different amounts. In particular NZS entitlements would be inversely related to an individual's lifetime income, therefore this option has a substantial redistributive element to it.

An understanding of how implementation of these policies might affect national savings is important for a number of reasons. These include links to external vulnerabilities (Saving Working Group, 2011; and Brook, 2013) and the capital stock (Coleman, 2013), both of which impinge on economic growth.

Empirical evidence directly testing whether the expansion of Pay As You Go (PAYGO) funded retirement income systems such as NZS reduces saving rates or capital accumulation is surveyed by Schmidt-Hebbel (1998). Feldstein (1974) estimated the U.S. social security system reduced voluntary saving by 40 – 50%, a higher reduction than estimated for other OECD countries. Samwick (2000) provides cross-country panel data

evidence that countries with PAYGO retirement income schemes have lower saving rates than other countries, and that the difference is larger for countries with more comprehensive schemes. In a different context, Gokhale, Kotlikoff, and Sabelhaus (1996) show that the post-war decline in the U.S. saving rate is associated with an increase in medical expenditures on elderly people associated with the expansions of the U.S. PAYGO-funded medical system.

Law et al. (2011) provide related evidence for New Zealand, examining the impact that the introduction of KiwiSaver in 2007 had on household and national savings, finding little effect. This is unsurprising however, given that this policy made no explicit link between the introduction of KiwiSaver and consequences for future NZS entitlements. The approach taken to model that particular policy's effect on national savings is therefore not appropriate in the current context.

Instead, the approach taken in this paper is to use life expectancy and population projections to consider the contributions that many overlapping cohorts, as well as the government, would make to national saving in response to a policy change given various assumptions about their propensity to save. Cohorts are also able to adjust to any policy change by altering their consumption patterns in retirement and the timing of the decision to retire. The consequences of these decisions, such as their effects on various forms of tax revenue, are also considered.

Results suggest that even seemingly modest changes to retirement income policies could lead to substantial cumulative changes in national saving by 2061. In particular, a change to the indexation of NZS is estimated to lead to cumulative changes in national savings by 2061 of approximately 87% of GDP. Introducing compulsory private saving where accumulations are used to reduce the costs of NZS as well as lifting the age of eligibility for NZS are also both estimated to yield substantial cumulative changes in national savings by the end of the period (each by approximately 38% of GDP).

Results also suggest that each of the three policy options considered have very different distributional effects both within and across age cohorts. Within cohorts all individuals are treated the same under the first two policy options. This is not the case with respect to compulsory private saving with abatement of NZS entitlements. In fact, the tax system together with several aspects of this policy's design mean that within almost all age cohorts those in the top income decile in each year of life will lose more than six times the amount of NZS entitlements than will those in the second income decile.

Reflecting on the rationale for each policy's design however, being to improve the fiscal sustainability of NZS, lifting the age of eligibility for NZS appears able to generate superior improvements in the Government's fiscal position compared to the other two policy options over the medium to long term. Indeed, in this respect the option of compulsory private saving with abatement of NZS entitlements does not generate the same annual level of fiscal improvement as lifting the age of entitlement until 2057.

The remainder of this paper is organised as follows. Section 2 describes three policy options designed to improve the fiscal sustainability of New Zealand Superannuation (NZS). The modelling strategy employed to assess their implications for national saving, as well as the data used, are outlined in Section 3. Section 4 presents results, including the possible cumulative effect of each policy on our net international investment position (NIIP) by 2061. Conclusions are drawn together in Section 5.

2 Retirement Income Policy Options

A central part of retirement income policy in New Zealand is NZS, a universal government-funded pension intended to insure a basic standard of living for the elderly. Currently New Zealand residents are eligible for NZS from the age of 65, with payments generally increasing over time in line with wage growth.¹ The costs of NZS are met out of general taxation, making NZS what is commonly referred to as a Pay As You Go (PAYGO) pension scheme.

If the parameters of NZS remain unchanged the scheme will expand due to increased life expectancy. In particular, an individual reaching the age of 65 in 2060 can expect to live (and receive NZS) for an additional 4.4 years compared with the same person in 2010. Three policy options to improve the fiscal sustainability of NZS examined in this paper (primarily for their possible effects on national savings) include: raising the age of eligibility for NZS; changes to indexation of NZS payments; and introducing compulsory private saving where accumulations are used to reduce NZS entitlements. The exact details of these policies are described below.

2.1 Raising the age of eligibility for NZS

There are several possible variants for increasing the age of eligibility for NZS, including for example indexing this to improvements in life expectancy. For simplicity however, it is assumed that the age of eligibility is increased by two years from 65 to 67. Compared to projected improvements in life expectancy this is a relatively modest increase, with life expectancy increasing by this much between 2010 and 2030.

The policy change is announced in 2013, but not implemented until 2020 in order to give people time to prepare. Given this timing those 60 years of age and older in 2013 will be unaffected by this policy. The universal provision of NZS will remain unchanged and payments will be the same for all those receiving NZS at any particular point in time.

To simplify the forthcoming modelling the increase in eligibility age happens all at once rather than being staggered over several years as happened when the age of eligibility for NZS was increased from 60 to 65. This simplification has a negligible effect on results.

2.2 Changing the indexation of NZS

Currently NZS payments are linked to nominal wage growth. For this option it is assumed that a less generous indexation methodology will apply while the age of entitlement for NZS remains unchanged at 65. In particular, nominal NZS payments will increase at the average rate of wage and CPI growth. More precisely, assuming nominal wage growth of 3.5%² and inflation of 2%, NZS payments will increase by 0.75 percentage points less on average per year (at 2.75%) than would be the case under the status quo.

¹ To meet residency requirements for New Zealand Superannuation, an individual must have lived in New Zealand for 10 years since they were aged 20 years, of which five years must have been since they were aged 50.

² Comprising 1.5% productivity growth and 2% inflation.

As was the case with the previous policy option, the change is announced in 2013, but not implemented until 2020. Given this timing and longevity projections, those 84 years of age and older in 2013 will be unaffected by this policy. The universal provision of NZS will remain unchanged and payments will be the same for all those receiving NZS at any particular point in time. However, now each retiring cohort will lose more of their lifetime NZS entitlements (that would have been received under the status quo) than the previous cohort. Over a long period NZS entitlements will be substantially less under this option than the status quo, however, the purchasing power of NZS will still be greater than it is today.

2.3 Compulsory private saving

The final option considered is the introduction of a compulsory private savings scheme where accumulations are used to reduce NZS entitlements. This policy requires a more precise description than the previous two options. For example, one must specify exactly for whom it is compulsory, for how long, at what level of contribution, from where those contributions are sourced and so on.

Assumed is a compulsory private saving scheme, similar in all other respects to KiwiSaver. All those aged between 25 and 64 inclusive with positive income that are either salary/wage earners or are self employed must contribute. This equates to about 70% of the 25-64 year old population. Those individuals will be required to contribute 3% of their gross income as will their employers (however Employer Superannuation Contribution Tax will be deducted from these contributions).

Government contributions will initially include a Member Tax Credit (MTC) of up to \$521 which matches individuals' contributions at fifty cents in the dollar and a kick-start of \$1000 for new members. These contributions will increase in line with wage growth over time.³

Once an individual reaches the age of 65 their accumulations in the compulsory saving scheme are then compared with their expected lifetime NZS entitlements. For every dollar they have accumulated they will lose fifty cents of NZS, and will continue to do so until their entire expected NZS entitlements have been abated away. However, rather than have the government collect a portion of an individual's compulsory private savings accumulations the day that they turn 65, a reduced stream of NZS entitlements that is unique for each individual is calculated.

This policy would again be announced in 2013, but would not be implemented until 2020. With this timing all those 58 years of age and older will be unaffected by this policy.

This policy is very different from the first two options outlined. NZS would no longer necessarily be received by everyone meeting residency requirements. Individuals who do receive NZS would receive different levels of payments, even those of the same age receiving NZS at the same time. Further, saving would be imposed on some individuals for whom that was not optimal at a particular point in time or who would have done so anyway in a preferred form (for example by paying down ones mortgage), introducing welfare costs on these people. This option may be relatively attractive to those who consider individuals cannot be relied upon to make rational decisions about their retirement provisions on their own, or who consider that ex ante redistribution is an important component of retirement income policy.

³ Though no such mechanism exists within the current design of KiwiSaver the current exercise requires consideration of contributions more than a century into the future, by which time inflation would have eroded the real value of the MTC and kick-start to virtually nothing without such an assumption. It also has the significant advantage of greatly simplifying the modelling of this option.

3 Modelling National Savings

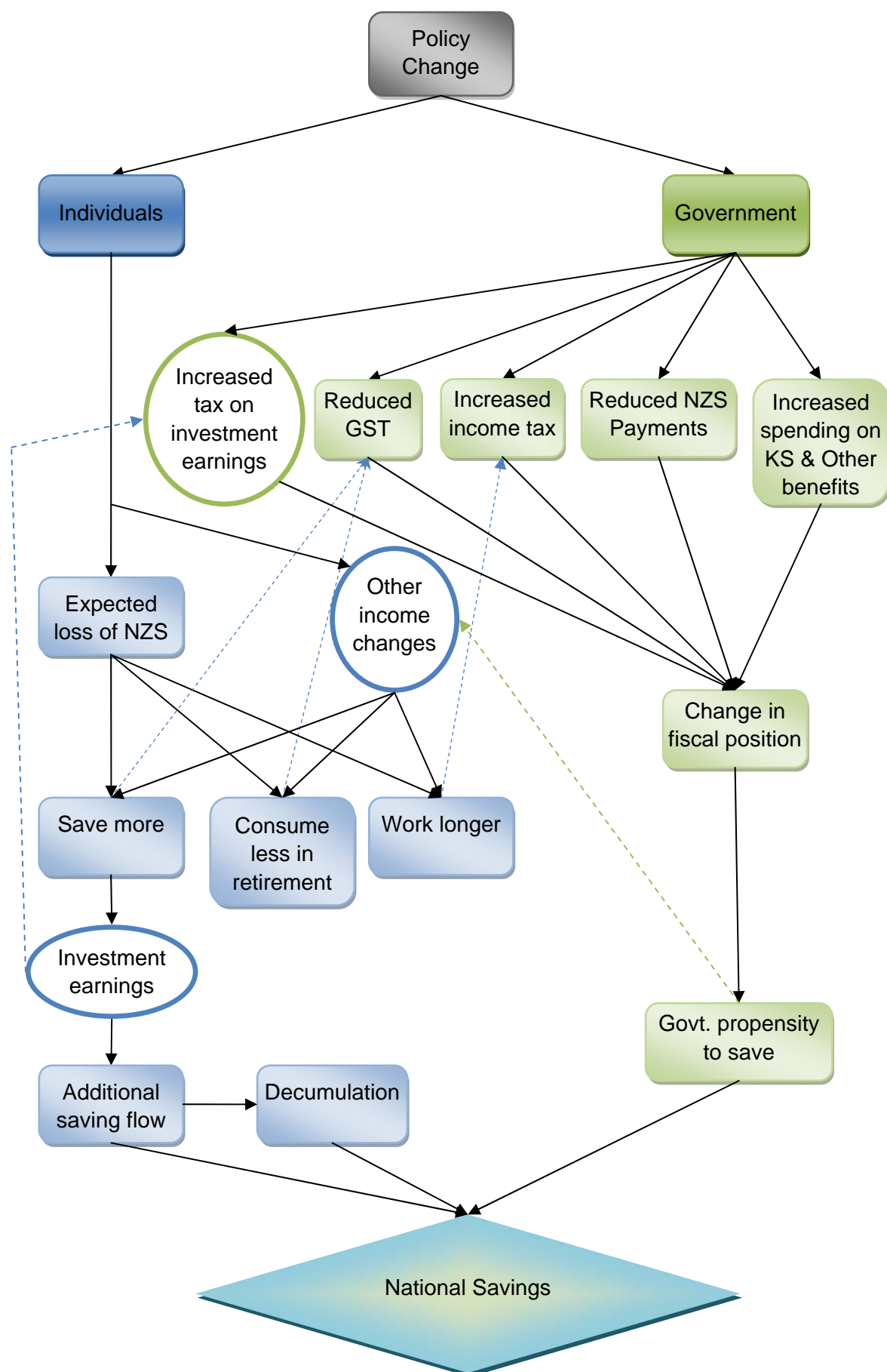
In this section the approach to modelling national savings is discussed. This approach stems from a desire to model the three policies outlined in the previous section in a consistent way and the realisation that each will result in a loss of an individual's current expected NZS entitlements.

The model is outlined in Figure 1, with ovals representing potentially important elements that have been excluded. The effects of a retirement income policy change on national savings are considered for both individuals (in blue) and the government (in green). In the case of individuals the first step is to determine the expected loss of NZS entitlements that the policy change would bring about compared with the status quo. Individuals then choose to respond in one, or a combination of three ways. They save more over their working lives, consume less in retirement or work longer than they otherwise would have. This allows for the calculation of additional saving flows for individuals over time and the eventual decumulation of those savings. In any given year, to calculate the total contributions that individuals make to national savings, savings flows are simply added over all individuals belonging to cohorts aged between 25 and 64 in that year, and any decumulation by individuals belonging to cohorts aged 65 and older is subtracted.

In the case of the government, the first step is to determine the effects that the policy change would have on a number of elements of its budget constraint. These include reduced expenditures on NZS and increased expenditures associated with other policies such as KiwiSaver. Depending upon how individuals choose to respond to the policy change, effects on revenues such as GST and income tax are also important. These are then combined in any given year to arrive at the overall change in the government's fiscal position. However, before estimating the effect on national savings an assumption about the government's propensity to save must first be made.

In the remainder of this section the process of modelling the contributions that individuals and the government might make to national savings in response to three distinct retirement income policy changes is described in more detail in subsections 3.2 and 3.3. First, a description of the data used is provided in subsection 3.1.

Figure 1 – Outline of the model



3.1 Data

Data requirements for this analysis are relatively modest. Population projections and life expectancies from Statistics New Zealand (SNZ) are the most important. However the Household Economic Survey is also used for information on income distributions and tax rates, as described in later sections.

Population projections for every year between 2013 and 2061 are used and provide not only an estimate of the total population of New Zealand in each of those years but also a detailed decomposition of that population by age. This allows examination of the contributions that many potentially different overlapping cohorts will make to national saving in response to each of the three policy changes considered. Cohorts are defined by their age in 2013. The youngest cohort considered will not be born until 2036 and will reach the age of 25 (the age from which adjustment to policy changes through additional saving is assumed to begin) in 2061. The oldest cohort assumed to adjust to policy changes through additional saving contains members who are 64 years of age in 2013. However, the oldest cohort considered contains members who are 83 years of age in 2013, having sufficiently long life expectancies such that a change to the indexation of NZS implemented in 2020 would still have a modest effect on them.

Life expectancies most relevant for this exercise are those conditional on reaching the age of 65 for all cohorts younger than this in 2013. The reason is that cohorts need to have some expectation about how long they will live beyond this point in order to determine how much of an effect any policy change will have on them, before they can decide how to change their saving behaviour.⁴ However, as with population projections, SNZ provide this information only until 2061 yet the youngest cohort considered does not reach the age of 65 until 2101. To overcome this limitation, the average of the annual improvement in life expectancy projected by SNZ to 2061 is applied for a further 40 years to 2101.

3.2 Individuals

The first step in ascertaining individuals' collective contributions to national savings that might result from a policy change effecting their NZS entitlements in each year between 2013 and 2061 is to calculate the total loss of expected future NZS entitlements faced by representative members of each age cohort affected by that policy change. Given the period of interest, life expectancy and the assumption that adjustment to policy change via saving begins from the age of 25 at the earliest, this calculation is required for cohorts aged between -23 and 83 years in 2013.⁵

The total loss in expected future NZS entitlements is measured as the stock of wealth that would be required by an individual on the 65th birthday (or at 2013 for those older than 65 in 2013) in order to provide an income stream exactly equal to their lost NZS income over retirement due to any policy change. Given a nominal interest rate (after tax and management fees) of 5% this is achieved by adding the discounted present values (to the 65th birthday) of each year's lost NZS entitlements respectively.

⁴ Of course, not all members of any given cohort will survive to the age of 65. However, this assumption simplifies the modelling substantially and one could argue is appropriate from a precautionary savings perspective.

⁵ Those aged 65 and older in 2013 will not be assumed to save more or work longer as a result of policy change. However, in the case of a change to the indexation of NZS entitlements they will still respond by lowering consumption, hence an estimate of their total loss of NZS entitlements is still required.

In the case of the first policy option considered (that of raising the age of eligibility for NZS by two years) calculating the total loss of expected future NZS entitlements faced by a representative member of any particular age cohort is relatively easy. There are only two years of lost NZS income to consider, those that will no longer be received by individuals when they are 65 and 66 years of age. The nominal value of those entitlements in any year is determined by the current average after tax level of NZS entitlement (approximately \$15,000 in 2013) and the rate of growth in wages, which is assumed to be 3.5% per annum.

In the case of the second policy option considered (that of changing the way NZS is indexed), calculation of the total loss of expected future NZS entitlements is more complicated. It requires calculation of the difference between the nominal value of NZS entitlements under the status quo (when indexed to wage growth at 3.5% per annum) and those under the new indexation regime (when indexed to the average rate of wage and CPI growth at 2.75% per annum) in every year from 2020 to 2128. For each cohort a subset of the discounted present values (at the 65th birthday, or in 2013 for those already older than 65) of these differences are then summed depending upon the year in which its members reach 65 and their conditional life expectancy at 65 (or in 2013 for those already older than 65). For example, for the cohort who turns 65 in 2020 and has a conditional life expectancy of 20.7 years, it is the differences in NZS entitlements between 2020 and 2041 that are relevant.

In the case of the final policy option considered, the first step in the calculation of any losses in expected future NZS entitlements is to estimate balances in the compulsory private saving scheme for members of each cohort at their 65th birthday. This is not straightforward, however, because the tax system, together with the design of this particular policy option, treat individuals very differently depending upon their incomes. To account for this, estimates of retirement balances for ten representative individuals for every cohort are calculated using the income, tax and policy information in Table 1 below.

Table 1 – KiwiSaver contributions and returns by income decile (2013 starting values)

Income Decile	Average Income (\$)	PIE Tax Rate (%)	ESCT Tax Rate (%)	KS Contribution (% of gross Income)				Nominal Return (%)
				EE (%)	ER (%)	MTC (%)	Total (%)	
1	-2,258	0	0	0	0	0	0	0
2	15,042	17.5	10.5	3.0	2.7	1.5	7.2	5.4
3	25,889	17.5	17.5	3.0	2.5	1.5	7.0	5.4
4	34,113	17.5	17.5	3.0	2.5	1.5	7.0	5.4
5	40,737	17.5	17.5	3.0	2.5	1.3	6.8	5.4
6	48,399	28	17.5	3.0	2.5	1.1	6.6	4.7
7	56,782	28	30	3.0	2.1	0.9	6.0	4.7
8	67,142	28	30	3.0	2.1	0.8	5.9	4.7
9	82,739	28	33	3.0	2.0	0.6	5.6	4.7
10	147,204	28	33	3.0	2.0	0.4	5.4	4.7

Notes: (i) PIE stands for Portfolio Investment Entities; (ii) ESCT stands for Employer Superannuation Contribution Tax; and (iii) EE, ER and MTC stand for Employee, Employer and Member Tax Credit respectively.

Recall from the previous section that only individuals aged between 25 and 64 who are employed are expected to contribute to the scheme. The average income values for each income decile are therefore calculated for these sources of income only and for individuals who are self employed or salary and wage earners of this age using the latest Household Economic Survey from Statistics New Zealand. With income on average being negative for those belonging to the bottom income decile⁶, only those belonging to income deciles 2 through 10 will be compelled to contribute to the scheme. This⁷ group amounts to approximately 70% of the population aged 25 to 64 in any given year.

The marginal tax rates provided are those that would apply given the average level of income for each income decile given current tax settings. For each income decile the annual after-tax flow of funds into the compulsory saving scheme can be calculated in terms of a percentage of gross income, being the sum of employee (EE), employer (ER) and government (MTC) contributions. While employee contributions (of 3% of gross income) are paid into the saving scheme before tax, employer contributions (also 3% of gross income) are deposited net of Employer Superannuation Contribution Tax (ESCT), with the rate at which this is applied depending upon income. Similarly, while the Member Tax Credit (MTC) initially matches employee contributions at a rate of 50 cents in the dollar, the total amount is capped so that as a proportion of gross income it diminishes as income rises.

Together ESCT and MTC design lead to considerable differences in the flows of funds into the compulsory saving scheme across the income distribution. For example, individuals in deciles 2 and 10 contribute in total 7.2% and 5.4% of gross income each year respectively. Further, after accounting for differences in tax rates applied to earnings from Portfolio Investment Entities (PIE), those belonging to the top 5 income deciles earn considerably lower after tax and management fees nominal returns on their investment than those belonging to the bottom 5 income deciles. In particular, assuming nominal before tax returns of 7.5% per annum and management fees of 1%, those in the bottom half of the income distribution will earn returns of 5.4% per annum after tax compared to only 4.7% for those in the top half of the income distribution.

Ignoring income mobility⁸ but allowing the income of members of each income decile to grow over time at an annual rate of 3.5% (along with all tax thresholds, the MTC and the kick-start), there is now sufficient information to calculate total accumulations held in the compulsory scheme for each representative member of all income deciles and age cohorts respectively at their 65th birthday. In particular, an annuity formula that allows for growth in nominal payments over time is applied. This simply requires the level of nominal income the representative individual earns in the first year they join the scheme, total contributions to the scheme as a share of that income, the growth rate of income, the appropriate interest rate and the total number of years they will contribute.

Losses of NZS entitlements are then calculated by comparing these accumulations to the discounted present value (at each cohort's 65th birthday) of NZS entitlements under the status quo for all representative members of each cohort, which in turn depends upon the year in which that cohort reaches the age of 65 and its conditional life expectancy at 65. For every dollar of accumulations in the compulsory scheme, fifty cents of NZS

⁶ Driven by negative self employment income.

⁷ An obvious implication of this being that approximately 30% of the population of each age cohort will be assumed to suffer no loss in expected NZS entitlements due to this policy option. An equivalent assumption (from the point of view of the additional national savings that would result) would be that each individual spent 70% of their life between the ages of 25 and 64 in employment.

⁸ That is, the movement of an individual throughout the income distribution over his or her lifetime.

entitlements will be lost up until the point at which these have been exhausted. For example, if an individual accumulates \$200,000 in the compulsory saving scheme by the age of 65 and the discounted present value of their future NZS entitlements under the status quo at that point were \$400,000, they would lose \$100,000, or 25% of their NZS entitlements. Another individual reaching the age of 65 at the same time but with say \$1m accumulated in the compulsory saving scheme would lose all their NZS entitlements.

Table 2 presents these losses expressed as a proportion of the discounted present value of expected future NZS entitlements under the status quo for a selection of age cohorts. Though the tax system and MTC already serve to reduce flows into the compulsory scheme for higher income individuals (as illustrated in Table 1), for almost all age cohorts those in income decile 10 still lose more than six times the amount of NZS than do those in decile 2.⁹ In addition, the further into the future a cohort reaches the age of 65 the more of its NZS entitlements will be lost, as that cohort will have contributed longer to the compulsory scheme, up until 2060 that is. For example the cohort that reaches the age of 65 in 2021 will only have one year of accumulations to abate against NZS, while the cohort aged 65 in 2060 will have 40 years of accumulations to abate against NZS. Beyond 2060 all cohorts reaching the age of 65 will have contributed to the compulsory scheme for the same number of years, however, as life expectancy continues to increase their losses as a proportion of expected NZS entitlements under the status quo will slowly decline.

Table 2 – Loss of NZS entitlements by income decile and year of retirement (%)

Income Decile	Retirement Year (Year reach 65)					
	2021	2026	2031	2041	2061	2101
1	0	0	0	0	0	0
2	0.4	1.5	2.6	5.0	10.6	9.5
3	0.5	2.3	4.1	8.2	17.5	15.7
4	0.6	2.9	5.4	10.7	23.0	20.6
5	0.7	3.4	6.2	12.3	26.5	23.7
6	0.8	3.8	6.9	13.2	26.5	23.7
7	0.8	4.1	7.4	14.2	28.6	25.5
8	0.9	4.7	8.5	16.4	32.9	29.5
9	1.1	5.5	10.0	19.4	38.9	34.8
10	1.7	9.1	16.7	32.6	65.6	58.7
Average	0.8	3.7	6.8	13.2	27.0	24.2

With losses in expected NZS entitlements calculated for each of the three policy options these are compared in Table 3. While the values for compulsory private saving are the averages across income deciles from Table 2, losses across the income distribution are the same for the other two policy options.¹⁰ It is clear that these policies have very different effects across age cohorts. Raising the age of entitlement to NZS by two years has the most consistent effect on age cohorts through time in terms of the proportion of expected entitlements under the status quo lost, diminishing only slightly over time with improvements in life expectancy. Changes to indexation of NZS entitlements on the other hand affect cohorts reaching the age of 65 shortly after the policy change is introduced far

⁹ The exception being those cohorts reaching the age of 65 very shortly after the policy was implemented, having small amounts of accumulations to abate NZS entitlements with the kick-start being a non-trivial portion of those even for high income individuals. Even so, for the cohort that reaches 65 in 2021 with only one year of accumulations, those in income decile 10 still lose more than four times the amount of NZS than do those in decile 2.

¹⁰ Except to the extent that life expectancy varies with income.

less than those reaching that age 80 years later for example. Compulsory private saving with abatement has virtually no effect on cohorts reaching the age of 65 shortly after the policy change is introduced, but this effect grows for 40 years, before declining thereafter.

Table 3 – Loss of NZS entitlements by policy and year of retirement (%)

Policy	Retirement Year (Year reach 65)					
	2021	2026	2031	2041	2061	2101
Lift age of entitlement to 67	11.0	10.7	10.6	10.2	9.7	8.6
Mixed wage & CPI indexation	7.9	11.3	14.6	20.8	31.8	49.6
Compulsory private saving	0.8	3.7	6.8	13.2	27.0	24.2

It is now possible to calculate the annual flow of savings individuals within any given cohort would need to make in order to have built up a stock of wealth at the age of 65 that would exactly offset their expected loss of NZS entitlements for each of the three policy options considered. The same annuity formula used to calculate accumulations in the compulsory savings scheme can again be used, though rearranged to give the amount of additional savings required by representatives of each cohort in the first year they begin adjusting to policy change via saving.

For any given cohort these saving flows increase with wage growth (by 3.5% per year) until the cohort reaches the age of 65. These savings earn nominal returns (after tax and management fees) of 5% per annum on average. Individuals belonging to different cohorts have more or less time to save in order to make up their expected lost NZS entitlements, however, the earliest individuals are assumed to adjust their saving behaviour is from the age of 25, providing a maximum of 40 years over which to save more than they otherwise would have.

Before aggregating these additional savings for all individuals within cohorts and then across cohorts in each year between 2013 and 2061 two further steps are required. First, individuals need not only adjust to policy changes of this sort by saving more. They may also choose to work longer, or consume less over their retirement than they otherwise would have. Hence, assumptions as to the extent to which each of these three adjustment mechanisms are adopted are required. These are outlined in Table 4.

Table 4 – Adjustment mechanism parameters

Age Group (@ 2013)	Adjustment Mechanism	Policy Option		
		Indexation	Age	Compulsion
Young (-23 to 24)	Save	0.8	0.775	0.85
	Work	0.1	0.15	0.075
	Consume	0.1	0.075	0.075
Middle (25 to 44)	Save	0.6	0.55	0.7
	Work	0.2	0.3	0.15
	Consume	0.2	0.15	0.15
Older (45 to 64)	Save	0.4	0.3	0.6
	Work	0.3	0.5	0.2
	Consume	0.3	0.2	0.2

Note: In the case of the older group of age cohorts (those 45 to 64 years of age in 2013) because of the timing of the introduction of policies those aged 60 to 64 will be entirely unaffected by raising the age of eligibility for NZS and hence will not adjust their behaviour in any way. Similarly, those aged 58 to 64 will be entirely unaffected by compulsory private saving with abatement of NZS entitlements.

Any given cohort must fully adjust to each policy change via a combination of three mechanisms, with the parameter values indicating the relative weighting applying to each of them. A value of 0.4 attached to saving for instance indicates 40% of the loss in NZS entitlements incurred by that cohort will be made up through additional saving. To allow for differences in adjustment behaviour cohorts have been divided into three broad groups according to their age in 2013. More weight has been given to adjustment via additional saving for younger cohorts who have a greater proportion of their working lives to save over and are likely to earn higher incomes than their predecessors. Older cohorts therefore adjust relatively more via working longer and consuming less in retirement.¹¹

There are also some differences in the way cohorts are assumed to adjust across policies. Compared with the indexation policy, more weight is given to adjustment by working longer for all cohorts when the age of eligibility for NZS is raised in recognition of the possibility that this may be taken by some as a signal of how long they should work. It may also be the case that finance constrained individuals with no other source of income would be strongly incentivised to continue working. Under the compulsory saving option, more weight is given to adjustment through saving. The reason being that it is likely compulsion would force at least some people to save more than they otherwise would of their own accord.

Finally, to the extent individuals do adjust to each of the three policy options considered by saving more, the eventual decumulation of those savings must also be considered. In particular it is assumed that on average individuals belonging to each respective cohort will decumulate their savings in each year (after 2020 and after they have turned 65) by the amount that each policy option has reduced their NZS entitlement in that year, weighted by how much it is assumed they adjusted their saving. In other words, if a particular policy option resulted in an individual losing \$100 in a particular year, and it was assumed that 50% of that individual's adjustment to the policy was through saving, then \$50 of decumulation would occur.

It is now a simple matter to determine the total contribution that individuals might make to national savings in each year between 2013 and 2061 in response to each policy option. In each year effected cohort members aged 25 to 64 in that year will undertake additional saving. The total contribution that any given one of those cohorts makes to national savings in a particular year is equal to the annual flow of savings calculated (for its representative to completely offset lost NZS entitlements) multiplied by the savings parameter value for that cohort and the total projected population of individuals of the corresponding age in that year. The contributions of all cohorts aged 25 to 64 in any given year are then added. Similarly decumulation by individuals belonging to cohorts aged 65 and older in each year must be subtracted.

Adjustment to policy change via working longer or consuming less after the age of 65 than otherwise would have been the case is assumed not to affect individual's savings directly. This behaviour will potentially affect national savings indirectly through changes to government revenues however and will be discussed in the following subsection.

¹¹ As discussed earlier in this paper, those 65 and older in 2013 will be entirely unaffected by raising the age of eligibility for NZS or compulsory private saving with abatement of NZS entitlements. This group will however be affected by a change to the indexation of NZS but are assumed to adjust to this only by reducing consumption.

3.3 The Government

Another avenue by which each of the policy options considered has the potential to effect national savings is through any effects they may have on the government's fiscal position. In the case of each option from the year 2020 onwards (2021 in the case of compulsory private saving with abatement of NZS) the government will face reduced expenditures on NZS than it otherwise would have. There will also be implications for tax revenues and in the case of the third policy option some additional expenditures associated with the compulsory saving scheme in the form of increased member tax credits and kick start payments.

Given calculations of losses of NZS entitlements faced by individuals in the previous subsection it is straight forward to calculate the government's reduced expenditures on NZS for all years between the implementation of each policy and 2061. In the case of raising the age of entitlement to NZS from 65 to 67, reduced NZS payments by the crown in any given year are simply the nominal value of NZS in that year multiplied by the total number of people in the population aged 65 and 66 in that year. Similarly, where the indexation of NZS is made less generous, reduced NZS payments by the crown in any given year are simply the difference in the nominal value of NZS entitlements under the status quo and those under the new indexation methodology in that year multiplied by the total number of people in the population aged over 65 in that year.

In the case of the third policy option, it is assumed that rather than collect a portion of an individual's compulsory private savings accumulations the day they turn 65, a reduced stream of NZS entitlements is calculated, as illustrated in Table 2. However, as described in the previous subsection, this will vary depending on the cohort to which an individual belongs. Reduced NZS payments by the crown in any given year are therefore calculated by multiplying the number of individuals belonging to each respective cohort over the age of 65 by that cohorts average lost share of the nominal NZS payment that would have been received under the status quo, and then summing over all cohorts over the age of 65 in that year.

In all three cases an adjustment is made to the estimate of reduced NZS payments made by the Crown for the possibility that payments of other benefits may increase, such as the sickness benefit or housing supplement, though these are assumed to be relatively small. In particular, 5% of the reduction in NZS payments is assumed to be spent on other benefits for the first 10 years after the age of entitlement to NZS is increased, and 2.5% for the second 10 years. For the other two policy options the effect is assumed to be smaller, at 2% and 1% for the same periods respectively. The reason is that in the case of raising the age of entitlement losses in NZS payments fall relatively heavily in a short space of time. Finance constrained individuals may therefore be more likely to need other forms of government assistance.

Additional expenditures associated with the compulsory saving scheme in the form of increased member tax credits and kick-start payments also result as greater numbers would belong to KiwiSaver than would otherwise have been the case. Increased KiwiSaver membership is calculated each year as one quarter of those aged between 25 and 64 inclusive who are salary and wage earners or self employed (assuming that the steady state level of KiwiSaver membership amongst this group under the status quo would have been three quarters). This number is multiplied by the average nominal member tax credit each year and the nominal value of the kick-start payment in the first year that the scheme is made compulsory. In subsequent years additional kick-start payments will only be made to those individuals turning 25.

Finally, two effects on Government revenues are considered. Increases in income tax arise from individuals working longer than they otherwise would have and reduced goods and services tax revenues result from any reduced consumption during retirement or because of additional saving (and hence less spending) during an individuals working life.

Additional income taxes are calculated similarly in the case of all three policies. As cohorts turn 65 they earn additional labour income in that year on average equal to the share of their total loss of NZS due to each respective policy change that was assumed to be adjusted for by working longer. This income is then multiplied by an average rate of tax on income of 25% (calculated using the Household Economic Survey). In the case of the policy option which changes the way NZS is indexed some cohorts who are already over 65 are still affected when the policy is announced, however, these cohorts are not assumed to work longer (or return to work at the age of 83 for example), rather they will only adjust by reducing consumption.

Reduced goods and services taxes are also calculated similarly in the case of all three policies. In particular, to the extent each respective cohort (between the ages of 25 and 64 inclusive) saves more during their working lives, they are also consuming less. Hence, additional household saving flows are simply summed each year and multiplied by 0.15/1.15 when the rate of GST is 15% (as lost consumption here is post tax). Post 65 cohorts also consume less as a result of each policy option by the share of their lost NZS entitlements it was assumed they would adjust to in this manner. For simplicity, it is assumed that this reduced consumption happens in the year each cohort turns 65 (or the year the policy was announced for cohorts over this age in the case of a change to indexation of NZS). Reduced consumption for this group is again multiplied in each year by 0.15/1.15 in order to calculate the loss of GST on this consumption.

In each year all changes in the government's revenues and expenditures discussed are summed to determine the total change in its fiscal position. The extent to which any change in the government's fiscal position will lead to further changes in national savings (over and above those brought about by changes in household behaviour) will depend on how the Government chooses to respond. In particular, if it passes on savings from reduced NZS payments (the dominant factor of those examined) in the form of reduced taxes, or spends these in other areas such that it maintains a balanced budget there would be no additional affect on national savings. If, on the other hand, the government leaves all other revenues and expenditures unchanged reduced NZS payments will be fully passed on to increased national savings from government. In the following section results for both of these extremes will be presented.

4 Results

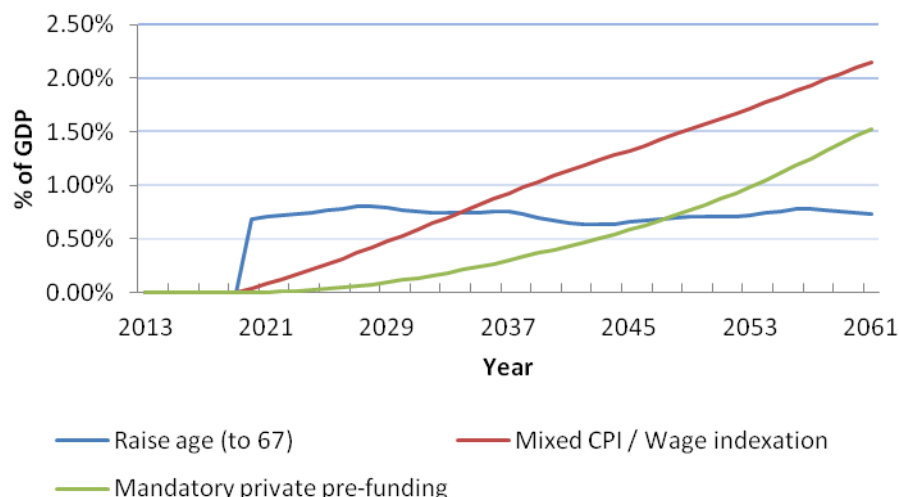
This section outlines results. In particular, the estimated effect each of the three policy options may have on the Government's fiscal position as well as their annual and cumulative contributions to national savings between 2013 and 2061 are presented. The sensitivity of these to the choice of interest rate, as well as the relative weighting individuals assign to adjustment to policy change via saving more, is also examined. In all cases the effects are shown as percentages of GDP.¹²

4.1 Government revenues and expenditures

Figure 2 illustrates the effect that reduced NZS payments brought about by each of the three policy options, considered respectively, is expected to have on the Government's fiscal position. Though each policy is announced in 2013 and implemented in 2020, they have very different effects in this respect.

Raising the age of eligibility of NZS brings about reduced Government expenditures in each year from 2020 of around 0.75% of GDP and is relatively constant over time. In the case of the introduction of a different indexation methodology, reductions in government expenditures on NZS are initially very small but grow over time such that by 2034 they are approximately equal to those generated by the first policy option and by 2061 are nearly three times as large. The third policy option (that of introducing compulsory private saving where accumulations are used to reduce NZS entitlements) produces a similar pattern or reduced Government expenditures on NZS over time, though more modest, and does not yield the same level of reductions as the first policy option until over three decades have passed.

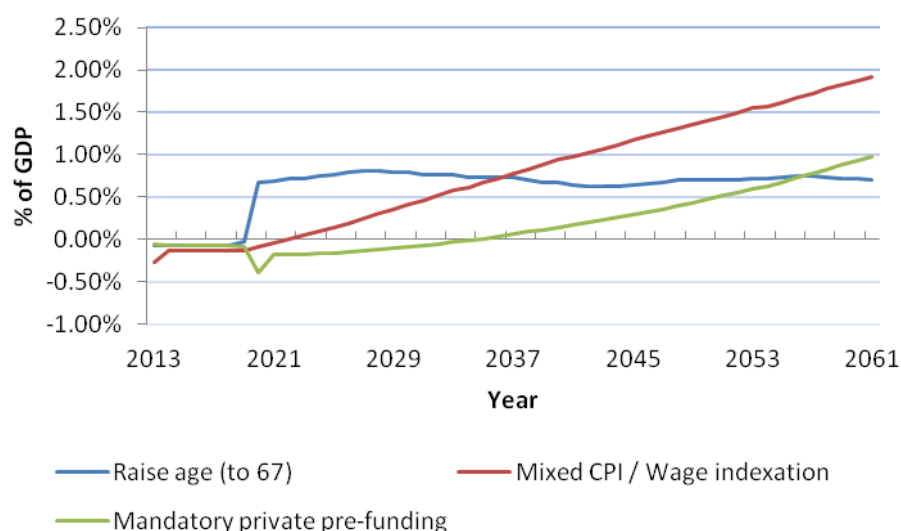
Figure 2 – Annual effect on fiscal position (from NZS reductions only)



¹² Where the nominal level of GDP in each year is assumed to grow at a rate of 4% (comprising 2% inflation, 1.5% productivity growth and 0.5% population growth).

The effect each policy option is predicted to have on the Government's fiscal position after also accounting for reduced goods and services tax, increased income tax, increased pressure on other benefits (once each policy is implemented) and increased costs associated with KiwiSaver, is given in Figure 3. Though the picture looks similar to that shown in Figure 2 there are some important differences. In particular, each of the three policy options considered now has a negative effect on the Government's fiscal position initially. In the case of the first two policy options this is relatively short lived. However, in the case of compulsory private saving it is not until 2036 that its effects on the Government's fiscal position become positive.¹³ Further, the point at which these overtake the positive effects on the fiscal position yielded by raising the age of eligibility does not occur until 2057.

Figure 3 – Annual effect on fiscal position (total)



4.2 National savings (annual)

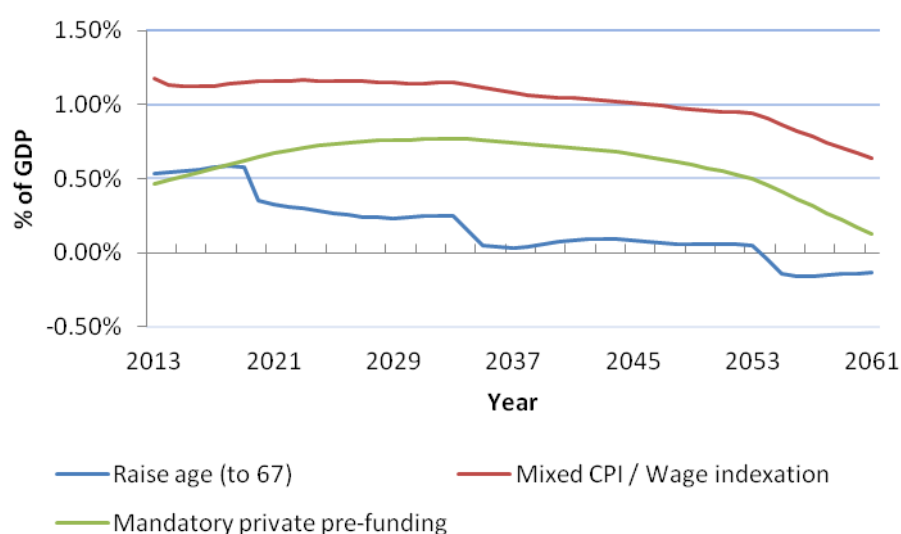
Figure 4 shows the estimated aggregate additional household savings generated in each year between 2013 and 2061 as a percentage of GDP by each of the three policy options considered respectively. Recall that also included in these estimates is the decumulation of savings, and it is this that is responsible for additional household savings declining later in the period. Additional household savings (particularly later in the period) are underestimated however, as additional returns on higher than otherwise savings balances are not included.¹⁴ Even so, all three policy options are estimated to generate substantial additional household savings for extended periods, particularly given reference to New Zealand's historic levels saving.¹⁵

¹³ Any improvements in the government's fiscal position generated by this option would be reduced to the extent that further incentives were added to the compulsory savings scheme over time.

¹⁴ Early in the period these will matter little as additional savings balances will be small and hence returns on those balances as a proportion of GDP will be very small. This simplification to the estimation will not change relativities between policies.

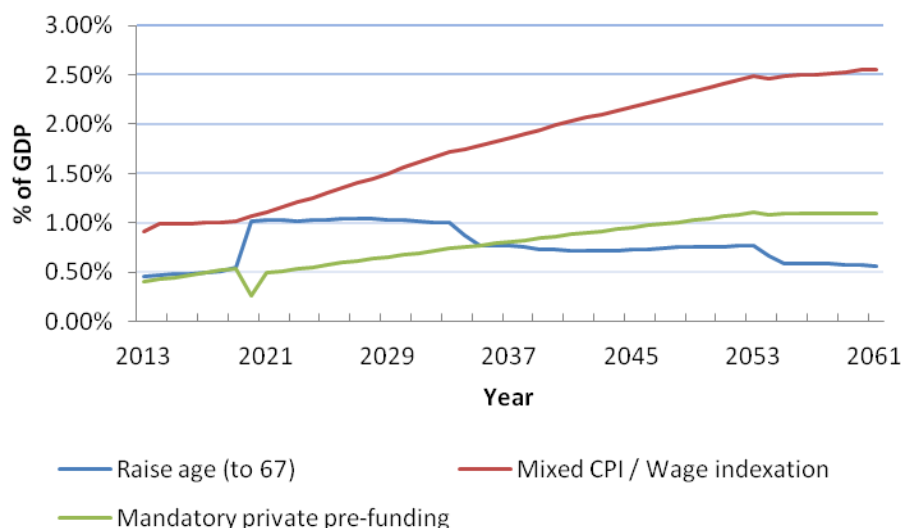
¹⁵ Add reference

Figure 4 – Annual household savings impact (also national savings if Government maintains balanced budget)



If the Government responds to reduced NZS payments and changes in other revenues and expenditures by increasing expenditures in other areas or reducing taxes such that its overall fiscal position remains unchanged, then the estimates presented in Figure 4 also show each policy's effect on national savings. If on the other hand Government responds by increasing its own saving (in other words by running larger than otherwise surpluses or smaller than otherwise deficits), the effect on national savings will be as shown in Figure 5.

Figure 5 – Annual national savings impact (when the Government saves)



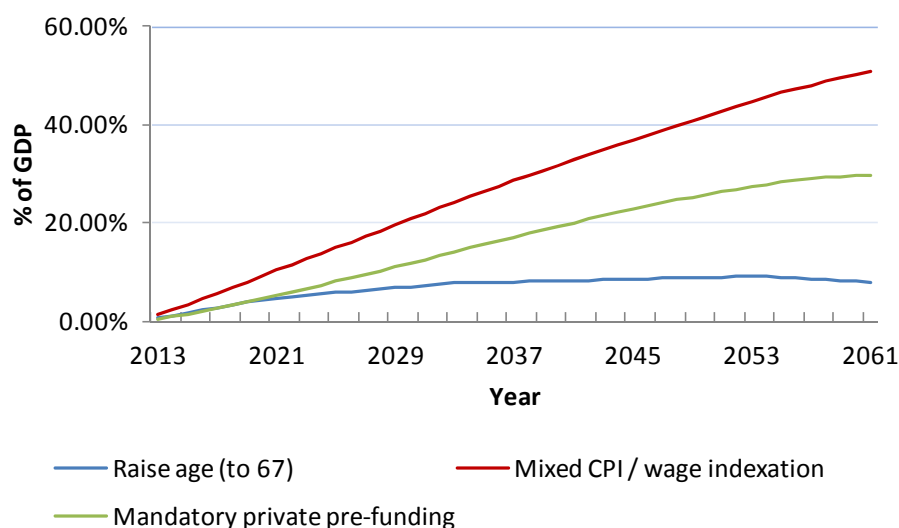
As before, changing the way NZS entitlements are indexed yields the highest additional national savings in all years, with approximately 0.9% of GDP in 2013 rising to 2.5% in 2061. However, because of the increased fiscal costs associated with compulsory private saving and the fact that with this policy option it takes some time for cohorts reaching the age of 65 to do so with substantial amounts of saving in the compulsory vehicle that can be used to offset NZS entitlements, the relationship between this policy and that of raising the age of eligibility for NZS is somewhat different. In particular, the annual additional contributions to national savings that raising the age of eligibility is estimated to generate are considerably larger than those brought about by the compulsory private saving option for around two and a half decades.

4.3 National savings (cumulative)

The previous subsection focused on annual additions to national savings brought about by three different retirement income policy options. For readers concerned with some notion of macroeconomic vulnerability,¹⁶ the cumulative effects on national savings of each policy may be of greater interest.

These are illustrated in Figure 6 between the years 2013 and 2061 in the case where the Government responds to each policy in order to leave its overall fiscal position unaltered. By the end of the period the cumulative effect on national savings from increasing the age of eligibility for NZS is estimated to be 8% of GDP. Changing the indexation method or introducing compulsory private saving are estimated to yield cumulative changes in national savings over the same period by 51% and 30% respectively.

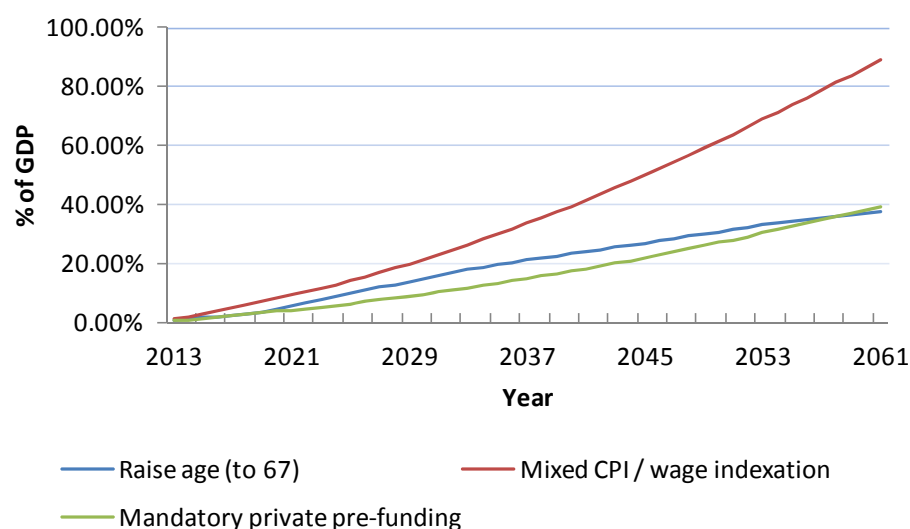
Figure 6 – Cumulative national savings impact (when Government maintains a balanced budget)



Cumulative national savings effects from these policy options will be considerably larger if instead the Government responds to largely positive changes these bring about to its revenues and expenditures by saving more. These are illustrated in Figure 7. With changes to the indexation of NZS the cumulative change in national savings over the period is estimated to be approximately 87% of GDP. Introducing compulsory private saving where accumulations are used to reduce the costs of NZS as well as lifting the age of eligibility for NZS are also both estimated to yield substantial cumulative changes in national savings by 2061 (each by approximately 38% of GDP). It is worth noting though that the cumulative national savings brought about by lifting the age of entitlement outpace those from compulsory private saving until 2060.

¹⁶ These are clearly linked to New Zealand's Net International Investment Position (NIIP), a key macroeconomic indicator of vulnerability, and under certain assumptions improvements in national savings would translate one-for-one to improvements in the NIIP. However, a detailed examination of retirement income policy options effects on the NIIP is outside the scope of this paper.

Figure 7 – Cumulative national savings impact (when Government saves)



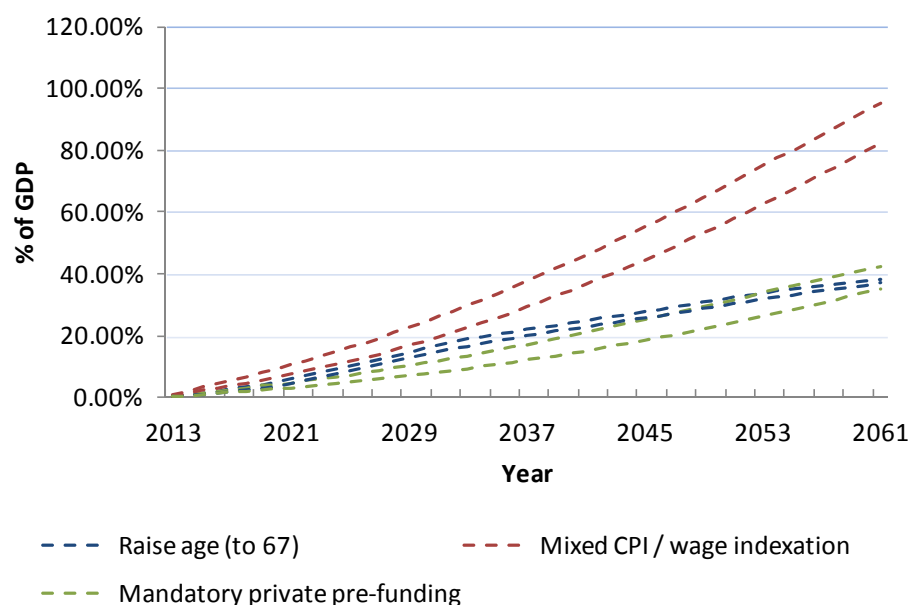
4.4 Sensitivity analysis

To conclude this section the sensitivity of results to the choice of key parameters is examined. In particular, the effect of changes in the interest rate as well as the relative weighting individuals assign to adjustment to policy change via saving more are considered respectively. In both cases this is illustrated by showing the evolution of cumulative national savings that would result (ie, Figure 7 from the previous subsection is reproduced).

The dashed lines in Figure 8 show the impact on cumulative national savings of ‘high’ and ‘low’ savings responses by individuals to each policy option respectively. These are derived by changing the parameter values that set how individuals allocate adjustment to policy change over three mechanisms, saving more over their working lives, working longer and consuming less during retirement. In particular, the initial parameter values for the saving response of three broad groups of age cohorts to each policy (used to generate results in earlier subsections and provided in Table 4) are increased and decreased by approximately 17.5% of their initial values respectively.¹⁷ The parameter values for working longer and consuming less in retirement are adjusted accordingly such that they, together with the saving adjustment parameter, sum to one. Exact parameter values are provided in Appendix Table 1.

¹⁷ The adjustment of 17.5% (17.647 precisely) being the maximum possible increase to the saving adjustment parameter for the youngest age cohorts under the compulsory private saving scheme with abatement of NZS given initial parameter choices outlined in Table 4. Greater change than this would mean that there would be more than complete adjustment to the policy change by this group via saving.

Figure 8 – Sensitivity of cumulative national savings to saving parameter selection



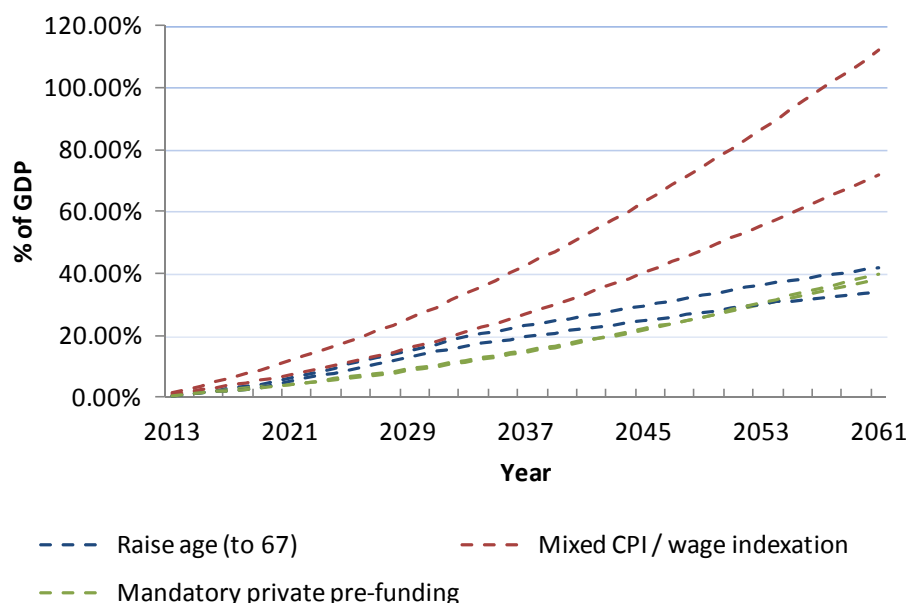
The effect is most noticeable in the case where the indexation methodology of NZS is changed, where a ‘high’ savings response by individuals brings about cumulative changes in national savings of approximately 13% of GDP more than a ‘low’ savings response by the end of the period. It is also noticeable in the case of compulsory private saving with abatement of NZS entitlements, yielding a difference in cumulative changes in national savings of around 8% of GDP by 2061. Relativities between the three policy options have not been altered. However, the timing of the point at which cumulative changes in national savings generated by raising the age of eligibility for NZS and those generated by compulsory private saving with abatement of NZS entitlements are equal, occurs somewhat earlier when individual savings responses are ‘high’.

Figure 9 illustrates the sensitivity of results to the choice of interest rate. In particular, cumulative changes in national savings are presented for each policy option where nominal interest rates (after tax and management fees) have been set to 4% and 6% respectively.¹⁸ The higher dashed lines for each policy option are associated with the lower interest rate and vice versa.

This may seem somewhat counterintuitive but is consistent with two features in particular of the model. First, the loss of expected future NZS entitlements resulting from policy change is calculated as a stock of wealth required by an individual at the age of 65 of sufficient size to generate an income flow over the remainder of that individual’s life to offset the policy change. As interest rates rise, the stock of wealth required to do this is reduced, hence individuals need to save less over their working lives all else equal. Second, recall that individuals’ investment returns on higher than otherwise savings balances have not been incorporated in the model (in the sense that when earned they haven’t been added to estimates of national savings). This means that as the interest rate rises, these returns rise and the saving flows required by individuals to generate a given stock of wealth at their 65th birthday is reduced.

¹⁸ Recall that results contained in previous subsections have been based on an interest rate of 5%.

Figure 9 – Sensitivity of cumulative national savings to the choice of interest rate



Cumulative changes in national savings are affected most by a change in the interest rate in the case of a change in the indexation methodology of NZS. A 2% difference in the interest rate yields a 40% difference in cumulative changes in national savings as a proportion of GDP by the end of the period. Interest rates have little effect however in the case of compulsory private saving with abatement of NZS entitlements. The reason for this is that in this case as well as the effects of the interest rate discussed in the previous paragraph there is the competing effect that as the interest rate rises, accumulations in the compulsory saving vehicle will be larger causing greater loss of NZS entitlements for individuals through abatement (and greater fiscal savings for the government), necessitating a greater saving response. Again, relativities between the three policy options remain unchanged.

5 Conclusion

Over the next half century the ratio of working-age to older people in New Zealand is expected to fall considerably. One obvious area where this marked demographic change is likely to have important consequences is that of retirement income policy. This paper has sought to examine the implications of three retirement income policy options, designed to improve the fiscal sustainability of NZS, for national savings. These policies being to: lift the age of eligibility for NZS by two years; index NZS payments by the average of wages and the general price level; and make private saving compulsory and use those accumulations to reduce NZS entitlements. An understanding of how such policies affect national savings being important for a number of reasons including links to external vulnerabilities and the level of our capital stock, both of which may impinge on economic growth.

The approach taken stems from a desire to model the three policies outlined in a consistent way and the realisation that each will result in a loss of an individual's current expected NZS entitlements. After calculating these losses for individuals belonging to each of a large number of overlapping cohorts and deciding on how they will adjust their behaviour in response, additional flows of individual savings and their eventual decumulation can be aggregated. The Government's propensity to save was also considered and is important because each policy has considerable effects on its revenues and expenditures.

Results suggest that even seemingly modest changes to retirement income policies could lead to substantial annual and cumulative changes in national saving by 2061. In particular, a change to the indexation of NZS is estimated to lead to cumulative changes in national savings by 2061 of approximately 87% of GDP. Introducing compulsory private saving where accumulations are used to reduce the costs of NZS as well as lifting the age of eligibility for NZS are also both estimated to yield substantial cumulative changes in national savings over the period (each by approximately 38% of GDP).

Although many variants of each policy considered are conceivable, the patterns of additional national savings generated over time will be similar (though the level would change). Reflecting on the rationale for each policy's design however, being to improve the fiscal sustainability of NZS, lifting the age of eligibility for NZS appears able to generate superior improvements in the Government's fiscal position compared to the other two policy options over the medium to long term. Indeed, in this respect the option of compulsory private saving with abatement of NZS entitlements does not generate the same level of fiscal improvement as lifting the age of entitlement until 2057.

Similarly, it is clear that each of the three policy options considered (as would similar variants of each) have very different distributional effects both within and across age cohorts. Within cohorts, to the extent that life expectancies across individuals are similar, all individuals are treated the same under the first two policy options. This is not the case with respect to compulsory private saving with abatement of NZS entitlements. In fact, the tax system together with several aspects of this policy's design mean that within almost all age cohorts those in the top income decile will lose more than six times the amount of NZS entitlements than will those in the second income decile.

Lifting the age of entitlement to NZS has the most consistent effect on age cohorts through time in terms of the proportion of expected NZS entitlements under the status quo lost, diminishing only slightly over time with improvements in life expectancy. Changes to indexation of NZS entitlements on the other hand affect those cohorts reaching the age of 65 shortly after the policy change is introduced far less than those reaching that age 80 years later for example. Compulsory private saving with abatement has virtually no effect on those cohorts reaching the age of 65 shortly after the policy change is introduced, but this effect grows for 40 years, before declining thereafter.

Decisions about appropriate retirement income policies are complicated and require careful consideration of their affects on a range of factors. These include: implications for retirement income adequacy and poverty reduction in old age; distributional and welfare consequences; fiscal sustainability; notions of equity; capital accumulation; macroeconomic vulnerability; and not least of which, the extent to which any policy might reasonably be expected to meet its objectives a priori. The aim of this paper is considerably more modest than to form a view about the merits of any one retirement income policy option over another. Rather it seeks to inform some important aspects of any such view and demonstrates that the quantification of many aspects of a policy's affects are possible with reasonable assumptions. In order to do so, a framework for estimating the national savings effects of retirement income policies has been developed that could be applied to most policies affecting NZS entitlements.

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Appendix

Appendix Table 1 – Adjustment mechanism parameters (high and low saving variants)

Age Group (@ 2013)	Adjustment Mechanism	Policy Option					
		<u>Indexation</u>		<u>Age</u>		<u>Compulsion</u>	
		High S	Low S	High S	Low S	High S	Low S
Young (-23 to 24)	Save	0.941176	0.658824	0.911765	0.638235	1	0.7
	Work	0.029412	0.170588	0.081618	0.218382	0	0.15
	Consume	0.029412	0.170588	0.006618	0.143382	0	0.15
Middle (25 to 44)	Save	0.705882	0.494118	0.647059	0.452941	0.823529	0.576471
	Work	0.147059	0.252941	0.251471	0.348529	0.088235	0.211765
	Consume	0.147059	0.252941	0.101471	0.198529	0.088235	0.211765
Older (45 to 64)	Save	0.470588	0.329412	0.352941	0.247059	0.705882	0.494118
	Work	0.264706	0.335294	0.473529	0.526471	0.147059	0.252941
	Consume	0.264706	0.335294	0.173529	0.226471	0.147059	0.252941