pensionbriefing

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Modelling the distributional aspects of KiwiSaver: methodology and results

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The taxpayer-funded subsidies to KiwiSaver are distributed to members based on the contributions made by individuals and their employers. Over time, the subsidies that relate to the employers' contributions become relatively more important as the real value of the fixed-dollar "member tax credit" diminishes. The KiwiSaver Excel Spreadsheets allow the impact of these to be modeled.[1]

Scope of KiwiSaver Excel Spreadsheets

The KiwiSaver Excel Spreadsheets highlight aspects of the KiwiSaver scheme that could have substantial distributional implications now, and in the future as the scheme matures. Originally designed to analyse the distributional impact of changes to the KiwiSaver scheme by the National government in late 2008, the spreadsheets were later expanded to model other aspects of the scheme. The three aspects of the KiwiSaver scheme modelled in this PensionBriefing are:

1. *The distributional impact of the changes made to the KiwiSaver scheme by the National government in 2008*. The changes included the complete removal of the Employer Tax Credit (ETC)[2] and the $40 fee subsidy. The Compulsory Employer Superannuation Contribution was limited to 2% instead of 4% of employee pay. The tax exemption (ESCT) was also limited to the 2% employer contribution.

2. *The lump sum benefit to KiwiSaver members based on whether or not they choose to contribute the full $1,043 per annum in order to quality for maximum Member Tax Credit (MTC).* KiwiSaver members earning below $52,000 p.a. and only contributing 2% of their earnings to KiwiSaver do not receive the full value of the MTC. They can choose to increase their contributions to the scheme to receive the maximum of $1,043 p.a. Contributing up to $1,043 p.a. has a significant impact on the lump sum benefit an individual can expect at age 65, and on the proportion of the lump sum funded by taxpayers.

3. *The impact of inflation on the lump sum benefit if the real value of the MTC is not maintained by the government over the years.* Inflation will have a major impact on the value of the MTC received each year by KiwiSaver members of different ages who join in the same year. Currently, the value of the MTC is not indexed to inflation, so that its real value will

[1] RPRC acknowledges the contribution of Anton Samoilenko, researcher, in compiling this PensionBriefing, funded by a scholarship from The University of Auckland Business School.

[2] The ETC was paid to employers to offset the cost of the compulsory employer contribution. It was abolished from 1 April 2009 with the reduction of the employer contribution from 4% of employee pay to 2%.

decrease each year. In addition, inflation has a number of other distributional effects on KiwiSaver as a long-term saving scheme.

General assumptions

In order to model the lump sum benefit KiwiSaver members could expect at age 65, several assumptions are made.[3]

The net real rate of return is approximately equal to the net nominal interest rate minus inflation, so the KiwiSaver Excel Spreadsheets use a net after-tax, real rate of return to calculate the total lump sum benefit members can expect at age 65. The lump sum results are therefore presented in today's dollars, simplifying comparison of the overall sizes of the lump sums. In addition, using the net real rate of return eliminates the need to make assumptions about future rates of inflation. Assumptions about long-term inflation rate are tested separately.

The member's pay is assumed to be increasing at the rate of inflation. While members' pay increases that are higher than the rate of inflation could be incorporated in the Spreadsheets, the main focus of the Spreadsheets was analysis of the lump sum at age 65, so the complication of further pay increases was excluded.

A further simplifying assumption is holding tax brackets for the member's income constant in real terms over time.[4] This assumption maintains the member at a constant marginal tax rate and has a strong impact on assessing the distributional effects of the KiwiSaver scheme. Any reduction in personal tax rates will reduce the value KiwiSaver members receive from the ESCT exemption.

Calculations

A 'future value' formula is used throughout the spreadsheet to calculate the values of the various KiwiSaver benefits by the time the individual retires. Future value calculations are used on the proportion of income that the individual employer contributes to the KiwiSaver scheme each year and on all of the KiwiSaver benefits that are received by the scheme on an annual basis. The $1,000 'Kickstart' payment is invested at the net real rate of return until the individual retires.

Taxpayer-funded benefits are then added together to produce the 'Tax-Funded' amount which shows the proportion of the lump sum that is derived from government-paid incentives. The tax-funded proportion of the lump sum adds an interesting dimension to the interpretation of the results, particularly when we look at the changes to the scheme by the National government.

A 'Special Formula' is used in the spreadsheet that examines the impact of inflation on the value of the MTC.[5] The formula is used to calculate the future value of the MTC, but with the real value of the MTC decreasing at the rate of inflation for each year.

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[3] For the purposes of this PensionBriefing, the effects of the differing tax rates of Portfolio Investment Entities (19.5%) and other investment vehicles (30%) are not considered.

[4] In New Zealand, fiscal drag or bracket creep is an enduring problem. Tax brackets are rarely adjusted, so inflation causes more and more people to move into higher tax brackets.

[5] The formula was supplied by Alistair Marsden, Accounting and Finance Department, The University of Auckland, and has been tested against the sum of the cash flows that represent the decreasing value of the MTC.

Results

The Spreadsheets contain options for the member's age, income and net real rate of return. To preserve continuity in reporting the results, the net real rate of return is set at 2% per annum. When looking at the effects of inflation, the long term inflation rate is assumed to be 2.5% per annum. Age and income are variables used to compare the distributional effects of the scheme.

The first section looks at the total value and structure of the lump sum benefit KiwiSaver members can expect at age 65 based on their real income throughout their membership. For the purpose of reporting results, the age of the representative KiwiSaver member was set at 25, leaving a period of 40 years over which that member would contribute to the scheme.

Spreadsheet 1: KiwiSaver before and after changes

Under the rules introduced by the National government from 1 April 2009, the minimum contribution level was reduced from 4% to 2% of member's pay. To enable comparison of the lump sum benefit at age 65 under the old and the new rules, the Spreadsheets assume that the individual continued to contribute 4% of pay to the KiwiSaver scheme under the new rules.

Table 1 shows that the changes made to the KiwiSaver scheme in 2009 will have a major impact on the total value of the lump sum benefit members can expect at age 65. The most significant impact resulted from the 2009 reduction in the compulsory employer contribution from 4% to 2% of employee pay. At the same time, discontinuing the $40 fee subsidy resulted in a $2,416 reduction in the lump sum benefit at age 65.

Table 1: Changes in the total lump sum benefit (assuming 4% contribution rate; 40 years' membership, 2% p.a. net real return)

Pay	2009 rules	2007 rules	Difference
$20,000	$123,012	$197,910	-$74,898
$30,000	$173,931	$275,587	-$101,657
$40,000	$210,172	$323,909	-$113,737
$50,000	$246,413	$372,231	-$125,817
$60,000	$282,654	$420,552	-$137,898
$70,000	$318,896	$468,874	-$149,978
$80,000	$355,137	$517,195	-$162,059
$90,000	$391,378	$565,517	-$174,139

Overall, changes made to KiwiSaver resulted in an average benefit reduction of 34%, with the highest percentage reduction experienced by those earning $20,000 a year (38%) and the lowest reduction experienced by those earning $80,000 p.a. and above (31%).

The 2009 changes also had an impact on the taxpayer-funded proportion of lump sum benefit. As shown in Table 2, the greatest change to the proportions was due to discontinuing the ETC. Other factors contributing to lower member returns were cessation of the $40 fee subsidy, and reduced total value of the ESCT exemption at age 65 via changes in the employer contribution.

Table 2: Changes in the tax-funded proportion of the final lump sum benefit*

Pay	2009 rules	2007 rules	Difference
$20,000	45.20%	56.30%	-11.09%
$30,000	41.87%	52.92%	-11.06%
$40,000	35.85%	46.59%	-10.74%
$50,000	34.55%	45.80%	-11.25%
$60,000	31.53%	42.43%	-10.90%
$70,000	29.20%	39.76%	-10.56%
$80,000	28.70%	39.46%	-10.76%
$90,000	27.22%	37.71%	-10.49%

*Note: Given that members are assumed to be contributing 4% of their pay (see table 1), only those earning $26,000 or less would not be saving enough to accrue the maximum MTC.

Tax changes from 2007 to 2009 are shown in Table 3. Any future changes to tax rates and tax brackets will effect the proportion of the lump sum benefit that is tax-funded through the total value of the ESCT exemption.

Table 3: Changes in tax brackets and tax rates from 2007 to 2009

Income 2007	Tax Rate 2007	Income 2009	Tax Rate 2009
$0-$9,500	15%	$0 - $14,000	12.50%
$9,501 - $38,000	21%	$14,001 - $48,000	21%
$38,001 - $60,000	33%	$48,001 - $70,000	33%
$60,001 and over	39%	$70,001 and over	38%

As shown in Table 4, if the calculations were done using the tax scales in 2007 when the scheme started, KiwiSaver members earning below $38,000 would not experience much change, while results for members earning over $38,000 p.a. would be measurably different, as they would be in the 33% tax bracket instead of the present 21% tax bracket. Another group affected by tax changes is KiwiSaver members who earn over $60,000 p.a. (or $70,000 p.a. after 1 April 2009), since their tax bracket would have changed from 39% to 38%.

Table 4: Changes in tax-funded proportion of final lump sum benefit (assuming 4% contribution rate; 40 years' membership, 2% p.a. net real return)

Pay	2009 rules 2009 tax brackets	2009 rules 2007 tax brackets	2007 rules 2009 tax brackets	2007 rules 2007 tax brackets
$40,000	35.85%	38.61%	46.59%	50.17%
$70,000	29.20%	30.79%	39.76%	41.93%
$80,000	28.70%	28.97%	39.46%	39.83%
$90,000	27.22%	27.50%	37.71%	38.09%

The results also indicate that under the 2007 KiwiSaver rules, changes to the tax scale would have a more significant impact on the proportion of the lump sum that is tax-funded.

Spreadsheet 2: Maximising the value of the MTC

Under the 2009 rules, KiwiSaver members can choose to contribute more than the minimum 2% compulsory contribution in order to qualify for the maximum MTC of $1,043 p.a. This effects the final value of the lump sum benefit, and the proportion of the lump sum that is tax-funded.

In cases of no voluntary contributions, KiwiSaver members contribute only the compulsory 2% of pay to the scheme. In cases of voluntary contributions, members contribute $1,043 p.a. to get the full MTC. For the purpose of examining the effects of this change in saving behaviour, we assume the members can afford to contribute up to $1,043 p.a. to their KiwiSaver account.

Table 5 shows that the changes affect KiwiSaver members with annual pay less than $52,000 p.a. Members earning more than $52,000 p.a. will qualify for the maximum MTC from their minimum contributions to the scheme. The results are not surprising, with low income earners receiving the greatest benefit from contributing up to $1,043 p.a.

Table 5: Changes in the final benefit (40 year member, 2% p.a. net real return, 2% contribution rate)

Pay	No voluntary contributions	Voluntary contributions	Difference
$20,000	$74,690	$152,367	$77,677
$30,000	$110,932	$164,448	$53,516
$40,000	$147,173	$176,528	$29,355
$50,000	$183,414	$188,609	$5,195
$60,000	$210,172	$210,172	$0

However, to put this result into the proper context, KiwiSaver members who earn $20,000 p.a. would need to more than double their annual contribution to the scheme to access the full value of the MTC, while members earning $50,000 p.a. would only need to contribute an extra $43 p.a. While it appears that the rules benefit the KiwiSaver members in the lower end of the income scale, affordability of additional contributions for these members is a separate issue.

As Table 6 shows, by contributing up to $1,043 p.a. KiwiSaver members can increase the tax-funded proportion of the lump sum benefit. Increasing their personal contributions means they also increase of the size of the MTC relative to the (unchanged) employer's contribution.

Table 6: Changes in the tax-funded percentage of the final benefit (contribution of $1,043 p.a.)

Pay	No voluntary contributions	Voluntary contributions	Difference
$20,000	42.10%	46.13%	4.03%
$30,000	41.52%	44.28%	2.76%
$40,000	41.23%	42.69%	1.46%
$50,000	45.00%	45.14%	0.14%
$60,000	42.41%	42.41%	0.00%

Reducing the minimum contribution to 2% was intended to make KiwiSaver more affordable to members in low income groups, while enabling low- and mid-income members the ability to

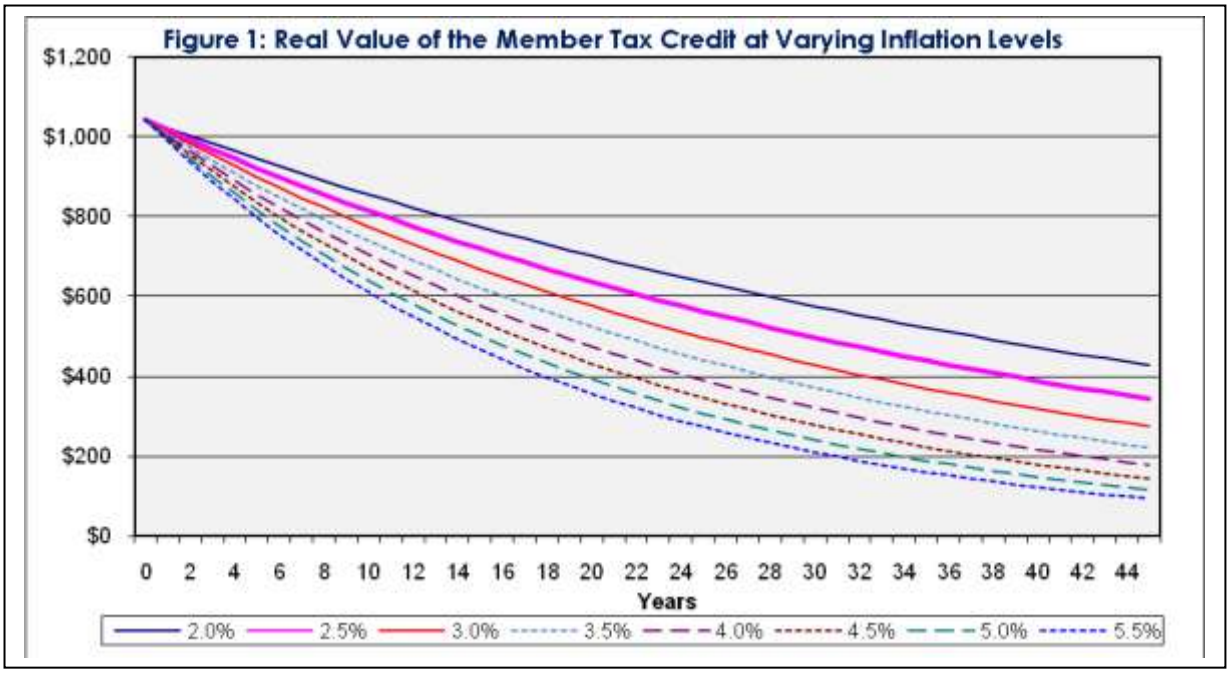
receive more of the MTC. As the maximum value of the MTC is fixed at $1,043, this change preserves some vertical equity for members with incomes below $52,000.[6]

Spreadsheet 3: Impact of inflation on the value of the MTC

The calculations in Spreadsheet 3 show the effect of inflation on the value of the MTC for members who contribute no more than 2% of their pay to KiwiSaver. Currently, there is no indication that the value of the MTC or the $1,000 Kickstart payment will be indexed to the rate of inflation, consequently the real value of these benefits will reduce each year by the rate of inflation. This has an impact on the distributional effects of KiwiSaver.

The value of the Kickstart payment is also affected by inflation. This means that KiwiSaver members who joined in the first year of the scheme received the full value of the payment, while members who join in the future will receive less in real terms. Once the payment is invested, the interest rate earned on the investment should cover the rate of inflation. Therefore, the MTC is the only future benefit negatively affected by inflation for a member joining after the first year.

Figure 1 illustrates the present value of the MTC at inflation rates from 2.0% to 5.5% p. a. The Reserve Bank of New Zealand has an inflation target of 1-3% over the medium term, so inflation rates over 3% p.a. are not likely under current policy objectives.



However, the calculations in this spreadsheet cover 40 years, giving potential for new policy targets. Also, including inflation rates over 3% offers a perspective on their impact on KiwiSaver.

Since 1990, the average inflation rate has been 2.5% p.a., represented by the bold line in the figure. The results in the following sections assume the average inflation rate.

After approximately 29 years at an average 2.5% inflation rate, the annual value of the MTC in today's dollars is half the starting value of $1,043. By the time an individual retires at age 65, the

[6] The preservation of vertical equity is an effect of the maximum $ MTC and the 2% limit.

present value of the last MTC they receive would be about $343. This constant decrease in the MTC's real value impacts on the final benefit at age 65 and on the tax-funded proportion of the lump sum.

Table 7 shows the significant impact of inflation on the final benefit. At 2.5% p.a. inflation over 40 years, the individuals would experience an average drop in the lump sum benefit of 9.25%, with the greatest drops experienced by members earning $50,000 p.a. or less. For those earning above $50,000 p.a. the percentage impact of inflation is less, and it decreases with each income bracket i.e. the effects of inflation are regressive.

Table 7: Impact of inflation on the final benefit (40 years; MTC $1,043 in 2009)

Income	Total benefit at 65 (2.5% inflation)	Total benefit at 65 (no inflation)	Difference	Percentage Change
$20,000	$67,070	$74,690	-$7,620	-10.2%
$30,000	$99,501	$110,932	-$11,430	-10.3%
$40,000	$131,933	$147,173	-$15,240	-10.4%
$50,000	$164,364	$183,414	-$19,050	-10.4%
$60,000	$190,303	$210,172	-$19,870	-9.5%
$70,000	$214,463	$234,333	-$19,870	-8.5%
$80,000	$238,624	$258,494	-$19,870	-7.7%
$90,000	$262,785	$282,654	-$19,870	-7.0%

These results highlight the fact that KiwiSaver members in low and mid-income groups rely more on the MTC to finance the final benefit than members in the high-income groups. The MTC is limited to the maximum value of $1,043 so for members in the high-income groups it comprises a much smaller proportion of their total lump sum.

The impact of inflation on the proportion of the lump sum that is tax-funded varies somewhat from the impact on the total value of the final benefit. Table 8 (below) shows KiwiSaver members who earn $40,000 p.a or less experience the biggest percentage drop. This result is consistent with the conclusion that members in low and mid-income ranges feel the impact of inflation the most.

Table 8: Impact of inflation on tax-funded portion of final benefit

Income	Tax-funded portion (2.5% inflation)	Tax-funded portion (no inflation)	Difference
$20,000	35.52%	42.10%	-6.58%
$30,000	34.80%	41.52%	-6.72%
$40,000	34.44%	41.23%	-6.79%
$50,000	38.63%	45.00%	-6.37%
$60,000	36.39%	42.41%	-6.01%
$70,000	34.15%	39.74%	-5.58%
$80,000	34.39%	39.43%	-5.04%
$90,000	32.97%	37.69%	-4.71%

Table 8 results use a long term average inflation rate of 2.5% p.a. Increasing the inflation rate by 0.5% would result in a further reduction of between $1,058 and $2,759 in the final benefit, and a reduction of around 1% in the tax-funded proportion of the benefit across the income ranges.

Spreadsheet 4 Results in relation to age

For the purpose of reporting age-based results from the Spreadsheets, the only difference between KiwiSaver members is their age when joining the scheme. We model the different lump-sum outcomes by age 65 for people of different ages who join the scheme in 2009. Other assumptions are: members' pay is $40,000 p.a., their contributions are 2% of pay, and the net real interest rate is fixed at 2% p.a.

Table 9 shows that, as to be expected, members who join KiwiSaver later in their life receive a considerably smaller final benefit than those who are younger when they join. The proportion of the lump sum that is tax-funded increases slightly partly due to the increased value of the Kickstart payment relative to the overall size of the final benefit. These results are not surprising.

Table 9: Age and final benefit ($40,000 pa, 2% contributions, 2% net real return)

Age	Final benefit	% Tax-funded
25	$147,173	41.23%
30	$121,987	41.31%
35	$99,175	41.42%
40	$78,513	41.58%
45	$59,800	41.82%
50	$42,850	42.21%
55	$27,498	42.98%
60	$13,594	45.18%

More importantly, these results provide a baseline for the following calculations demonstrating the effects of inflation on the distributional outcomes of KiwiSaver. Table 10, based on the Table 9 calculations, shows the impact of an inflation rate of 2.5% p.a which diminishes the real value of the MTC for each year until the member retires.

Table 10: Age, inflation and the final benefit

Age	Final benefit (no inflation)	Final benefit (2.5% inflation)	Difference
25	$147,173	$131,933	-$15,240
30	$121,987	$110,439	-$11,548
35	$99,175	$90,773	-$8,402
40	$78,513	$72,735	-$5,778
45	$59,800	$56,143	-$3,657
50	$42,850	$40,827	-$2,023
55	$27,498	$26,628	-$870
60	$13,594	$13,399	-$195

As expected, inflation has the greatest negative effect on the KiwiSaver members who joined at younger ages. Members who joined at age 25 would experience a 10.4% decrease in the final benefit, while members who joined at age 60 will experience a decrease of less than 1.5%. Overall, inflation compresses the present value of the difference in final benefits between KiwiSaver members who join early in their life and members who join much later.

Table 11 illustrates the interaction of inflation and the age (in 2009) at which the member joined KiwiSaver. Firstly, the results show the negative effect of inflation on the tax funded proportion of the total lump sum benefit, with greatest impact on members who joined young. They face a longer period over which the real value of the MTC deteriorates.

Table 11: Age, inflation and the tax funded proportion of the final benefit

Age	% Tax-funded	% Tax-funded (2.5% inflation)	Difference
25	41.23%	34.44%	-6.79%
30	41.31%	35.18%	-6.13%
35	41.42%	36.00%	-5.42%
40	41.58%	36.94%	-4.64%
45	41.82%	38.03%	-3.79%
50	42.21%	39.34%	-2.87%
55	42.98%	41.12%	-1.86%
60	45.18%	44.38%	-0.80%

If the value of the MTC was maintained by the government, the gap between the tax-funded proportions of the total lump sum benefit will be less than 5 percentage points: 45.19% at age 60 compared with 41.23% at age 25. However, if the real value of the MTC is not maintained over the years, the gap in the tax-funded proportions will widen to almost 10 percentage points: 44.38% at age 60 compared with 34.44% at age 25.

Overall, the results in this section show that inflation changes the distributional outcomes of KiwiSaver. If the real value of the MTC is not maintained, KiwiSaver will disproportionately benefit current older members, particularly those who joined at the scheme's inception compared to current younger members.

If instead of joining today, the 25 year old decides to join at some point in the future, the degree to which their lump sum is tax-funded will depend on whether the Kickstart and MTC are adjusted for inflation. If they are not indexed, today's 25-year old who delays joining will not be in the favoured position of today's 60 year-old who joins today. Thus, there are significant generational equity issues.

Policy Implications

Changes made to the KiwiSaver scheme by the National government will have a mixed effect on the distributional outcomes of the scheme. First: discontinuation of the ETC and the $40 fee subsidy reduces the proportion of the final benefit funded by taxpayers, especially for those on low incomes. However, reducing the ESCT exemption to 2% of income has reduced the taxpayer-funded contribution to the final benefit received by higher income members.

Second: the KiwiSaver Excel Spreadsheets clearly show that inflation has a negative effect on the distributional impact of the scheme. If the real value of the MTC is not maintained, KiwiSaver will favour older members in high tax brackets since these members will be affected by inflation over a shorter period of time and will receive the greatest benefit from the ESCT exemption.
If, also, the Kickstart is not indexed, future members will be affected by its lower real value at the point of joining.

Third: limiting the ESCT exemption to 2% of the member's income has reduced the regressivity of KiwiSaver, that is, it has improved the distributional nature of the scheme. However, from a distributional point of view, the most progressive change the government could make to KiwiSaver is the elimination of the ESCT exemption. This concession is regressive: the benefit associated with the ESCT exemption is highest for those the highest income tax brackets. Also, because the benefit is proportional to members' incomes, the real value of the exemption is not affected by inflation. The ESCT exemption is a tax expenditure that costs approximately $170 million a year in forgone tax revenue (Policy Advice Division of Inland Revenue Department & Treasury, 2009). It is unclear why taxpayers should give greater retirement-saving assistance to the highest paid KiwiSaver members.

By removing the ESCT exemption, the government would both improve the distributional nature of the scheme, and reduce the tax burden associated with government financing of benefits predominantly captured by higher-income members. It would also move KiwiSaver closer to the original design as announced in the 2005 Budget. The gain in revenue maybe applied to indexation of the KickStart and MTC to improve intergenerational equity.

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