KiwiSaver: An Initial Evaluation of the Impact on Retirement Saving

David Law, Lisa Meehan and Grant M. Scobie*

*Authors' contact details:
    grant.scobie@treasury.govt.nz
    david.law@treasury.govt.nz
    lisa.meehan@treasury.govt.nz

Abstract

KiwiSaver is a voluntary savings scheme aimed at increasing the retirement wealth of a target population. A critical element shaping the success of KiwiSaver is the extent to which individuals participate in the scheme, given its voluntary nature; and, having chosen to participate, the extent to which their attitudes and practices toward savings have been modified by their participation. This paper presents the results of an initial evaluation to assess individuals' saving behaviour following the introduction of the KiwiSaver scheme. It is based on the findings of a national survey conducted in 2010.

We find that members adjust their savings portfolio such that only about one third of the contributions they make to their KiwiSaver account represents additional savings. Further, only 22% of respondents report that their expected retirement income would not be sufficient to meet basic living costs. Critically, regression analysis finds no relationship between KiwiSaver membership and any shortfall or excess in respondents' expected retirement income relative to either the amount needed to meet basic needs in retirement or to be comfortable.

Consequently, examination of standard measures of programme efficacy such as target effectiveness and leakage suggests that KiwiSaver has been only modestly successful in reaching the target population and that leakage to the non-target population was high. This implies that the ongoing cost of the scheme per target member could exceed $13,000 per year. Finally, recognising that KiwiSaver may have had broader objectives not explicitly stated in the Act, the scheme's possible effect on national saving was examined. In the long run the effect on net national saving appears marginal at best.

Executive Summary

KiwiSaver is a voluntary savings scheme aimed at increasing the retirement wealth of a target population.[1] Its introduction in 2007 was prompted by a view that household saving in general appeared to be low and declining, and that there may be some who would reach retirement with an accumulation insufficient to allow them to sustain their pre-retirement standard of living. As the population ages, a significantly greater number of people will become eligible for the universal state pension (New Zealand Superannuation, hereafter NZS), resulting in increased pressure on government finances. Given the costs to the Crown of the KiwiSaver scheme, it is appropriate at this time to assess the contribution it is making to future retirement incomes.

KiwiSaver has proved very attractive to savers, with membership still increasing at a rate of about 20,000 a month and total savings of nearly $8 billion now in individuals' accounts (Inland Revenue 2010a). Over time this should help to deliver significant levels of individual retirement savings and hence contribute towards the scheme's stated objective of enabling some private individuals to save more for their retirement than they might otherwise have done.

However, the strong growth in membership and the private benefit of growing accumulations of retirement savings have come at significant public cost. Through direct subsidies and forgone tax the Government now contributes over a billion dollars per year to individual KiwiSaver accounts, estimated at about 40% of total contributions in 2009/10 (Inland Revenue 2010a). Especially now that this contribution is being funded through increases in public debt, it is both prudent and opportune to examine the impact of the scheme.

A critical element shaping the success of KiwiSaver is the extent to which individuals participate in the scheme, given its voluntary nature; and, having chosen to participate, the extent to which their attitudes and practices toward savings have been modified by their participation, particularly whether they save more or whether they substitute saving through KiwiSaver for other forms of saving. This paper presents the results of an initial evaluation to assess individuals' saving behaviour following the introduction of the KiwiSaver scheme.

This analysis of the impact of the scheme is based on a national survey of 825 individuals conducted by personal interviews between January and March 2010.[2] Clearly there are limitations to the data on which this study is based. In the first instance the scheme had been in place for less than three years at the time of the survey. Changes in saving behaviour may occur over much longer periods and so we cannot be sure we have captured the full effect of the scheme at this early stage. Critical elements of the survey results on which we have drawn are based on asking for expected levels of income and expenditure in retirement. While the survey gives valid estimates for the population, there will be wide variation across individuals. As with any survey, there is a risk that some respondents may have answered questions about what they would have done in the absence of the scheme in a way they felt showed them in a "favourable" light with the interviewer. Finally, it should be noted that while the models used in this analysis can reveal significant associations, they do not unequivocally establish the

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[1] The KiwiSaver Act 2006 explains the purpose of KiwiSaver is to "encourage a long-term savings habit and asset accumulation by individuals who are not in a position to enjoy standards of living in retirement similar to those in pre-retirement." This suggests there may be a "target population" for which KiwiSaver is intended to help. This is further addressed in Section 4.8.

[2] This survey was undertaken by Colmar Brunton on behalf of IRD, as part of the KiwiSaver Evaluation Programme.

direction of causation. For example, does membership lead to greater financial planning, or does having done financial planning lead to joining KiwiSaver?

The principal findings of the analysis can be summarised as follows.

KiwiSaver membership

- Older individuals and those who expect NZS to be their main source of retirement income are more likely to be KiwiSaver members.

- Being a KiwiSaver member is associated with an increased likelihood of having done some financial planning for retirement, while those in poorer health or expecting NZS to be their main income are less likely to have undertaken retirement planning.

- Those expecting NZS to be a major source of income were more likely to have opted in, while older individuals and those with higher incomes were less likely to have opted out.

Funding KiwiSaver contributions (additionality)

- KiwiSaver members report that on average they would have applied 64% of the money they are now contributing to KiwiSaver to other forms of saving and or debt reduction had they not joined KiwiSaver. In other words, about one third of their private contributions represents additional savings over and above those that would have been made anyway.

- Those owning their own home or having higher levels of education would have saved more of the contributions to KiwiSaver in the absence of the scheme. In contrast women or those in part time employment would have tended to spend more of their contributions to KiwiSaver in the absence of the scheme.

- Females, those with more children, those expecting NZS to be their main income in retirement and those in poor health were all less likely to have saved specifically for retirement had they not joined KiwiSaver.

Retirement income expectations

- Overall 78% of respondents expected their retirement incomes would be adequate to meet their basic needs. 50% of respondents expected their incomes would be adequate to live comfortably in retirement.

- Those reporting less than average health were likely to have a significantly larger shortfall in expected retirement income relative to that needed for living comfortably.

- About 80% of KiwiSaver members did not have an expected income shortfall in retirement (relative to meeting their basic needs).

- While this finding could be interpreted as a measure of success of the scheme, there is no evidence that membership influenced the size of the expected shortfall in retirement income. Indeed, among those not in the scheme, 76% also had no expected shortfall in retirement income. Critically, after controlling for other factors which may affect the size of the shortfall with regression analysis, no statistically significant difference was found between KiwiSaver members and non-members.

Reaching the target population

- The KiwiSaver scheme appears to reach about one third of the target population, defined in the Act as those who would not otherwise have saved enough to maintain their standard of living in retirement.

- Leakage, that is, the proportion of KiwiSaver members considered to fall outside the target population, however, is estimated to be as high as 93%.

- With ongoing costs of the scheme for salary and wage earners projected to total around $823 million for the 2011/12 year, the costs for each member of the target population may exceed $13,000 per year.

Impact on national savings

- While there may be some short-run increase in national saving, it appears that given the extent of public contributions through tax concessions and direct grants, the net contribution to overall saving would be marginal at best in the longer term, and may in fact reduce national saving.

The results in this study represent an initial assessment of some aspects of the KiwiSaver scheme. It is important to stress that this paper is based on data collected between January and March 2010, before the various changes to the scheme that were announced in Budget 2011 had taken effect.

Further evaluation must await additional data garnered when the scheme has greater maturity. Given the importance of KiwiSaver as an element of New Zealand's retirement income saving policies, further evaluation will be highly desirable. In conjunction with IRD, the Treasury has developed a set of questions on KiwiSaver to be included in the last wave of a major longitudinal panel study conducted by Statistics New Zealand. It is expected the results of that survey will be available for analysis in the first half of 2012, and the findings should shed further light on the behavioural changes induced by KiwiSaver.

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1   Introduction

KiwiSaver is a voluntary savings scheme aimed at increasing the retirement wealth of a target population.[3]   Its introduction in 2007 was prompted by a view that household saving in general appeared to be low and declining, and that there may be some who would reach retirement with an accumulation insufficient to allow them to sustain their pre-retirement standard of living. As the population ages, a significantly greater number of people will become eligible for the first tier, universal state pension (New Zealand Superannuation, hereafter NZS), resulting in increased pressure on government finances. Given the costs to the Crown of the KiwiSaver scheme, it is appropriate at this time to assess the contribution it is making to future retirement incomes.

People under the age of 65 may join KiwiSaver. A main innovation of KiwiSaver is the automatic enrolment feature, which works on the behavioural economics notion that people suffer from inertia. All new employees are automatically enrolled, but they have the ability to opt-out within two to eight weeks of starting a new job. KiwiSaver members are required to make a minimum contribution of 2% of their gross salary/wages, and have the option of taking a contributions holiday after a year's membership. Employers must also make a matching contribution of at least 2%. In addition to salary/wage deductions, all KiwiSaver members can make voluntary contributions of any amount. There are also government incentives for joining and contributing. When the survey was conducted, the main incentives were a $1,000 kick-start contribution, a matching government contribution that was capped at $1,042.86 a year, and exemption from employer superannuation contributions tax (ESCT). Savings are generally locked-in until a member turns 65.

A critical element shaping the success of KiwiSaver is the extent to which individuals participate in the scheme, given its voluntary nature; and, having chosen to participate, the extent to which their attitudes and practices toward savings have been modified by their participation, particularly whether they save more or whether they substitute saving through KiwiSaver for other forms of saving. This paper presents the results of an initial evaluation to assess individuals' saving behaviour following the introduction of the KiwiSaver scheme.

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[3]   The KiwiSaver Act 2006 explains the purpose of KiwiSaver is to "encourage a long-term savings habit and asset accumulation by individuals who are not in a position to enjoy standards of living in retirement similar to those in pre-retirement." This suggests there may be a "target population" for which KiwiSaver is intended to help. This is further addressed in Section 4.8.

This work is part of a wider, on-going programme of evaluation under the leadership of IRD.[4] This is a broad programme covering the administration of the scheme, the scale and pattern of uptake, the contribution of different features of the scheme, communications, its impact on financial markets, and critically, the savings habits and asset accumulation of both members and non-members.

The current analysis focuses solely on the last of these elements and relates specifically to Objective D of the Joint Evaluation Strategy (Inland Revenue, Ministry of Economic Development *et al* 2006, Appendix D, p.ii):

> The impact KiwiSaver is having on the saving habits and asset accumulation of individuals who are not in a position to enjoy standards of living in retirement similar to those in pre-retirement.

The following are the specific short-term objectives stated in the Strategy:

1. What is the scale and nature of participation and non-participation over time?

2. Why have individuals opted-in/-out?

3. Do the asset accumulation activities of KiwiSaver participants differ from those of non-participants?

4. What would savers have done if KiwiSaver didn't exist?

The results of the analyses in this paper address these questions. In addition, the paper examines the effectiveness of the scheme. This aspect relates to scheme's ability to reach its target group, and having enrolled those in the target group, the extent to which the scheme has achieved the stated objective for that group.

The analysis undertaken here is based on the key statement of the high level intent of KiwiSaver in the KiwiSaver Act 2006:

> The purpose of this Act is to encourage a long-term savings habit and asset accumulation by individuals who are not in a position to enjoy standards of living in retirement similar to those in pre-retirement. The Act aims to increase individuals' well-being and financial independence, particularly in retirement, and to provide retirement benefits.
>
> To that end, this Act enables the establishment of schemes (KiwiSaver schemes) to facilitate individuals' savings, principally through the workplace.

While the specific purpose is stated in the Act, it is possible that those framing the programme had other implicit objectives. These could include for example: increasing national saving rates through greater household saving, and thereby reducing New Zealand's external vulnerability; or enhancing economic growth by facilitating investment through the deepening of domestic capital markets.[5] While recognising that there may well have been wider objectives, this paper focuses principally on the effectiveness of the scheme to deliver to the target population. We do however present an initial evaluation of the possible contribution to national saving.

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4   See Inland Revenue et al (2006).
5   See Capital Market Development Taskforce (2009) and Savings Working Group (2011).

It is appropriate to underscore both the strengths and limitations of the survey[6] on which much of the analysis is based.[7] A positive feature is that the data come from a statistically valid national sample from which population estimates can be derived. It represents the most comprehensive source of household data collected since the scheme began; furthermore the results apply to 2010, so are relatively recent. However, it is recognised that as the scheme was introduced only in July 2007 and the survey conducted in the first quarter of 2010, the data reflect a very early stage of the scheme. In other words, while these results provide a useful preliminary assessment, they do not necessarily reflect the outcomes that will prevail once the scheme is fully matured. In addition, the survey provides a "snap shot" at one point in time; as a consequence it is limited in the extent to which it can identify how the savings behaviour of particular individuals has evolved over time. The survey relies on respondents' estimates of their expected income in retirement and the amount of income they would need to cover their basic needs or be comfortable.

It should be noted that the analysis in this paper relates to the KiwiSaver policy settings that were in place when the survey was conducted (January-March 2010). The analysis was undertaken as part of the ongoing KiwiSaver evaluation programme and does not address the specific changes that were announced in the 2011 Budget. Further analysis may examine the impact of these changes. These include an increase in the minimum employee contribution from 2% to 3%, an increase in the compulsory contribution from 2% to 3%, a reduction in the member tax credit to a maximum of $521 and requiring $2 contribution from the member for each $1 of tax credit, and finally the removal of the exemption for the Employer Superannuation Contribution Tax (ESCT).

The paper proceeds as follows. The next section outlines the survey from which the data for this analysis has been drawn. It is followed by a brief discussion of the methodology. The main body of the results are in Section 4. The analyses examine factors associated with the likelihood of being a member, of undertaking financial planning, of having sufficient income in retirement, and importantly the extent that contributions made to KiwiSaver were "new" savings rather than funds diverted from other savings vehicles. In addition, we examine the effectiveness of the scheme in reaching the target group as specified in the Act. Finally we present some initial estimates of the possible impact of the KiwiSaver scheme on the overall level of national savings, reflecting both changes at the household level as well as the fiscal costs of the scheme. Conclusions are drawn together in Section 5.

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[6]   This survey was undertaken by Colmar Brunton on behalf of IRD, as part of the KiwiSaver Evaluation Programme.
[7]   For more details, see Colmar Brunton (2010) and Inland Revenue (2010b).

2   Data

This paper uses data from a survey of individuals undertaken by Colmar Brunton on behalf of IRD, as part of the KiwiSaver Evaluation Programme.[8] The unit record data were made available under a special agreement with selected researchers. The survey involved face-to-face interviews with 825 people aged 18-65 and was conducted between January and March 2010. The objectives of the survey were:

1. To gain a greater understanding of the profile of members and non-members and the reasons for membership/non-membership in order to determine whether participation is being successfully encouraged.

2. To investigate the drivers behind members' use of KiwiSaver features with a view to understanding how longer-term use of KiwiSaver might develop, whether the features are operating as intended, and how the use of these features may influence savings outcomes.

3. To investigate members' and non-members' attitudes and approach to savings for retirement to understand whether longer-term savings behaviours are being established.

4. To provide an indication of the extent to which members' KiwiSaver saving is additional to that which would have been undertaken in the absence of the scheme, with a view to determining whether KiwiSaver will promote greater financial independence in retirement for the target group, that is, individuals who are not in a position to enjoy standards of living in retirement similar to those in pre-retirement.

The 825 surveyed individuals consisted of 557 randomly selected members of the general public aged 18-65 years and a booster sample of an additional 268 KiwiSaver members.

The survey was weighted in two stages. The first stage involved weighting to adjust for the unequal probabilities of selection associated with the sample design described above. This included applying weights to ensure that the proportion of KiwiSaver members was in line with administrative data. The second stage involved weighting on the basis of the underlying population age and gender distribution. This was done on the basis of administrative data for the KiwiSaver booster sample, and Census data for the general sample. No attempt was made to benchmark against other characteristics, such as KiwiSaver members by method of enrolment.

Of the total respondents, 474 were KiwiSaver members made up of 206 from the general survey populations and 268 from the booster sample. The remaining 351 were not members. The response rate for the general sample was 75% and for the booster sample 57%.

In a number of cases rather than provide exact dollar amounts, respondents were asked to indicate which of a series of incremental bands best fitted their circumstances. The mid-points of the bands were used as the value for further calculations.[9] More details of the survey design and methodology, as well as detailed summary statistics can be found in a technical report (Colmar Brunton 2010).

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[8]   For more details, see Colmar Brunton (2010) and Inland Revenue (2010b).

[9]   Some of these bands were open ended; in these cases we used the starting point of the band for all respondents in those bands respectively. For example, the top income band was $100,000 and above, and this was filled in with $100,000 for each member of this group.

3   Methodology

The principal approach to the analysis of the survey of individuals is to estimate a series of multivariate regression models of the form:

$$Y = \beta_o + \beta_1 X_1 + ...\beta_n X_n + \varepsilon$$

in which a dependent variable Y is expressed as a linear function of a series of explanatory variables plus an error term. Estimates are made of the coefficients β_i together with their corresponding standard errors. The strength of this approach is that it allows an estimate of the effect of a particular independent variable to be made while holding constant the effect of other variables. For example, the expected level of retirement income (Y) might be associated with age and health status amongst other independent variables. A bivariate analysis might show that older people expect lower retirement incomes. However this apparent association may simply have been due to the fact that the self-reported health status declines with age, and those with poorer health, regardless of age, would tend to have a lower expected retirement income. Only by correcting for the effect of age would the true underlying effect of health be revealed.

The dependent variable may be a binary variable (eg the respondent is a KiwiSaver member: Yes=1 or No=0) or a continuous variable (eg the amount of any retirement income shortfall). The explanatory variables may be continuous (eg net wealth), binary (eg partner is a KiwiSaver member: Yes=1 or No=0), or categorical (eg self-reported health status: Excellent, Very Good, Good, Fair, Poor).

In the case of a binary dependent variable, a logit model is fitted and marginal effects for each independent variable are estimated assuming all other variables are held at their mean values. For example, if we wish to analyse the effect of employment status on whether a respondent is a KiwiSaver member we fit a logit regression and hold all variables at their mean level (age, education, occupation, wealth, income, etc) and allow a change in labour force status (eg from part-time to full-time employment) and derive an estimate of the marginal change in the probability of being a KiwiSaver member.

In the case of a continuous dependant variable the models are estimated using either Ordinary Least Squares, or where appropriate, a Heckman selection procedure.

In order to hold constant as many factors as possible, each regression contains an extensive set of conditioning variables. While the exact number of conditioning variables varies with the particular question being addressed the overall set of variables used is listed in the Appendix. These include age, gender, income, wealth, number of children, labour force status, occupation, ethnicity, home-ownership, risk attitude, NZS main source of retirement income, self-assessed health status, marital status, education, year joined KiwiSaver and the experience of traumatic event(s). Importantly KiwiSaver membership is also included where appropriate. In general, when presenting the results of regression analysis we have restricted the tables to include only those variables which are statistically significant.

4   Results

This section summarises the findings of the analyses which sought to address the following key areas: which factors are associated with membership; whether the respondent had undertaken any financial planning and whether one chose to opt-in or opt-out of the scheme. Of central interest is the extent to which the contributions to KiwiSaver represent additional savings rather than simply a substitution from other forms of saving or debt reduction.

Respondents were asked whether they expected to experience a change in living standards in retirement. In addition, they were asked to estimate the income they expected to have in retirement as well as the level of income they would need in order to meet their basic needs or to be comfortable respectively. This information was then used to construct measures of any shortfall with respect to their expected retirement income. These estimates are presented together with factors associated with the magnitude of the shortfall. The section concludes with an assessment of the effectiveness of the scheme (in relation to its stated purpose) and the possible impact on national saving.

4.1   KiwiSaver membership

In seeking to understand KiwiSaver's impact and its effectiveness in reaching the target population, it is necessary to examine the characteristics of those who joined the scheme and those who chose not to. We posed the question: what factors most influenced the probability that a person would be a KiwiSaver member? This was addressed by estimating a logit model in which the dependent variable (membership status) was coded 1 if the respondent was a member and 0 otherwise. A summary of the results for those variables having a statistically significant effect is given in Table 1.

The results are presented as marginal changes in the probability that an individual is a member of KiwiSaver. The overall probability of being a KiwiSaver member is found from the weighted numbers in the sample. There were 318 KiwiSaver members out of a total of 825 respondents, implying the overall probability of being a KiwiSaver member was 38.5% (= 318*100/825).

The results in the table are interpreted as follows: the probability of those who do not expect NZS to be their main source of income being KiwiSaver members, for example, is 33% (found in the column headed "Initially"). Holding all other factors constant at their mean values, the probability of being a KiwiSaver member given the individual does expect NZS to be their main source of income is 48% (found in the column headed "After the change"). The difference between these two probabilities is therefore the marginal effect of expecting NZS to be the main source of retirement income, which in this particular case is 15% (found in the column headed "Marginal effect"). Alternatively stated, a typical individual is 15 percentage points more likely to be a KiwiSaver member if they expect NZS to be their main source of retirement income.

A legitimate question is whether or not the direction of causation could be reversed; that is, being a KiwiSaver member "causes" the respondent to expect that New Zealand superannuation would be their main source of income. However, this seems unlikely given that, if anything, one would hope that those in KiwiSaver would no longer need to rely so heavily on NZS as their main source of income in retirement. If this were the case

we would expect to see a negative association between KiwiSaver membership and reliance on NZS in contrast to the positive association shown in Table 1.

Table 1: Factors that influence the probability of being a KiwiSaver member (%)

Variable	Probability of being a KiwiSaver member (%)		
	Initially	After the change	Marginal effect (percentage points)
Other ethnicity[3]	35	52	+17
Expect NZS to be main income source	33	48	+15
Employed part-time	39	51	+12
Age	37	25	(-13)
Age squared	37	56	(19)
Net effect of age (5-year increase)			+6
Self employed	39	26	-13
Has a partner	48	32	-15
Other occupations[4]	43	22	-21

Notes:

1. Based on the entire sample: number of observations = 825.
2. The relationship with age is nonlinear; the results shown apply to a 5year increase in age from the mean age of 40.2 years.
3. Refers to those not identified as NZ European, Maori, Asian or Pacific Island, comprising 11.4% of the sample.
4. Refers to those not classified as professionals, managers, technicians and trade workers, community and personal service workers, clerical and administrative workers, sales workers, machinery operators and drivers, or labourers, comprising 10.8% of the sample.
5. Only variables whose coefficients were statistically significant at least at the 10% level are listed in the table.

The last column of Table 1 indicates those factors that increase the likelihood of KiwiSaver membership (values bearing a + sign) or decrease the probability (indicated by a – sign). One of the most significant factors, belonging to the "other ethnicities" has a major effect, but applies to only a small share of the sample (11.4%). Likewise being classified as "other occupations" reduces the probability of being a KiwiSaver member but again this result, while statistically significant applies only to 10.8% of the sample.

Those employed part-time relative to full-time were more likely to have joined KiwiSaver, and the probability of joining increased modestly with age. Those with a partner, relative to un-partnered, and those self-employed relative to full-time employed were less likely to be KiwiSaver members.

4.2   Financial planning for retirement

The KiwiSaver Act 2006 includes as a purpose the encouragement of a long-term savings habit. One dimension of developing these long-term habits might be undertaking some financial planning. Respondents aged 25 and over were asked about the extent to which they had thought about financial planning for retirement. Those answering "a lot" or "a fair amount" were grouped together in contrast to others who responded "a little" or "not at all". Respondents were more likely to have thought about financial planning for their retirement if they were a KiwiSaver member (see Table 2). Interpreting this finding raises again the question of causality: was joining KiwiSaver a result of having done some financial planning for retirement, or was it the case that KiwiSaver members, having joined, were stimulated to undertake some financial planning? Without further tests, we can only conclude that there is an association

between membership and the extent of financial planning, but the direction of the effect is unclear.

Females who are not partnered are significantly more likely to have thought about financial planning for retirement; in contrast, partnered females were less likely to have engaged in retirement planning. These differences highlight the need for detailed analysis, as in this case the combined model (pooling partnered and non-partnered respondents) showed no significant effect for females. Older non-partnered respondents were more likely to have engaged in financial planning.

Table 2: Factors that change the probability that a person aged 25 and over will have thought about financial planning for retirement

Variable	Direction and significance		
	Partnered	Not partnered	Both
Number of observations	469	218	687
Respondent is a KiwiSaver member	ns	++	+
Respondent is female	-	++	ns
Age	ns	++	ns
Good health	--	--	--
Fair health	ns	---	-
Poor health	--	--	---
Expect NZS to be main income source	--	ns	--

Notes:

1. Only variables that were statistically significant for at least one sub-group are shown.
2. Sample restricted to those 25 years old and over.
3. +++ or --- significant at the 1% level; ++ or -- significant at the 5% level; + or - significant at the 10% level.
4. ns = not significant.

Two factors significantly reduced the likelihood of having undertaken some financial planning for retirement: health and the role of NZS in retirement income. Respondents were asked for a self-assessment of their health status. They were asked to select one of the following five categories: Excellent; Very good; Good; Fair or Poor. Overall, those whose self-assessment rating was below very good were significantly less likely to have engaged in financial planning for retirement. It is possible that those in poorer health may have at least subconsciously felt they had lower life expectancy as a result and therefore less need for financial planning (recalling that the result comes after allowing for the effect of income and wealth and a large number of other variables that might have confounded the association).

The second factor concerns the expectation regarding NZS as the main source of income in retirement. Those who expect NZS to be their main source are significantly less likely to have engaged in financial planning for retirement. This result is consistent with the proposition that those relying principally on NZS anticipate holding few other retirement assets, and are unlikely to be planning to save more. As a consequence they have little or no incentive to engage in retirement planning as long as they continue to expect that they will receive NZS under its current terms.

4.3   Method of enrolment

Respondents who were members could have become so by one of two routes: they would have been automatically enrolled if they had started a new job or alternatively they could have opted in, either through their employer or directly through a KiwiSaver provider. In this section we explore the factors associated with the decision to opt-in as distinct from auto-enrolment. The results are in the first column of Table 3.

In relation to the decision to opt in as distinct from being auto-enrolled, respondents were more likely to have opted in if they owned their own house, had higher net wealth or expected NZS to be their main source of income in retirement. Respondents were less likely to have opted in if they were employed part time, or had higher income.

The second column of results indicates factors that significantly affected the probability that having been enrolled, a KiwiSaver member would opt out. All automatically enrolled members had the option of opting out after two weeks and before eight weeks. In interpreting these results, it is important to underline the fact that the underlying regressions for opt-in and opt-out refer to two distinct populations. The opt-in group are those, who not having been automatically enrolled, took an active decision to voluntarily join the scheme. In contrast, those who are opting out come from the group who were automatically enrolled.

Respondents were more likely to have opted out rather than remaining in (having been automatically enrolled), if they were partnered. In contrast, they were less likely to have opted out, if they expected NZS to be the main source of income in retirement, were unemployed at the time of the survey, had higher income, or were older.

Table 3: Factors that change the probability that a person would have opted in or opted out of KiwiSaver membership

	Direction and significance	
Variable	Opt in	Opt out
Number of observations	474	526
Owns house	+	ns
Net Wealth	+	ns
Expect NZS to be main source	++	-
Has a partner	ns	+
Respondent income	-	--
Respondent employed part time	-	ns
Age	ns	--
Respondent is unemployed	ns	-

Notes:

1. Only variables that were statistically significant for at least one sub-group are shown.
2. +++ or --- significant at the 1% level; ++ or -- significant at the 5% level; + or - significant at the 10% level.
3. ns = not significant.

4.4 Alternative use of funds now going to KiwiSaver (additionality)

KiwiSaver was designed as a mechanism to foster increased individual savings and greater preparedness for retirement. However, experience with subsidised schemes such as KiwiSaver indicates that while some additional savings may be achieved there is inevitably a degree of substitution that occurs, as individuals switch their saving from non-subsidised to subsidised forms. One measure of the success of KiwiSaver therefore will be the extent to which KiwiSaver membership is associated with additional savings, as distinct from members simply having diverted funds from other savings vehicles or debt reduction. The analysis that follows is based on a question that asked respondents how the contributions they were making currently to KiwiSaver would have been used in the absence of the scheme.

Each respondent was given 10 points to allocate across various categories, some of which related to saving and debt reduction, while others related to consumption. The averages shown in the last column of Table 4 refer to the mean score across all individuals reporting an allocation to a particular category. For example, when asked how many of their 10 points they would have allocated to spending on daily activities and normal outgoings in the absence of the scheme, on average respondents used 3.58 of their 10 points on this item.

Table 4: Alternative uses of KiwiSaver contributions

Use of funds, had the respondent not joined KiwiSaver		Score[1]		
		Not home owner	Home owners	Overall
Would have been spent on consumption	Spend on daily activities and normal outgoings	4.36	2.87	3.58
	Other[2]	0.08	0.07	0.07
	Sub-total	*4.44*	*2.94*	*3.64*
Would have been saved or used to reduce debt	Superannuation scheme	0.73	0.96	0.85
	Other saving or investment for retirement	1.46	2.20	1.85
	Saving or investment other than for retirement	1.73	0.89	1.29
	Pay off mortgage or other debt	1.64	3.01	2.36
	Sub-total	*5.56*	*7.06*	*6.36*
	Total	10.00	10.00	10.00

Notes:

1. Based on 503 observations and using sample weights; 18 missing observations have been excluded. Note that the number of observations is greater than the total number of respondents who were KiwiSaver members as the "additionality" question was asked of respondents who were either members themselves, or whose partner was a member, on the basis that financial decisions tend to be made at the level of the economic family unit. The total score adds to 10 in all cases as each respondent was asked to allocate 10 points across the stated categories.
2. 'Other' has been assigned to consumption in the absence of any further information.

KiwiSaver members report that on average they would have applied 64% of the money they are now contributing to KiwiSaver to other forms of saving and/or debt reduction. In other words 64% of the money in KiwiSaver represents on average a substitution from funds that would have already been applied to savings or debt reduction in the absence of the scheme. The remaining 36% is, on average, money that would have otherwise been consumed (see Table 4, last column). It is possible that as a result of raising the level of awareness about the need for retirement savings, respondents would in general now consume less and save more, thus causing us to underestimate the additional

saving due to KiwiSaver. However, the survey provides no basis for evaluating this possibility.

Gibson and Le (2008) provided an early estimate of additionality based on a nationwide survey carried out a few months after the introduction of KiwiSaver. They estimated that only between 9% and 19% of KiwiSaver balances represented new saving by members, with the remaining balances being either existing saving or debt reduction that had been shifted into KiwiSaver, or government and employer transfers. However, a more comparable figure to our 36% estimate is the ratio of additional member saving to total member saving. Gibson and Le estimated this additionality measure to be between 23% and 48%; the midpoint of this range is 36%, corresponding precisely to the estimate from the present analysis.

It is of interest to enquire about estimates of additionality from other countries. While there have been numerous studies for the United States,[10] the institutional, regulatory and tax contexts differ significantly from those prevailing in New Zealand, limiting the value of such comparisons. While there are still some very important differences, comparisons with Australia are arguably somewhat more relevant. In an early study, Morling (1995) obtained an estimate of additionality of 26 cents in the dollar, a result close to the estimate in this study. Connolly (2003) estimated an additionality of 62 cents in the dollar for the Australian compulsory superannuation scheme, and in a more recent study Connolly (2007) estimated that the scheme had increased retirement savings by the equivalent of an additional two years of retirement consumption.[11]

The extent to which KiwiSaver contributions would otherwise have been saved, including through debt reduction, may well be different for those who own a home. Some homeowners will be repaying mortgages, and for many, reducing mortgage debt gives the highest and surest return to saving.

To examine the effect of home ownership, the respondents were grouped into two categories: those owning and those not owning a home. Table 4 shows that homeowners on average would have allocated around 15 percentage points more of their contributions to other forms of saving or paying down debt than non-homeowners in the absence of KiwiSaver (7.06 versus 5.56). It is interesting that this difference is not solely due to mortgage repayment. Homeowners would have also allocated more of their contributions to both superannuation schemes and other savings or investments for retirement than non-homeowners. This pattern may result both because homeowners with a mortgage may have been motivated to reduce debt, while those who are mortgage-free might be at the stage of making greater provision for retirement.

To examine the distribution of saving, respondents were then assigned a score between 0 and 10 representing the sum of the points they allocated to the saving and debt reduction categories listed in Table 4, or in other words, the extent to which their KiwiSaver contributions are substitutes for other forms of saving. For example, a respondent who allocated one of their 10 points to spending on daily activities, another three to a superannuation scheme and six points to debt repayment would have been assigned a value of 9 (= 3 + 6). In contrast, had all of their KiwiSaver contributions come from current consumption, they would have been assigned a score of zero.

The results are summarised in Table 5. For the total sample, 47% of the respondents had a score of 8 or higher (indicating high levels of substitution). Amongst the group not

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[10] See Toder (2006).

[11] For a discussion of the Australian scheme and implications for New Zealand, see Guest (2010)

owning their home this share was 36% while for home-owners it was 57%. Over 40% of home owners would have saved the entire amount compared to only 20% of non-home owners. In fact, 10 (ie, all contributions would have been saved) was the most prevalent score amongst both homeowners and non-homeowners.

It appears that home ownership does have an important bearing on the extent of saving. However, the results in Table 5 do not control for other factors which might influence individual saving behaviours. One cannot claim unequivocally that home ownership matters until other factors are accounted for.

Table 5: Extent to which KiwiSaver members would have saved their contributions to KiwiSaver in the absence of the scheme

Extent of saving (saving score)	Those who own house		Do not own house		Total	
	%	Cumulative	%	Cumulative	%	Cumulative
0 (none)	12.6	12.6	17.2	17.2	14.9	14.9
1	0.0	12.6	1.4	18.6	0.7	15.6
2	2.7	15.3	5.7	24.3	4.2	19.8
3	4.3	19.6	4.9	29.2	4.6	24.4
4	4.2	23.8	4.8	34.0	4.5	28.9
5	8.2	32.0	14.1	48.2	11.2	40.1
6	4.0	36.0	8.7	56.9	6.4	46.5
7	6.7	42.7	7.4	64.3	7.1	53.6
8	10.1	52.8	11.1	75.4	10.6	64.1
9	6.8	59.5	4.2	79.6	5.5	69.6
10 (maximum ie, 100%)	40.5	100.0	20.4	100.0	30.4	100.0
Total	100.0		100.0		100.0	

Note:

A score of zero corresponds to those KiwiSaver members who indicated all of their contributions would have been spent on daily activities and normal outgoings, had they not been in KiwiSaver. At the other end of the scale corresponding to a score of 10, are those present KiwiSaver members who indicated that all of their contributions would have been invested in some form of saving (both retirement and other types) and/or used to pay of mortgage or other debt.

To allow for this, a regression model was estimated in which the dependent variable was the saving score and the explanatory variables a full set of factors drawn from the survey (age, gender, region, marital status, occupation, education, etc.). The results indicated that those owning their own home would have saved 12 percentage points more of their KiwiSaver contributions than non-homeowners in the absence of the scheme. For example, consider the case of two respondents with similar characteristics. The first, who does not own their own home, may have had a saving score of 6. Our model on average predicts that the second respondent, who did own their own home, would have had a saving score of 7.2.

In addition, respondents with higher levels of education would also have saved 4 percentage points more of their contributions for every additional year of education. In contrast, those in part-time employment as opposed to full-time employment tended to spend more of their contributions (12 percentage points more), as did females as opposed to males (7 percentage points more).

Finally, we examine the factors that are associated with a greater or lesser likelihood that the funds contributed to KiwiSaver would have been used specifically for retirement in the absence of the scheme. The results, summarised in Table 6 relate solely to saving

for retirement as distinct from debt reduction or saving for other purposes. In this sense, it is a somewhat less useful measure of additionality, as saving or debt reduction in forms other than specific retirement saving (for example, paying off a mortgage) will improve retirement outcomes. In Part A of Table 6, the sample includes all respondents who were either KiwiSaver members themselves, and/or had a partner who was a KiwiSaver member. Willingness to accept risk tends to raise the probability that such a household would have saved the funds specifically for retirement, had they not been in KiwiSaver. In contrast, having more children, expecting NZS to be the main source of income in retirement and being in poor health reduce the likelihood that a respondent would otherwise have saved the contributions to KiwiSaver specifically for retirement.

Table 6: Factors that change the probability that a KiwiSaver member would have set money aside specifically for retirement had they not joined KiwiSaver

Variable	Unit change	Initially	After the change	Marginal Effect (percentage points)
A. If the respondent and/or the respondent's partner was a KiwiSaver member				
Willing to accept higher risk	1	59	71	+12
Number of children	2	64	46	-18
Expect NZS to be main source	1	70	53	-18
Poor health	1	62	16	-47
(Home ownership)	1	58	69	(+11)
B. If the respondent is a KiwiSaver member				
Other occupation	1	55	82	+28
Combined years of schooling	3	63	73	+9
Female	1	69	57	-12
Expect NZS to be main source	1	71	50	-22

Notes:

1. In the case of categorical variables such as gender, a unit change implies for example changing states from male to female. In the case of continuous variables, for example, years of schooling, the unit change refers to the increase in that variable used to estimate its marginal effect.
2. Only variables that were statistically significant at the 10% level or better are shown. The exception is home-ownership which was significant at the 16% level (ie, there is an 84% probability that this result did not arise by chance).

The effect of home ownership is marginally significant by the usual statistical norms. The effect is positive, making it more likely homeowners would save specifically for retirement were they not KiwiSaver members. Had debt repayment been a major alternative we might well have expected that the likelihood of saving for retirement would have been lower.

When the sample was restricted to those respondents who themselves were KiwiSaver members, females had a lower probability they would otherwise have saved specifically for retirement had they not joined KiwiSaver, as did those expecting NZS to be their main retirement income source.

4.5   Expected changes in standard of living

The KiwiSaver Act sets out the goal of KiwiSaver to assist members smooth their pre- and post-retirement living standards and to reduce the likelihood that individuals would

experience a significant decline in their living standards once retired. In order to test this, respondents were asked whether they expected their standard of living in retirement to improve, stay the same or decline (along with a number of measures of expected and required income which are discussed further in Section 4.6 below). When asked about expected changes in living standards, respondents were not given any guidance as to "relative to what." However, it would appear that the majority would have made the implicit comparison based on their current living standards.

A logistic regression model was estimated in which the dichotomous dependent variable was set equal to one if the respondent felt their living standards would stay the same or improve (relative to their pre-retirement state) or zero (for those who expected a decline in living standards).[12] The results are summarised in Table 7.

Factors which increased the expectation that the standard of living will improve or stay the same included: having part-time employment or being self-employed (relative to full-time employment), being willing to tolerate higher risk, and being in the labourer occupational class.

In contrast, respondents whose self-assessed health rating was less than excellent were less likely to expect their living standards to remain the same or improve. In addition, those who expected NZS to be their main source of income were less likely to expect a similar or improved standard of living in retirement.

Importantly, KiwiSaver membership was of course included in this regression as an explanatory variable. However, it was not found to be statistically significant. In other words, all else equal, KiwiSaver membership was not found to increase the likelihood of experiencing similar or improved living standards in retirement compared to those in pre-retirement.

Table 7: Factors that are associated with expecting to have a standard of living in retirement that is the same or better than pre-retirement

Variable	Direction and significance
Respondent is employed part-time	+++
Respondent is self-employed	++
Willing to accept higher risk	+
Labourer	+
Very good health	--
Good health	--
Fair health	-
Expect NZS to be main source	-

Notes:

1. Only variables that were statistically significant are shown.
2. Sample restricted to those 25-years-old and over and able to specify an expected retirement age: number of observations = 564
3. +++ or --- significant at the 1% level; ++ or -- significant at the 5% level; + or- significant at the 10% level.

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12   The categories were: increase a lot, increase somewhat, stay the same, decrease somewhat, decrease a lot (and 3% of respondents who answered "don't know").

4.6   Adequacy of income in retirement

This section explores respondents' expectations about their retirement incomes and the level of income they would require to meet their basic needs in retirement and to live comfortably in retirement. The analysis centres on three questions:

(a) how adequate do respondents expect their retirement income to be?

(b) how many respondents expected to have a shortfall with respect to basic needs and with respect to being comfortable? and

(c) what was the extent of the shortfall?

Respondents were first asked if they had thought about financial planning for retirement. Those answering "not at all," "don't know" or refused to answer were not questioned further about their retirement income expectations and are therefore excluded from the following analysis.

Adequacy of retirement income has to be measured against some reference point. The survey specified two such points. The first was based on asking respondents for an estimate of the income they would need "to have just enough to live on." The second asked for an estimate of the income needed "to live comfortably in retirement." The results for both cases are summarised in Table 8.

Respondents were left to self-define what the requirements are for basic and comfortable living and therefore the responses provided will reflect differing sets of expectations as to what is necessary. Additionally, respondents were asked to provide economic family unit-based estimates; that is, if the respondent was partnered at the time of the survey, they were asked to provide figures for the totals required for both themselves and their partner and if the respondent was un-partnered, they were asked to provide figures for themselves only. In order to make figures for partnered and non-partnered respondents comparable, the responses of those who were partnered were multiplied by 60%.

Table 8: Summary of key measures for retirement income adequacy

Variable	Lower Quartile	Median	Upper Quartile
Expected income in retirement ($)	25,000	35,000	54,000
Retirement income needed to meet needs ($)	21,000	33,000	45,000
Retirement income needed to feel comfortable ($)	29,600	45,000	55,000

Note:

    All dollar values refer to annual incomes.

At each of the three points we examine across the distributions (the lower quartile, median, and upper quartile) income needed to meet basic needs is below the expected retirement income.   However income needed for living comfortably in retirement exceeded the income expected in retirement in each case. The minimum level of income expected in retirement was $1,800 by a person who apparently discounted any chance of receiving NZS.

We now consider the extent of any shortfall in expected retirement incomes. Clearly there will be a distribution with some individuals expecting to have an income in excess of the amount they feel they would need either for meeting basic living standards or

being comfortable; and there will be another group whose expected incomes in retirement would fall short of one or both of the adequacy targets (see Table 9).

Table 9: Extent and size of any shortfall or excess in expected retirement incomes

	Variable	With respect to amount needed to meet basic needs			With respect to amount needed to be comfortable		
		KiwiSaver	Non-KiwiSaver	Combined	KiwiSaver	Non-KiwiSaver	Combined
Those reporting a shortfall in expected retirement income	Share of total (%)	8	14	22	23	27	50
	Mean shortfall ($)	-9,900	-14,100	-12,600	-13,900	-16,200	-15,100
	Median shortfall ($)	-6,000	-10,000	-6,800	-12,000	-12,000	-12,000
	Average income ($)	42,000	37,900	39,400	46,200	45,200	45,700
Those reporting an excess of expected retirement income	Share of total (%)	33	45	78	17	33	50
	Mean excess ($)	+9,200	+12,000	+10,800	+6,100	+4,700	+5,200
	Median excess ($)	+5,200	+9,000	+6,000	0	0	0
	Average income ($)	52,100	56,300	54,500	55,000	57,200	56,400

Note:

The respondents included in this analysis are those aged 25 and over, and who had given some thought to financial planning for retirement. 18% of those over 25 were excluded because they had not thought at all about retirement planning.

With respect to the basic needs threshold, 78% of respondents provided estimates that indicated their income would exceed the amount needed to cover basic needs. This proportion was similarly high for both KiwiSaver members (80%) and non-members (76%).

Of those reporting a shortfall with respect to basic needs, only about a third were KiwiSaver members and their mean shortfall was $9,900 compared to the larger mean expected shortfall of $14,100 reported by the non-KiwiSaver members. It is possible that these non-KiwiSaver members are planning to increase their savings at a later date, rely on an inheritance or simply accept a lower standard of living. However their current mean income was below that of KiwiSaver members: $37,900 compared to $42,000.

Among those expecting a "excess" with respect to basic needs, about 40% were members of the KiwiSaver scheme. The non-members reported a larger expected surplus than members ($12,000 versus $9,200).

Up to this point, factors other than KiwiSaver, which might affect the various measures of retirement income shortfalls/excesses, have not been controlled for. It is of course important to do so in order to guard against the possibility of detecting spurious relationships. This is done in the following section, where we utilize a Heckman selection model, a procedure specifically designed to control for any sample selection bias that may result from survey routing.

4.7 Factors that influence the extent of an expected shortfall in retirement income

In the previous section an estimate was made of the difference between the income a respondent expected to have and that which they felt they would need to either cover their basic living costs or alternatively live comfortably in retirement. Clearly, some respondents will report a shortfall and others a "surplus." Furthermore, a respondent may feel their expected income to be more than adequate to meet basic needs (that is,

an excess), while estimating that with respect to the amount needed to live comfortably they would experience an expected shortfall.

In this section, a regression model is estimated in order to identify those factors associated with the size of any differences (either positive or negative) between respondents expected income and that which is required. Separate equations were fitted for the basic needs and comfortable cases.

In generating observations of the expected shortfall in retirement incomes, respondents had to satisfy three conditions: namely: (a) be 25-years-old and over; (b) had thought at least a little about financial planning for retirement; and (c) were able to give an estimate of their expected income in retirement. From the total sample of 825 observations, 696 were aged 25 and over; of these 573 had done some financial planning; and of these 367 could provide an estimate of their expected retirement income.[13]

In this case, standard regression techniques may result in biased coefficient estimates. Therefore, we instead utilize a Heckman selection model, a procedure specifically designed to control for any sample selection bias that may result from survey routing of the type described above.

The Heckman procedure involves first estimating a "participation equation" involving all 825 survey respondents. In this case, a probit regression was estimated in which the dependent variable assumed a value of one if the three conditions specified above were satisfied, and zero otherwise. This is then used to calculate an adjustment factor known as the inverse Mills ratio that is included in the second-stage regression, in which the size of the expected shortfall (a continuous dependent variable) is estimated.[14] In each stage, the explanatory variables were the large set of independent variables used throughout this study.[15] The results of the second stage regression are summarised in Table 10.

Amongst the standard explanatory variables (eg, age, gender, income, etc.) used throughout this analysis, KiwiSaver membership status is included in an effort to determine whether, and the extent to which, KiwiSaver membership is a factor that explains an expected shortfall or surplus in retirement income.

Consider first the results in the block headed "with respect to basic needs." Two factors significantly reduced the expected shortfall or increased the excess of expected retirement income relative to that required; these were income and labour force status. Those with higher incomes, other factors equal, were likely to have a smaller shortfall or larger excess. For every $1,000 of extra income, the gap was reduced by $105, indicating a modest but statistically significant effect. Relative to those in fulltime employment, those respondents who were self-employed, unemployed or not in the labour force had expected shortfalls some $10,000 less (or excess of $10,000 more). This could well represent the fact that expectations of retirement income of those not in full-time employment were much more closely matched to their living costs, albeit at more modest levels. Alternatively, particularly in the case of those not in the labour force, this

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[13] These numbers refer to weighted estimates; see Figure 4.

[14] Full Maximum Likelihood estimation was actually used here, where both stages are estimated simultaneously. However, the discussion above more closely matches Heckman's two-step procedure, being somewhat easier and more intuitive to explain.

[15] To satisfy exclusion restrictions a number of variables relating to occupational class were omitted from the selection equation. Also, in the participation equation, the number of years respondents expected to be in retirement was included, whereas in the second stage, this variable was replaced with the expected age of retirement.

could represent an active choice, given they already have significant wealth or are matched with a high-wealth partner.

Table 10: Factors that significantly change the expected shortfall or excess in retirement income

| | | Expected shortfall in retirement income | | | |
| Variable | Unit change | With respect to needs | | With respect to comfortable | |
		Change	Significance	Change	Significance
A.	Factors that significantly decrease the expected shortfall or increase the excess				
Respondent income	$1,000	+$105	+++	+$75	++
Self-employed[4]	1	+$10,200	+++	+$4,100	+
Unemployed[4]	1	+$8,900	++		ns
Part-time employment[4]	1		ns	+$7,000	+
Not in the labour force[4]	1	+$10,800	+		ns
Asian[5]	1		ns	+$330	+
B.	Factors that significantly increase the expected shortfall or decrease the excess				
Female[6]	1		ns	-$3,500	(-)[9]
Own house[7]	1		ns	-$4,800	-
Maori[5]	1		ns	-$220	-
Very good health[8]	1		ns	-$3,900	--
Fair health[8]	1		ns	-$11,600	--

Notes:

1. Only variables that were statistically significant for at least one sub-group are shown. Dollar values preceded by a (+) indicate that increasing the associated variable reduces the expected shortfall or increases the excess.
2. +++ or --- significant at the 1% level; ++ or -- significant at the 5% level; + or - significant at the 10% level.
3. ns = not significant.
4. Relative to full-time employment.
5. Relative to New Zealand European.
6. Relative to male.
7. Relative to non-owners.
8. Relative to excellent health.
9. Significant at the 11% probability level.

The second block of results examines the factors that are associated with the relation between expected income and the amount needed for living comfortably. Again income (with a modest effect) and labour force status are associated with a lower shortfall (or greater excess). In this case, however, there is an additional set of significant variables associated with a greater shortfall (or reduced excess). Females are shown to have a shortfall some $3,500 greater than that for males; Maori a shortfall $220 more than Europeans; and those reporting less than excellent health have a significantly increased shortfall.

The health factor creates the largest effect, with those reporting only fair health having a shortfall some $11,600 greater (or an excess smaller by this amount) relative to those reporting excellent health. This could reflect that those with inferior health expect higher medical costs in retirement and hence the amount they perceive they would need for comfortable living, other things equal, would be commensurately greater. At the same time, their poorer health during their working life may impede their ability to accumulate

savings for retirement, as a result of reduced labour force participation. There is well documented evidence on the association of health and labour force participation (Enright and Scobie 2010, Holt 2010) and between wealth and health (Anastasiadis 2010, Carter, Blakely *et al* 2009). However, it is worth noting that this analysis has assumed that the self-assessed health rating provided by respondents which presumably was based on their state at the time of the survey interview, is a reasonable proxy for their expected health in retirement.

A possibly counter-intuitive outcome relates to home ownership. Typically it is thought that those owning a home enjoy a higher standard of living than those who are paying rent in retirement. However, the present finding is that home ownership is associated with a greater shortfall. This could arise if aspirations differ; for example, that home owners set a higher bar for the income they would need to live comfortably.

KiwiSaver membership was, of course, included as an explanatory variable. It was not, however, found to be statistically significant. In other words, all else equal, KiwiSaver membership was not found to improve expected retirement income outcomes; that is, KiwiSaver membership was associated with neither reduced expected shortfalls nor increased excesses of retirement income over the amount respondents required either to meet their basic needs or to be comfortable. This result is robust to any selection bias that may have resulted owing to survey routing and is an important point to bear in mind when considering the results in the following section.

4.8 Effectiveness of KiwiSaver in addressing the target population

In this section, we explore the effectiveness of the KiwiSaver scheme in reaching the target population as stated in the purpose of the Act: namely, KiwiSaver aims to enhance the savings for retirement of those individuals who would not otherwise be in a position to enjoy standards of living in retirement comparable to those in pre-retirement; that is, how effective is KiwiSaver in reaching this group? In addition we estimate the extent of the "leakage," that is, the number of KiwiSaver members who are considered to fall outside the target group?

Figure 1 represents graphically the steps in identifying the target population as specified in the Act. As living standards are extremely difficult to measure, the target population is defined by two conditions which can be measured. It is those people eligible to join KiwiSaver who (a) had an expected shortfall in their retirement income relative to either basic needs or living comfortably; and (b) if they were to join KiwiSaver, would increase their savings significantly.

Figure 1: Identifying the target population
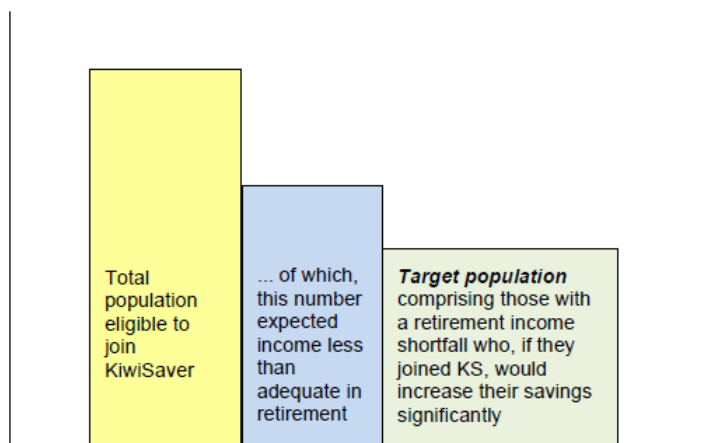
The survey does not give any indication of the additional amount that would be sufficient to close any gap, and ensure income in retirement was able to meet basic needs. Furthermore, meeting basic needs does not necessarily imply that post-retirement living standards would match their pre-retirement level.

The various components of pre- and post-retirement living standards are illustrated in Figure 2 for the case where the individual has a shortfall in their expected retirement income relative to both comfort and needs. Data from the survey provide estimates of areas labelled B, C and D. The expected basic needs gap is measured by C, while the expected gap relevant to a comfortable standard of living is given by C + D. Of course only a portion of survey respondents report an expected retirement income shortfall (see Table 9).

It should be noted that the Act refers to living standards not pre- and post-retirement incomes. It is possible that living standards which incorporate a range of non-monetary dimensions may well be comparable even if monetary income is lower. For example an individual may well place a high value on leisure time and this could more than compensate for a reduced monetary income. The standard rule of thumb for income replacement rates which are invariably less than 100% in part reflects the value that might be placed on non-monetary aspects, and the fact that some expenses associated with working are no longer needed in retirement.

Figure 2: Pre and post-retirement income
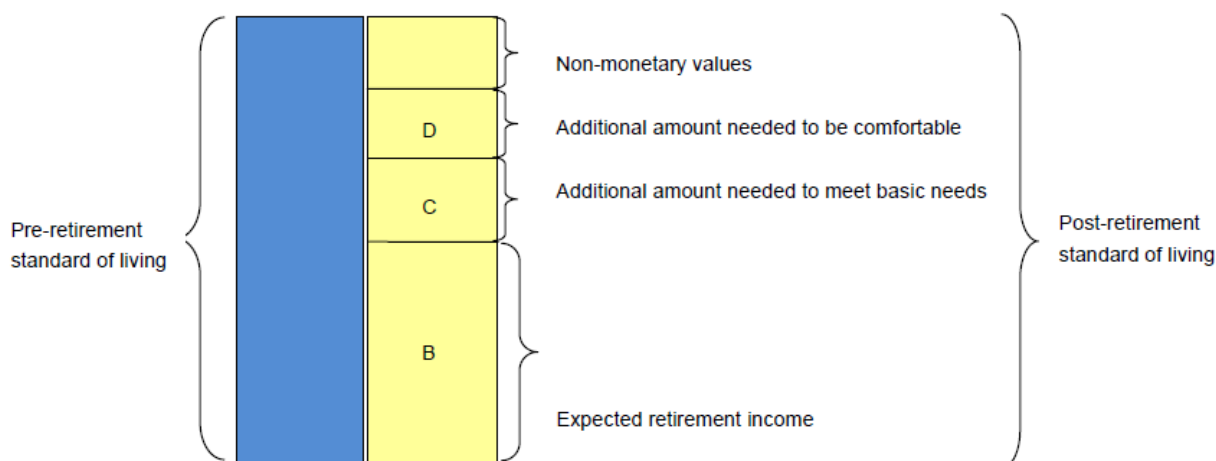
We construct two sets of measures relating to target effectiveness and leakage. The first refers only to one characteristic of the target population: that they have a shortfall in their expected retirement income. This can be visualised with reference to Figure 3 (page 23). In this case target effectiveness is defined as the number of KiwiSaver members who have a shortfall as a proportion of all those who have a shortfall (comprising both KiwiSaver and non-KiwiSaver members). This corresponds to the ratio $D/(D+F)$. The target effectiveness of the programme would be 100% if all those who reported an expected shortfall in retirement income relative to meeting basic needs were KiwiSaver members.

Leakage refers to those who are benefitting from KiwiSaver membership but who were not expecting a shortfall in retirement income. Again with reference to Figure 3, this corresponds to $1-(D/B)=(E/B)$. While it is possible that some of those KiwiSaver members who report no expected shortfall (Box E) may be doing so as a result of having joined KiwiSaver, Section 4.7 provides evidence to the contrary. That is, the results of regression analysis that included KiwiSaver membership as well as a large number of other conditioning variables likely to affect retirement income outcomes, all else equal, suggest that KiwiSaver membership does not improve expected retirement income outcomes. KiwiSaver membership was associated with neither reduced expected shortfalls nor increased excesses of retirement income over the amount respondents required either to meet their basic needs or to be comfortable. Therefore, we do not expect that this possibility will have a material impact on either our measures of target effectiveness or leakage.[16]

It is not possible to apply the stylised breakdown in Figure 3 to all survey respondents as a particular series of filters were applied to the questions in the survey related to expected retirement incomes. Specifically, the questions related to retirement income were directed only at those 25 years and older, who had undertaken some financial planning and who could provide estimates of expected retirement income. Again, recall from Section 4.7 that the results of a Heckman selection model (a procedure specifically designed to take account of potential bias resulting from sample selection issues such as these) found no relationship between KiwiSaver membership and improved retirement income outcomes. Therefore, it is unlikely that the survey routing described above will have a material impact either on our measures of target effectiveness or leakage.

Table 11 shows estimates of both target effectiveness and leakage based on the sub-group of respondents who were able to provide estimates of retirement income and the income they required to meet their basic needs or to be comfortable. The weighted sample counts required to make these calculations can be found in the blue section of Figure 4 (page 24). On the basis of needs, of all those with an expected shortfall, 37% were KiwiSaver members. Of the total KiwiSaver membership, 80% did not report having any expected shortfall. Both measures improve when the calculations are based on the income respondents expect to require in order to be comfortable in retirement.

Table 11: Targeting and leakage measures for KiwiSaver

	Based on needs	Based on being comfortable
Target effectiveness	37%	46%
Leakage	80%	43%

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[16] In future work we intend to explore this issue further by utilising Propensity Score Matching techniques, which would require some information prior to the introduction of KiwiSaver. Such data is expected to be available from the longitudinal Survey of Family, Income and Employment (SoFIE).

We now turn to a second set of measures for target effectiveness and leakage. It is not sufficient that an individual with an expected shortfall is a member of KiwiSaver for the programme to have been effective. It must also be the case that having joined KiwiSaver, the individual would have reduced their consumption spending thus making additional retirement savings over and above those they would have made, had they not joined KiwiSaver. The corollary is that, if they would have saved the funds specifically for retirement or in some other form of saving, then there would be no net additional savings. In this case, despite having a shortfall and being a KiwiSaver member, they would not be contributing to the effectiveness of the programme by making additional savings for retirement to close some of the expected gap in their retirement income.

These measures can again be visualised with reference to Figure 3. The target group is depicted as Box I. It captures those KiwiSaver members (Box B) who have a shortfall in expected retirement income (Box D) and who in the absence of KiwiSaver would have used their contributions for current consumption (Box I). Target effectiveness is then calculated as (I/D), conditional on being in KiwiSaver. Leakage is calculated as 1-(I/B)=(H+E)/B.

As before, it is not possible to apply the stylised breakdown in Figure 3 to all respondents due to routing. For the estimates presented in Table 12 we again rely on the weighted sample counts in the blue section of Figure 4. We also require some additional information; namely the weighted counts for those KiwiSaver members with expected retirement income gaps, who in the absence of KiwiSaver would have used a significant proportion of their contributions for current consumption. Setting this proportion at anything over 30% (that is, when at least 30% of an individual's KiwiSaver contributions represent new saving) yields weighted counts of 10 and 33 when the retirement income gaps are based on basic needs and being comfortable respectively.

Table 12: Targeting and leakage measures for KiwiSaver adjusted for savings behaviour

	Based on needs	Based on being comfortable
Target effectiveness	33%	46%
Leakage	93%	78%

The result of making the adjustment for savings behaviour is to reduce the targeting effectiveness and raise the leakage. These results suggest that based on these measures KiwiSaver has been only modestly successful in reaching the target audience stated in the Act, and a significant part of the "benefits" leak to individuals outside the target group. Indeed, our calculations based on basic needs suggest that for every member of the target population that is a member of KiwiSaver, another 14 members are not part of the target population (i.e. a total of 15). Similarly, this ratio based on being comfortable is 1:4.

Given the significant fiscal costs associated with KiwiSaver, the cost per member who belongs to the target population will likely be substantial. With the help of additional information from Inland Revenue, we can derive an estimate of this.

Projected membership by salary and wage earners for the 2011/12 year is around 945,000. Ongoing costs for this group in that year are projected to total around $823 million. ($670 million from member tax credits and a further $153 million from the employer superannuation contribution tax exemption). This means for each of these KiwiSaver members, the ongoing cost per year was around $870. The cost per member

from the target population based on basic needs is over $13,000 per year ($870*15) and based on being comfortable it is around $4,000 per year ($870*5). These estimates would be higher still if we were to include the costs of additional members such as children, together with the $1,000 kick-start contribution, the first-home deposit subsidies and administration costs incurred by Inland Revenue.

Figure 3: Measuring the effectiveness of KiwiSaver: A stylised framework

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                        ┌──────────────────────────────┐
                        │  A.  Total eligible population │
                        └──────────────────────────────┘
                ┌────────────────┴──────────────────────┐
      ┌──────────────────────┐            ┌──────────────────────────┐
      │  B. KiwiSaver members │            │  C. Non-KiwiSaver members │
      └──────────────────────┘            └──────────────────────────┘
         ┌────────┴────────┐                  ┌──────────┴──────────┐
   ┌──────────┐    ┌──────────┐         ┌──────────┐       ┌──────────┐
   │ D.       │    │ E.       │         │ F.       │       │ G.       │
   │ Have a   │    │ No       │         │ Have a   │       │ No       │
   │ shortfall│    │ expected │         │ shortfall│       │ expected │
   │ (gap) in │    │ shortfall│         │ (gap) in │       │ shortfall│
   │ expected │    │ in       │         │ expected │       │ in       │
   │ retirement│   │ expected │         │ retirement│      │ expected │
   │ income   │    │ retirement│        │ income   │       │ retirement│
   │          │    │ income   │         │          │       │ income   │
   └──────────┘    └──────────┘         └──────────┘       └──────────┘
     ┌────┴─────┐
 ┌──────────┐ ┌──────────┐
 │ H.       │ │ I.       │
 │ Would have│ │ Would have│
 │ used the │ │ used the │
 │ money for│ │ funds for│
 │ saving had│ │ consumption│
 │ they not │ │ had they not│
 │ joined   │ │ joined   │
 │ KiwiSaver│ │ KiwiSaver│
 └──────────┘ └──────────┘
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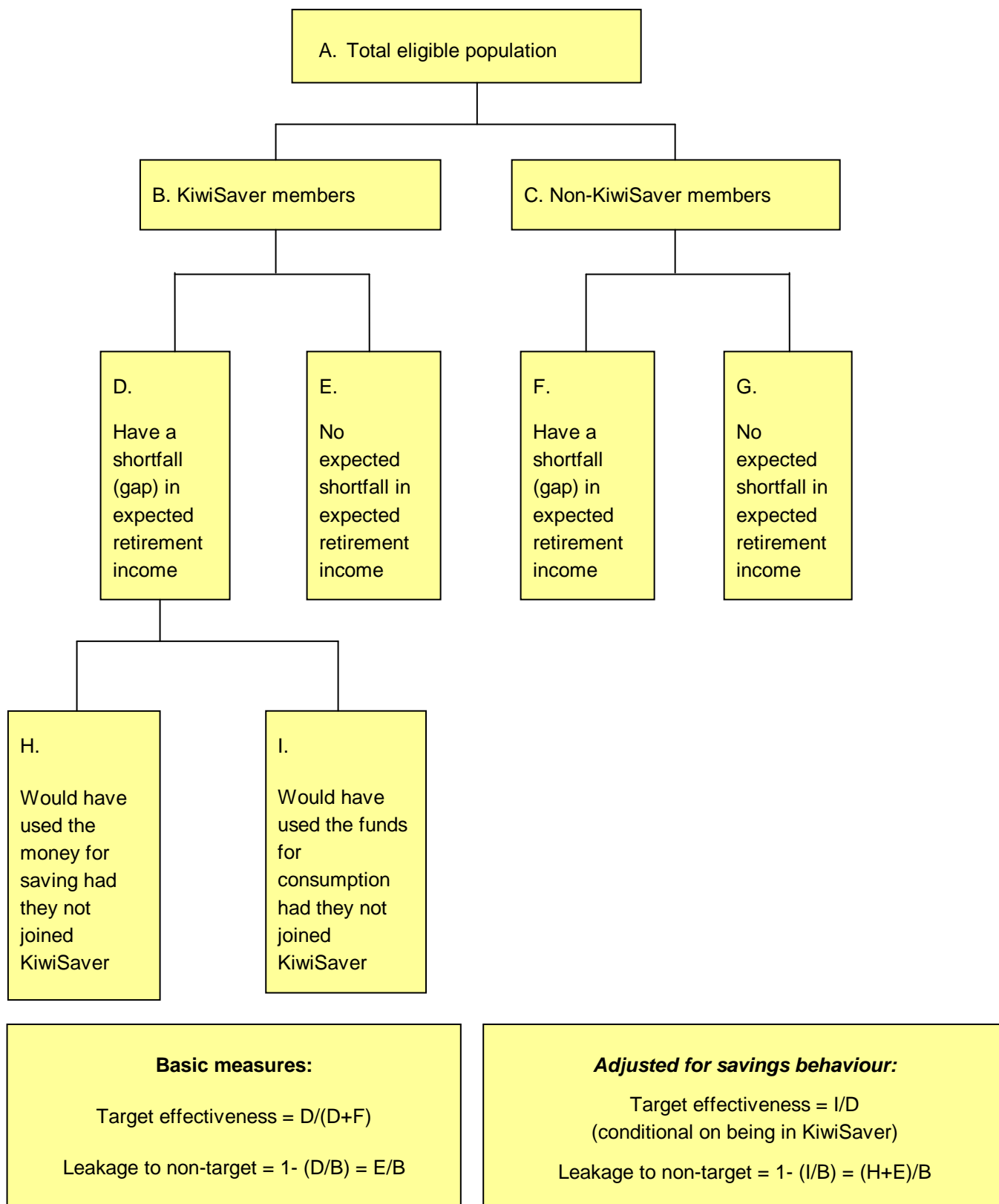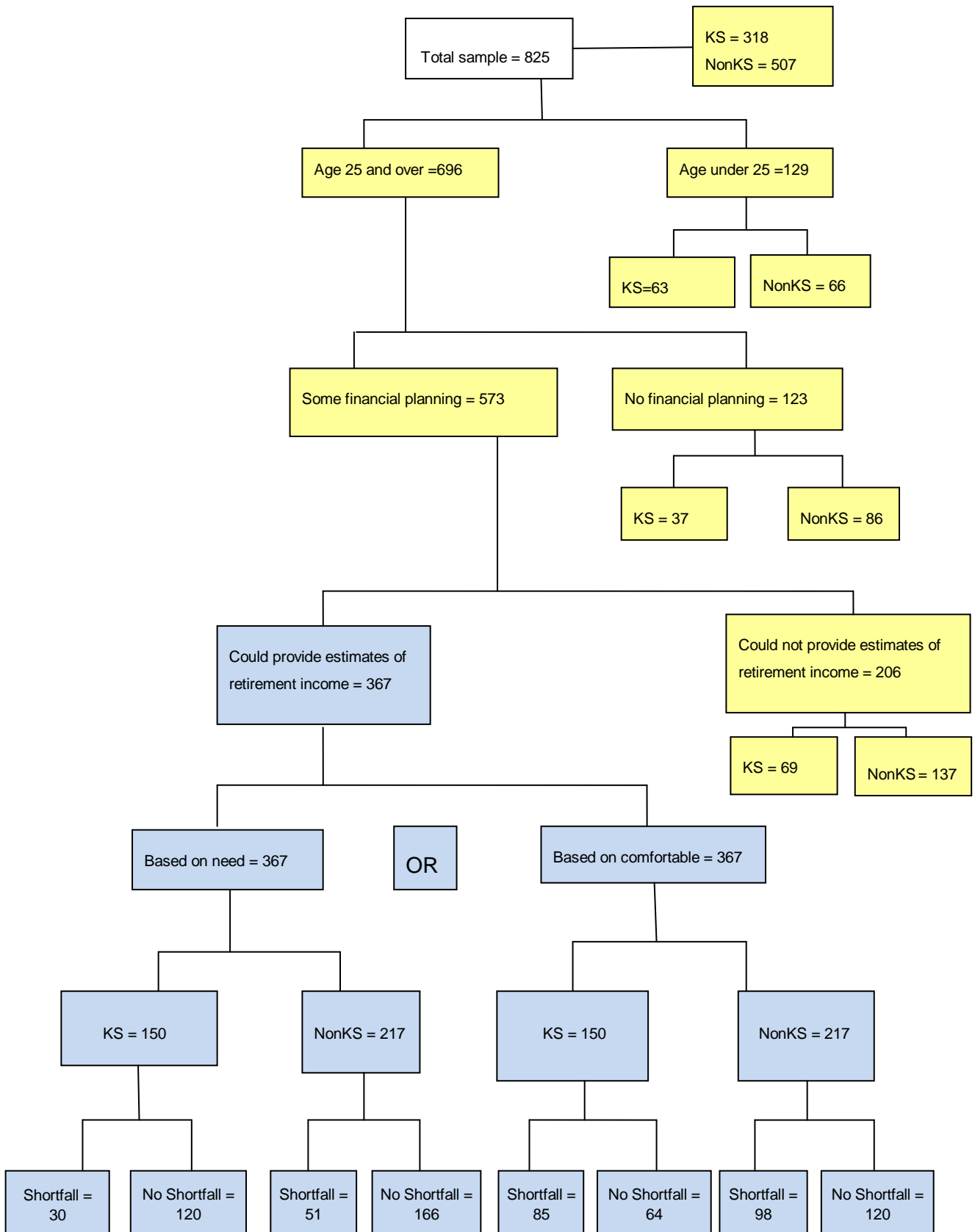| Basic measures:	Adjusted for savings behaviour:
Target effectiveness = D/(D+F)	Target effectiveness = I/D (conditional on being in KiwiSaver)
Leakage to non-target = 1- (D/B) = E/B	Leakage to non-target = 1- (I/B) = (H+E)/B

Figure 4: Breakdown of the sample: weighted numbers

4.9   Implications for national saving

In this section, we draw on the results of the survey and use them in a wider context to consider the implications for national savings.[17]

As shown in Table 4 of Section 4.4, the extent of additional saving by respondents in the survey was on average 36%. Clearly, those on low incomes have limited scope for substitution and their additionality would be expected to be much higher. Conversely, those on higher incomes would have additionality less than the average. As a result, the estimates for individuals need to be weighted by income to get an aggregate estimate of additionality.   As high-income individuals contribute a disproportionate share of total saving, weighting in this manner reduces aggregate additionality to 29%.[18]   In other words, each additional dollar a member allocates to their KiwiSaver account, results on average in a net increase in saving of 29 cents.

This figure applies to the contributions made by members. However, the total amount applied to a member's account in KiwiSaver is made up of their own contributions, plus those of their employer and finally direct taxpayer-funded contributions from the government.   It is therefore necessary to consider the extent of additionality that is associated with employer and government contributions.

At one extreme, an argument could be made that all of the contributions by employers and the government are pure net additions to a household's overall retirement accumulation. In the very short run, it is possible that this is in fact the case. However, for this to hold in the longer term would imply that people do not take into account their overall KiwiSaver balances when making decisions about their overall savings portfolio. This seems improbable, and would be inconsistent with the evidence that a significant number of people make no provision for retirement beyond the expectation of NZS. Furthermore, employer contributions are simply part of an overall remuneration package, and as wages and salaries will be commensurately lower when employers are making these payments to KiwiSaver, individuals will quickly realise that it is "their money" rather than a "gift" from employers that is being contributed.[19]   They may then view this in a similar light as their own direct contributions.

An assumption of a life-cycle model of savings is that individuals seek to smooth their consumption over the pre- and post-retirement years. In order to do this, they forgo some consumption during their working lives in order to accumulate a stock of wealth at the time of retirement.[20]   The size of that stock will be determined so as to achieve the desired level of post-retirement consumption.   In other words, given their desired standard of living, their life expectancy, expected asset returns and prices, and taking into account public policies such as taxation and pension eligibility, they will aim to achieve a "target" level of wealth at retirement.

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[17]   This section uses the settings of the KiwiSaver programme that applied prior to the changes made in the 2011 Budget.

[18]   This figure was obtained first by fitting an OLS regression with the dependent variable being respondents' additional saving score and the independent variable being respondents' income. The parameter estimates were then applied to the KiwiSaver income distribution supplied by Inland Revenue and weighted by income. As additional saving on average declined with income, the weighted measure required for estimates of national saving is lower than the unweighted measure.

[19]   In reality, the compulsory employer contribution is very much like a payroll tax. Therefore, the final incidence of this will depend on the relative elasticities of supply and demand for labour.

[20]   Whether "retirement" occurs at a point in time or consists of a phased withdrawal from the labour market is immaterial here.

The recent boom in house prices in New Zealand, to the extent that some part was sustainable, arguably increased the wealth of home owners. This revaluation of asset prices is generally referred to as "passive saving" in contrast to making conscious decisions to forgo current consumption (termed "active saving").[21] Hull (2003) and De Veirman and Dunstan (2008) find that passive and active saving are negatively related, reinforcing the view that money is fungible and different forms of saving are potential substitutes in achieving a retirement-income wealth target. This evidence is consistent with the view adopted here in which, in the long run, all contributions to KiwiSaver are viewed in a similar manner – all contribute to achieving a long-run goal. Were this not to reflect actual saving behaviour, we would expect to see either large and widespread bequests (over-saving) or substantial drops in post-retirement living standards (under-saving). Typically, neither is observed.

The following estimates, summarised in Table 13, are partial in the sense that they relate to KiwiSaver accounts held by employees. Two cases are presented. Our preferred estimates pertain to the long run in which individuals look at the total amount of their KiwiSaver balances regardless of the source when making decisions about their saving for retirement, and additionality is set at 29% based on the estimates from the survey. The second case is a sensitivity analysis in which additionality is set at much higher levels for both Crown and employer contributions to individuals' KiwiSaver accounts. In both instances, each additional dollar of subsidy provided by the Crown to an individual's KiwiSaver account represents a dollar less saving by the Crown.[22]

In the long run, when members adjust their overall saving behaviour such that net additionality is 29% on all contribution sources, the costs to the government exceed the additional saving with the result that the scheme would reduce total national saving. Less than $1 of additional household saving is generated for each dollar of government contributions.

Sensitivity analysis allowing for much higher levels of additionality yields modest net additions to saving. This arises as the total additional saving by members exceeds the costs to the government. The fiscal costs (identical for both cases) shown in the last column are made up of the initial kick-start grant, the member tax credit and exemption from the employer superannuation contribution tax. Of these, the largest share (some 75%) is made up of the member tax credits.

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[21]   For an analysis of active and passive saving, see Le, Stillman and Gibson (2010).

[22]   This is the case regardless of whether the Crown is running a deficit or a surplus; that is, if the Crown is running surpluses, the effect of KiwiSaver subsidies will be to reduce the surplus, all else equal, and hence result in less public saving.

Table 13: Impact of KiwiSaver on national savings and the fiscal costs[1]

| Year | Change in national saving[2] ($m) | | Fiscal costs ($m)[5] |
	Short-term[3] (sensitivity analysis)	Long-term[4] (preferred estimates)	
2012	281	-49	949
2013	312	-25	967
2014	329	-4	958
2015	329	-13	991
2016	330	-15	1,006
2017	326	-26	1,033
2018	322	-37	1,061
2019	316	-48	1,090
2020	310	-61	1,120
2021	304	-75	1,152
Net present value[6]	2,322	-245	7,521

Notes:

1. Based on KiwiSaver members with employer contributions.
2. Change in national savings is the additional savings by households net of the fiscal costs.
3. The sensitivity analysis (short-run values) assumes additionality applying to employee contributions of 29%, employer contributions of 39% and Crown contributions of 59% respectively.
4. Our preferred estimates (long-run values) are based on an additionality applying to all contributions of 29%.
5. The fiscal costs are made up of the initial grant, the member tax credits and the exemption for the Employer superannuation contribution tax.
6. Net present values are the discounted sum of the 10-year flows, using a discount rate of 6%.

There is yet another dimension to the long-run view of retirement saving. Setting aside the issue of bequests, households accumulate retirement wealth so they can draw that down for income in retirement. In other words, in the long-run equilibrium, regardless of whether the additionality was 100%, the net effect is that household saving would be zero as the accumulations would be matched by the decumulations.

Also worth noting is that our analysis does not attempt to account for any changes in investment returns that might result from any change in the flow of saving into the capital markets or their allocation. However, it is not necessarily the case that this would increase national saving.

For example, consider the thought experiment where a couple buying a house was first allowed to use the resources allocated to their KiwiSaver account to pay down their mortgage and only when this was repaid began saving specifically for retirement. Compared to the case where they paid down their mortgage at a slower rate and put resources into KiwiSaver at the same time, our estimates suggest that this couple could have had around 25% more financial wealth at retirement. Given that a significant proportion of people are likely to own a home with a mortgage at some point throughout their life, this effect may significantly reduce national saving.

These estimates of course are based on a number of assumptions around income, house value, wage growth, initial mortgage term, the proportion of their budget they allocate to saving or paying down debt, and others. However, the main factor driving this result is the superior after-tax real returns from paying down one's mortgage as opposed to investing in a retirement fund such as KiwiSaver. So long as this persists, then the general result is robust to these other assumptions.

5   Conclusions

The KiwiSaver scheme has been a major addition to New Zealand's retirement savings options. While it is voluntary, it has undoubtedly led to increased attention on retirement savings and savings more generally. Furthermore, there is reasonable evidence that some people are now saving more than they would have in the scheme's absence. In short, the scheme has arguably enhanced a culture of saving and overall household savings may be higher than they would otherwise have been. However, this has come at a cost. In 2010/11 the cost to the government in forgone tax revenues, grants and tax credits exceeded $1 billion. It is, therefore, pertinent to inquire about the efficacy of the scheme with respect to the retirement saving behaviour of individuals.

This study has examined both the participation in the scheme and the extent of changes in saving behaviour. Overall, about one third of the eligible population were members of the scheme. Importantly, those who expected NZS to be their main source of retirement income were significantly more likely to have become a member. This finding is consistent with the notion that individuals aim to achieve a target level of retirement wealth. Those expecting NZS to be their primary source of income were also more likely to have opted in, while higher-income individuals were more likely to have opted out.

A crucial question is the extent to which the scheme has engendered additional household savings. The evidence from the survey is that for each dollar of member contributions to the scheme, saving in alternative vehicles is reduced by 64 cents (substitution). In other words, members of the scheme have increased the net saving (additionality) by 36 cents on average. Those owning their own home would have saved 12 percentage points more of their KiwiSaver contributions than non-homeowners had they not been members of KiwiSaver, after correcting for differences in age, income, family status, education, etc. It is interesting that this difference is not due solely to mortgage repayment. Homeowners also indicated they would have contributed more to other superannuation schemes, saving and investments for retirement in the absence of KiwiSaver. In addition, respondents with higher levels of education would also have saved 4 percentage points more of their contributions for every additional year of education. In contrast, those in part-time employment as opposed to full-time employment tended to spend more of their contributions (12 percentage points more), as did females as opposed to males (7 percentage points more).

An analysis was undertaken of the income respondents expected to have in retirement in relation to that which they reported would be required to meet either their basic needs or to be comfortable. The results indicated that only 22% have a shortfall in expected retirement income based on needs. In contrast, some 50% reported an expected shortfall with respect to being comfortable. These results were broadly similar for both KiwiSaver members and non members.

By comparing the expected outcomes of KiwiSaver members and non-members using regression analysis which controlled for an extensive set of variables likely to affect retirement income expectations, it was possible to test whether KiwiSaver membership was associated with changes in retirement income expectations. We find only a few factors help explain respondents' expected retirement outcomes. Factors that decrease retirement shortfalls (or increase the excess) include income and employment status other than full-time employment. Factors that increase retirement shortfalls include having very good or fair health relative to excellent health, and home ownership.

Importantly, KiwiSaver membership was not statistically significant. In other words, all else equal, KiwiSaver membership was not found to improve expected retirement income outcomes; that is, KiwiSaver membership was associated with neither reduced expected shortfalls nor increased excesses of retirement income over the amount respondents required either to meet their basic needs or to be comfortable. This result is robust to any selection bias that may have resulted owing to survey routing.

In conducting any evaluation, it is critical that the yardstick against which success is to be measured is clearly specified and quantifiable. The analysis of the effectiveness of the KiwiSaver scheme in this paper centres on the stated purpose of the Act. This refers to a target population who would not otherwise been in a position to enjoy a standard of living in retirement comparable to their pre-retirement level.

Using information on respondents' expected retirement outcomes and the degree to which KiwiSaver had changed their saving behaviour, we construct measures of target effectiveness and leakage for the scheme. Target effectiveness ranged from a third to a half, while leakage was as high as 93%, when the measure was based on retirement income shortfalls with respect to meeting basic needs, and 78% based on being comfortable. In other words, of all those eligible to join KiwiSaver, less than half of all those in the target population became members, and for each one of those a further 4 to 14 people joined from outside the target population. This implies that the ongoing cost of the scheme per target member could exceed $13,000 per year.

The possibility exists that respondents reported smaller shortfalls (larger excesses) in retirement income merely as a consequence of having joined KiwiSaver. However, Section 4.7 provides evidence to the contrary; that is, the results of regression analysis that included KiwiSaver membership as well as a large number of other conditioning variables likely to affect retirement income outcomes, suggest that KiwiSaver membership does not improve expected retirement income outcomes. Further, as a Heckman selection model was used, these results are robust to any selection bias that might have occurred due to survey routing. Therefore, we do not expect that this possibility will have had a material impact on either our measures of target effectiveness or leakage.

We recognise that the scheme may have had broader objectives not explicitly stated in the Act. An implicit objective of KiwiSaver may have been to increase national saving. After weighting for individuals' income we find that only around 29% of respondents' contributions to KiwiSaver represent new saving. With the Government effectively borrowing one dollar for each dollar it contributes to KiwiSaver, it is not surprising then that in the long run we find KiwiSaver would likely have a minimal contribution to national saving and could actually be contributing to reducing national saving.

The survey on which this analysis has been based was a national survey allowing statistically valid population estimates. It represents the most comprehensive survey of households since the inception of the KiwiSaver scheme. These are significant strengths of the data used here. However, there are limitations which need to be taken into account when considering the results of the study.

In the first place, the survey is a "snap shot" at a point in time; it does not provide a comprehensive basis for assessing changes in individual saving behaviour over time. Ideally, one would want to trace all assets and liabilities (both financial and non-financial) through time. Only a longitudinal panel survey can provide that sort of information. As the survey was taken less than three years after the initial launch of the KiwiSaver scheme, and as some of the respondents had joined subsequently, the data relate to a

relatively short period. For this reason, one cannot infer that the results from the scheme to date would necessarily reflect the outcomes that will prevail once the scheme has matured.

On a positive note, the relatively short time since the scheme's introduction may well have allowed respondents to report with greater accuracy any changes in their saving behaviour. In 10 years' time, say, the degree of recall bias could well be significantly greater as people would be less likely to remember their savings habits in the years prior to the introduction of KiwiSaver.

A critical set of questions that were central to the analysis of additionality required respondents to reflect on what they would have done with their KiwiSaver contributions in the absence of the scheme. Clearly, this is a hypothetical question, the answers to which may not necessarily reflect what the respondents really would have done. For example, it could be that some respondents felt they would appear in a better light with the interviewer by not admitting they would have spent the money on consumption items. This could result in biasing downward our estimates of additionality. If the respondent stated, for example, that all the money would have been saved (to create the impression of prudence), then switching to KiwiSaver would have implied no additional saving by that individual. On the other hand, a current member of the KiwiSaver scheme could have responded that all their contributions would have been spent rather than saved, thereby creating a "good" impression by demonstrating their conversion from profligacy to prudence. We are left with no basis in evidence to assess either the possible direction or the magnitude of any theoretical response bias.

Given the importance of KiwiSaver as an element of New Zealand's retirement income saving policies, further evaluation will be highly desirable. In conjunction with IRD, the Treasury has developed a set of questions on KiwiSaver to be included in the last wave of a major longitudinal panel study (SoFIE) conducted by Statistics New Zealand. It is expected the results of that survey will be available for analysis in the first half of 2012, and the findings should shed further light on the behavioural changes induced by KiwiSaver.

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Appendix

Appendix Table: Summary of variables used

Question number	Variable	No. of observations (unweighted)	Variable categories	Mean	Median	Notes
1a	**Respondent is a KiwiSaver member**	825 (All respondents)	KiwiSaver member (1) Non-KiwiSaver member (0)	0.386	0	
1b	**Respondent lives with a partner**	825 (All respondents)	Partnered (1) Non-partnered (0)	0.663	1	
1c	**Partner is a KiwiSaver member**	505 (Partnered respondents)	KiwiSaver member (1) Non-KiwiSaver member (0)	0.353	0	
1e	**Dependent children**	825 (All respondents)		0.875	0	Number of dependent children aged under 18 living in the household
7a	**Age**	825 (All respondents)		40.22	42	Age of respondent at interview date Age bands converted to ages by taking the mid-point of the band
7b	**Expected retirement age**	687 (Respondents aged 25 and over)		65.82	65	Age bands converted to ages by taking the mid-point of the band
7b, 7e	**Expected duration of retirement (years)**	687 (Respondents aged 25 and over)		18.75	20	
16a	**Respondent's sex**	825 (All respondents)	Female (1) Male (0)	0.513	1	
16b	**Respondent's ethnicity**	825 (All respondents)	NZ European (base)	0.613	1	Prioritised ethnicity
			Maori	0.118	0	
			Pacific Island	0.068	0	
			Asian	0.087	0	
			Other	0.114	0	

Question number	Variable	No. of observations (unweighted)	Variable categories	Mean	Median	Notes
15a	**Risk tolerance**	825 (All respondents)	Low	0.444	0	Risk tolerance: willingness to accept more risk for higher returns
			Medium	0.208	0	Low (strongly disagree/disagree with statement that willing to accept more risk for higher returns
			High	0.348	0	Medium (neither agree nor disagree with statement)
						High (strongly agree/agree with statement)
16c, 16d, 16s, 16ua, 16ub	**Respondent's income ($000s)**	825 (All respondents)		41.74		Respondent's adjusted gross annual income based on respondent's income or a portion of household income depending on the respective labour force status of both the respondent and their partner, as well as whether the respondent indicated they were the main income earner.
16e	**Owns house**	825 (All respondents)	Yes (1)	.538	1	Respondent is considered to 'own' the house if the house is owned by respondent and/or partner or house is in a trust
			No (0)			
16ta	**Respondent's years of schooling**	825 (All respondents)		13.65	14	Highest qualification converted into years of schooling
16tb	**Partner's years of schooling**	505 (Partnered respondents)		13.80	14	Highest qualification converted into years of schooling
16ta, 16tb	**Combined years of schooling**	825 (All respondents)		13.68	14	For partnered respondents: average years of schooling of respondent and partner
						For non-partnered respondents: respondent's years of schooling
16ua	**Respondent's labour force status**	825 (All respondents)	Full-time employed (base)	0.491	0	
			Part-time employed	0.185	0	
			Self-employed	0.106	0	
			Unemployed	0.088	0	
			Not in the labour force	0.129	0	
16ub	**Partner's labour force status**	505 (Partnered respondents)	Full-time employed (base)	0.561	1	
			Part-time employed	0.131	0	
			Self-employed	0.141	0	
			Unemployed	0.065	0	

Question number	Variable	No. of observations (unweighted)	Variable categories	Mean	Median	Notes
			Not in the labour force	0.063	0	
16w	**Self-rated health status**	825 (All respondents)	Excellent (base)	0.438	0	Some regressions combine "Fair" and "Poor" into one category due to a small number of observations
			Very good	0.308	0	
			Good	0.188	0	
			Fair	0.046	0	
			Poor	0.019	0	
16y	**Experienced at least one negative major life event since joining KS**	KS families (respondents who are KS members or whose partner is a KS member)	Yes (1) No (0)	0.517	1	Experienced at least one of the events listed in q16y, excluding the positive event "A boost to your income"
16q	**Respondent's occupation**	825 (All respondents)	Professionals (base)	0.225	0	
			Managers	0.129	0	
			Technicians and trade workers	0.128	0	
			Community and personal service workers	0.100	0	
			Clerical and administrative workers	0.103	0	
			Sales workers	0.066	0	
			Machinery operators and drivers	0.053	0	
			Labourers	0.087	0	
			Other	0.108	0	
16r	**Partner's occupation**	505 (Partnered respondents)	Professionals (base)	0.263	0	
			Managers	0.130	0	
			Technicians and trade workers	0.174	0	
			Community and personal service workers	0.063	0	
			Clerical and administrative workers	0.101	0	
			Sales workers	0.069	0	
			Machinery operators and	0.038	0	

Question number	Variable	No. of observations (unweighted)	Variable categories	Mean	Median	Notes
			drivers			
			Labourers	0.088	0	
			Other	0.074	0	
16fi-16p	**Net wealth ($000s)**	825 (All respondents)		29.13	9.4	Assets minus liabilities Banded data converted to numbers by taking mid-point of bands. House valuations that were not current were adjusted to 2010Q1 using national house price index Trust assets were measured as the outstanding amount of the loan to the trust
12a, 12b	**Expect NZS to be main source**	825 (All respondents)	Yes (1) No (0)	0.315	0	Expects NZS to be main source of income in retirement
7f	**Has the respondent thought about financial planning for retirement?**	687 (Respondents aged 25+)	Yes - a lot or a fair amount (1) No - a little or not at all (0)	0.504	1	
2b	**Opt in**	474 (KiwiSaver members)	Opted in - through employer or provider (1) Auto-enrolled or enrolled by someone else (0)	0.578	1	Method of enrolment for current KiwiSaver members
1a, 1j	**Opt out**	526 (KiwiSaver members and non-members who opted out)	Opted out (1) Current member of KS (0)	0.191	0	Did respondent actively opt out of KS?
2a	**When respondent joined KS**	474 (KiwiSaver members)	1 July 2009 onwards (1) 1 July 2007-30 June 2009 (0)	0.102	0	
13a	**If hadn't joined KS, would you have set aside money specifically for retirement?**	521 (KiwiSaver families that is respondents who are KS members or whose partner is a KS member)	Likely - very or quite likely (1) Unlikely - not that or not at all likely (0)	0.618	1	
13b	**If weren't a KS member, how much of your**	521 (KiwiSaver families, that is, respondents who are KS members or		6.39	7	How much, out of 10, would have saved or used to reduce other debt (versus being spent on daily outgoings or "other") The higher this number, the lower the amount of additional

Question number	Variable	No. of observations (unweighted)	Variable categories	Mean	Median	Notes
	contributions would you have saved or used to reduce debt?	whose partner is a KS member)				savings (i.e. the higher the degree of substitution)
7c	Expect to have a standard of living in retirement that is the same or better than pre-retirement?	564 (those 25 years old and over and able to specify an expected retirement age)	Yes -stay the same, increase somewhat or increase a lot (1) No - decrease a lot or somewhat (0)	0.726	1	
7g-7j, 7r-7v	Size of excess (+) or shortfall (-) in expected retirement income with respect to amount needed to meet basic needs ($)	376 (Respondents aged 25 and over who had thought at least a little about financial planning for retirement and could provide expected and required retirement incomes)		5660	3120	Expected and needed income given as annual, weekly or lump-sum in current dollars figure. Weekly amounts converted to annual by multiplying by 52 Lump-sum converted to annual amount using annuity due formula with 2% rate of return Question was answered for a couple or individual, depending on whether the respondent lived with a partner and whether a partnered-respondent preferred to think of him/herself as an individual or not. Data for a couple was adjusted to make it comparable to that of an individual by multiplying the couple's amount by 0.60 (which is consistent with the difference between NZS married couple and single rates
7k-7n, 7r-7v	Size of excess (+) or shortfall (-) in expected retirement income with respect to amount needed to be comfortable ($)	377 (Respondents aged 25 and over who had thought at least a little about financial planning for retirement and could provide expected and required retirement incomes)		-4912	0	Expected and needed income given as annual, weekly or lump-sum in current dollars figure. Weekly amounts converted to annual by multiplying by 52 Lump-sum converted to annual amount using annuity due formula with 2% rate of return

Note:

Missing values and responses of "don't know" or "refused" were imputed. The following variables were subject to imputation: KiwiSaver membership status of respondent's partner, respondent's labour force status, partner's labour force status, whether NZS is expected to be the main source of retirement income, level of risk tolerance, respondent's highest qualification, partner's highest qualification, asset and liability components of net wealth, income, whether or not the respondent has thought about financial planning for retirement, expected retirement age and duration of retirement, expected standard of living in retirement, method of joining KiwiSaver, opting out of KiwiSaver when joined KiwiSaver, respondent experienced at least major negative life event since joining KiwiSaver, what would have been done with the money if hadn't joined KS. Only a small number of imputed values were needed for each of these variables, with the exception of income. Thus, in accordance with Harrell's

guidelines (Harrell Jr 2001), a simple hotdeck imputation method was employed for all variables other than income. Hotdeck imputation was used as it is simple, preserves the distributional characteristics of the variable, and performs nearly as well as more sophisticated imputation approaches (Roth 1994). Income had a larger proportion of the sample with missing values (7.8% of the sample for non-partnered individuals and 9.5% of the sample for partnered individuals). Therefore, missing income data was imputed using the multivariate imputation method available in STATA software.