Cash use in New Zealand Survey information Sheet

Survey design

The survey questionnaire was developed and pre-tested by the Reserve Bank of New Zealand. It was designed to be completed in approximately 10 minutes and comprised pre-coded single and multiple response questions.

The layout and formatting of the paper version of the survey was also designed by the Bank.

All hard copies of the paper survey were printed by an external printing company. The printing proofs were approved by Research New Zealand and the Bank, before the final copies were delivered to Research New Zealand's office for distribution.

When the questionnaire content and layout had been finalised, Research New Zealand then scripted an online version of the survey. To minimise any response bias that may occur in completing the online survey versus the paper copy, the layout, presentation and structure was kept as close as possible to that of the paper survey. This meant that the online script contained no programmed routing and all questions (including those that were intended as single-response questions) were scripted to allow for multiple response. In addition, respondents were able to move past questions without entering a response at all, to reflect the fact that there were no forced answers in the paper survey.

The online survey script was then tested by Research New Zealand's scripting team and by the researchers who were working on this project. Survey test links were also provided to the Reserve Bank, enabling Reserve Bank staff to be involved in the testing phase as well.

The sample

The target audience for this survey were normally-resident New Zealand adults, aged 18 years and over.

The New Zealand General and Maori Electoral Rolls were used as the sampling frame for this research, as this is the most comprehensive and up-to-date register of the adult New Zealand population. Access to the Electoral Rolls was granted through a formal application process via the Electoral Commission's Enrolment Services.

The information contained in the Electoral Rolls enabled us to draw a random sample of n=6,400 people stratified by age group (18 to 29 years old, 30 to 44 years old, 45 to 60 years old and 60 years plus) nested in four broad geographic areas: Upper North Island, Lower North Island, Upper South Island and Lower South Island. Table 1 details how different New Zealand geographic regions were classified into these four broad areas.

Table 1: Geographic groupings

Broad areas	Region
Upper North Island	Northland region Auckland region Waikato region Bay of Plenty region Gisborne region
Lower North	Hawke's Bay region Taranaki region Manawatu-Wanganui region Wellington region
Upper South	Marlborough region Nelson region Tasman region West Coast region Canterbury region
Lower South	Otago region Southland region

The Electoral Rolls also enabled us to sample Maori and non-Maori electors proportionate to their distribution within each age band in each broad geographic area, based upon the Maori descent indicator in the Rolls.

Representativeness of sample

In designing the survey's stratified sampling scheme, the Reserve Bank's Sample Methodologist took into account the fact that certain groups in the general population (e.g. 18 to 29 year old males) are known to be less likely to respond to surveys. This meant that certain age groups were disproportionately sampled, in comparison to their normal proportions in the Electoral Rolls. Maori and non-Maori electors were sampled proportionate to their distribution within each geographic region.

Table 2 details the numbers of electors sampled from each region by age band and whether or not individuals were identified in the Electoral Rolls as being of Maori descent.

Table 2: Sampling population and initial samples drawn

Area	Sub-group	Population (Ni)	Sample (n)
Upper North	18-29 Non-Maori	247,382	571
Upper North	18-29 Maori	71,092	164
Upper North	30-44 Non-Maori	345,500	464
Upper North	30-44 Maori	73,792	99
Upper North	45-59 Non-Maori	383,165	460
Upper North	45-59 Maori	71,080	85
Upper North	60+ Non-Maori	403,011	437
Upper North	60+ Maori	45,001	49
Lower North	18-29 Non-Maori	98,992	330
Lower North	18-29 Maori	29,216	97
Lower North	30-44 Non-Maori	133,070	268
Lower North	30-44 Maori	29,949	60
Lower North	45-59 Non-Maori	162,188	271
Lower North	45-59 Maori	28,583	47
Lower North	60+ Non-Maori	185,496	259
Lower North	60+ Maori	17,912	25
Upper South	18-29 Non-Maori	76,515	368
Upper South	18-29 Maori	12,284	59
Upper South	30-44 Non-Maori	104,025	295
Upper South	30-44 Maori	11,548	33
Upper South	45-59 Non-Maori	135,731	294
Upper South	45-59 Maori	11,281	24
Upper South	60+ Non-Maori	155,466	272
Upper South	60+ Maori	6,676	12
Lower South	18-29 Non-Maori	35,617	366
Lower South	18-29 Maori	5,962	61
Lower South	30-44 Non-Maori	43,695	291
Lower South	30-44 Maori	5,542	37
Lower South	45-59 Non-Maori	54,816	291
Lower South	45-59 Maori	5,142	27
Lower South	60+ Non-Maori	62,976	270
Lower South	60+ Maori	3,238	14

The sampling procedure, reminder activity and weighting schemes (both described below) all aim to ensure that the final sample of respondents surveyed, accurately represents the target population of normally resident New Zealanders, aged 18 years and older.

Survey implementation

As mentioned earlier, the Cash Use in New Zealand Survey was completed using a mixed method approach, with respondents provided the option of completing the survey online or on paper. Fieldwork was completed between 22 August and 26 October 2017, during which time n=2,917 completed surveys were received.

Participants were first contacted by a letter in the mail which requested their participation in the

survey and provided an option to register online to complete the survey electronically. The survey and a freepost return envelope were posted to participants who didn't register online. Participants were encouraged to complete the survey through follow up postcards and or a telephone call.

The survey was designed to take approximately 10 minutes to complete and consisted of 27 questions.

Quality assurance processes and standards

Research New Zealand's partners, directors and staff are all members of the European Society of Marketing & Social Research (ESOMAR) and as such abide by its Code of Practice. Research New Zealand also have well-established quality assurance process and standards that are applied to each stage of the research process. Those are summarised below:

Data security

Respondent's names and addresses were removed from all copies of the dataset provided to the Reserve Bank to help protect respondents' anonymity.

All sensitive or personally identifiable information such as sample and data was transferred using Research New Zealand's secure file exchange portal.

All personal identifying information, including copies of the Electoral Roll data, were destroyed or deleted at the conclusion of the project.

Online survey scripting

Scripting of the online survey was completed by the same team that prepares telephone questionnaires for Research New Zealand's CATI system. The scripter, together with the researcher assigned to the project, went through a rigorous process of testing and re-testing the survey script, using a variety of different devices.

Members of the Currency Team at the Reserve Bank were also involved in the testing process and provided valuable feedback on how the online survey was to be programmed/structured. Unlike standard online surveys, the Cash Use in New Zealand Survey was scripted in a way that allowed multiple responses to all questions (including those designed for a single response), no questions were compulsory and no automated routing was required.

Data entry

Data entry of the paper survey questionnaires was completed by a dedicated in-house team of data entry operators. Editing of the paper questionnaires prior to entry was minimal, as respondents were able to provide multiple responses to all questions and any respondent errors with regard to routing were managed at a later date as part of the data cleaning process.

A minimum of 10 percent of each data entry operator's work was double-entered to ensure that the error rate was within an acceptable threshold. If an operator's work was found to contain five or more errors per 1,000 key strokes, all of that operator's work would have been re-entered and checked again.

The dataset, weighting approach and final weighting calculations were also reviewed by a statistician.

Follow-up calls

All of Research New Zealand's interviewers undergo extensive training (both initially and on an on-going basis), and are supervised, beyond the minimum Interviewer Quality Standards (IQS).

The team of interviewers selected to work on the Cash Use in New Zealand Survey follow up calls attended a briefing session prior to the fieldwork commencing. The briefing session covered aspects such as:

- Project background and objectives
- All aspects of administering the follow-up calls, including the need to capture reasons for non-response (where possible).
- Instructions were also given as to the process of emailing a direct link to the online survey, if requested by the respondent.

As a matter of course, five percent of each interviewer's work was intercepted by Research New Zealand's Quality Control Manager to ensure that the interviewers were conducting these calls to an acceptably high standard.

All interviews are recorded (with the respondent's consent), providing an additional level of quality control.

Data editing and cleaning

Editing and cleaning of the final 'master' dataset was completed and checked by senior members of the research team, based on the editing protocols provided by the Reserve Bank.

Response rate

A total of 6,400 potential respondents were randomly selected from the New Zealand Electoral Roll and invited to participate in this research.

Survey invitation outcomes were tracked, including numbers of postal returns and online completes. Opt-outs and (where possible) reasons for non-response were also recorded.

A participation rate and response rate have been calculated for this survey:

- Participation rate = (Number of completed surveys / total number of survey invitations sent out) * 100

  A total of 2,917 completed surveys were received from the 6,400 people who were invited to participate, resulting in a participation rate of 46%.

- Response rate = (Number of completed surveys / total number of survey invitations sent out (excluding ineligible respondents and estimated ineligibles for unknown outcomes)) * 100

  The response rate using this method is 49%.

The response rate represents the proportion of eligible individuals contacted during the survey period that completed the Cash Use in New Zealand Survey by its close-off date. The response rate is determined by assigning each sampled individual to one of four eligibility classes and is calculated as follows:

Response Rate = C / [C + B + D*(B+C) / (A+B+C)]

Where: A = ineligible respondents

B = eligible non-responding

C = eligible responding

D = individuals with unknown eligibility

Table 3 overleaf provides a breakdown of the research outcome codes that were used to calculate the response rate for the Cash Use in New Zealand Survey. Column 2 shows the unweighted frequency counts for each outcome. As weighted frequencies were used to calculate the response rates for the survey, Column 3 shows the weighted population counts for each outcome.

Table 4 provides a detailed breakdown of the response rates across the 32 different sampling strata.

Table 3: Outcome codes

	Total	Weighted counts*
Survey invitations	**6,400**	**3,055,939**
Eligible responders (C)	**2,917**	**1,482,801**
Completed online survey	853	409,486
Completed paper survey	2,064	1,073,316
Eligible non-responders (B)	**185**	**92,709**
Refused	162	81,420
Survey completed after the close-off date	23	11,289
Ineligible (A)	**44**	**26,229**
Deceased	8	4,715
Unable to complete survey due to physical/mental incapacity	36	21,513
Unknown eligibility (D)	**3,254**	**1,454,201**
Language barrier	5	3,410
Moved/not at that address	243	97,765
No response	3,006	1,353,026

* Weight applied to weighted counts is the sample design weight.
Note: weighted counts may not sum to 100% due to rounding.

Table 4: Detailed response rates by sample strata

Area	Age group	Maori %	Non-Maori %
Upper North	18-29	13	28
Upper North	30-44	22	39
Upper North	45-59	45	47
Upper North	60+	63	68
Lower North	18-29	24	35
Lower North	30-44	30	42
Lower North	45-59	43	57
Lower North	60+	68	74
Upper South	18-29	8	34
Upper South	30-44	30	50
Upper South	45-59	58	56
Upper South	60+	33	76
Lower South	18-29	26	28
Lower South	30-44	46	45
Lower South	45-59	44	54
Lower South	60+	79	82

Weighting

As with all surveys of the general population, the Cash Use in New Zealand Survey will have some inherent biases relating to:

- Disproportionate sample selection – certain sub-populations were over-represented to ensure adequate base sizes for analysis.
- Differential response rates (for example, females and older people are known to be more likely to respond to surveys, while younger males are less likely to do so).
- The sample frame used – while the New Zealand Electoral Rolls is the most accurate and representative sampling frame available, it does not include all members of the general population (for example, people in New Zealand who are not permanent residents).

To address these biases so that survey results more accurately reflect the wider population, the survey data has been weighted as follows.

Design weight

For each sampled respondent, a design weight was calculated based upon the probability of their being sampled from each of 32 different strata. This was done so that the weighted counts of the initial sample summed to the population they were drawn from, i.e. 3,055,939. These initial weights for each strata are shown in Table 5 overleaf.

Response rates, using the design-weighted data, were subsequently calculated for each strata, as well as an adjustment factor that was applied to the initial design weights. For example, the survey sample strata comprising Upper North Island Maori aged 30 to 44 years old achieved a response rate of 22 percent. The adjustment factor for that strata was then calculated as 1 / 0.22 = 4.5454. This factor was subsequently applied to the initial design weight for all respondents from that strata who completed the survey.

As response rates take into account that some members of the public were ultimately ineligible to complete the survey, as well as assume a proportion of those classified as ‘unknown eligibility’ will also be ineligible, the adjusted weighted design counts for all respondents in the achieved sample sum to 3,010,571.

Table 5: Initial and adjusted design weights

Area	Age group	Initial design weights Maori	Initial design weights Non-Maori	Adjusted design weights Maori	Adjusted design weights Non-Maori
Upper North	18-29	433.24	433.49	3255.37	1566.34
Upper North	30-44	744.61	745.37	3354.17	1931.53
Upper North	45-59	832.97	836.24	1870.53	1758.14
Upper North	60+	922.22	918.39	1451.65	1364.65
Lower North	18-29	299.98	301.20	1270.37	853.87
Lower North	30-44	496.53	499.15	1663.78	1178.30
Lower North	45-59	598.48	608.15	1429.15	1053.43
Lower North	60+	716.20	716.48	1053.66	962.90
Upper South	18-29	207.92	208.20	2456.80	617.53
Upper South	30-44	352.63	349.94	1154.93	707.65
Upper South	45-59	461.67	470.04	805.73	817.65
Upper South	60+	571.57	556.33	1669.24	754.90
Lower South	18-29	97.31	97.74	372.59	345.77
Lower South	30-44	150.15	149.78	326.03	336.11
Lower South	45-59	188.37	190.44	428.55	351.81
Lower South	60+	233.24	231.29	294.39	284.04

Population weight

Population data was sourced from Statistics New Zealand according to the estimated resident population aged 18 years and over, as at 30 June 2017. Table 6 compares the key characteristics of the survey population against the unweighted profile of those who responded to the survey. Variables shown are those which were used to calculate population weights for the surveys' achieved sample.

The table illustrates the proportional non-response and over-response biases by gender, age and region between the achieved sample when compared with the overall general public, as estimated by Statistics New Zealand (as at 30 June 2017).

To address this issue, a population weight to make the data more representative of the overall population was also calculated. This was done using an iterative proportional fitting procedure (IPFP) wherein the surveys' achieved counts by age, gender and region were 'raked' against the marginal population estimates for each of those dimensions until the weighted counts within each dimension converged.[1] Table 7 details the weights that were applied to each of the surveys' strata when viewed by age and gender, within each broad geographic area. Note that the counts of the achieved sample, when the population weights are applied, sum to 3,669,854 (compared with the estimated normally resident population aged 18 years and older of 3,669,852, as at 30 June 2017). The difference of two individuals when comparing the weighted survey data and the estimated population counts is due to rounding. Table 7 below shows the marginal totals of the weighted survey data compared with Statistics New Zealand's estimates.

[1] Raking adjustments are particularly useful when one has confidence in the accuracy of the high-level counts for particular characteristics, but lower confidence in the accuracy of counts wherein one or more variables have been nested (i.e. age by gender, within broad geographic area).

Table 6: Proportional distributions of population and the unweighted achieved survey sample

	Population proportions (%)	Sample proportions (%)
Gender		
Male	49	43
Female	51	57
Age groups		
18- 29 years	23	17
30-44 years	24	21
45-59 years	26	27
60+	27	35
Location		
Upper North Island	55	32
Lower North Island	22	22
Upper South Island	17	23
Lower South Island	7	23

Table 7: Estimated marginal totals – Stats NZ estimates and weighted Cash Use in New Zealand Survey data

Variable		Stats NZ estimate	Weighted survey data
Region	Upper North	2,005,140	2,005,141
	Lower North	792,428	792,429
	Upper South	620,174	620,174
	Lower South	252,110	252,110
Age band	18-29	844,222	844,223
	30-44	896,260	896,261
	45-59	941,470	941,470
	60+	987,900	987,900
Gender	Females	1,885,502	1,885,502
	Males	1,784,350	1,784,352
Total		3,669,852	3,669,854

*Based on Statistics New Zealand data – subnational population estimates as at 30 June 2017.
http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalPopulationEstimates_HOTPAt30Jun17.aspx

Data cleaning

As completed paper questionnaires were received, their return was logged in a master tracking file and the response data entered. The data entry programme was designed using the same programme and following the same structure as the online database. This meant that when the fieldwork was completed, the data entry and online datasets were able to be seamlessly combined into one 'master' dataset.

Data editing protocols were provided by the Bank to ensure that the 'master' dataset was cleaned in an agreed, consistent manner. The data cleaning was completed by two senior members of the Research New Zealand team.

During the initial checking of the master dataset, it was found that a small number of respondents (n=18) had completed both the paper and online versions of the survey. As agreed with the Bank, it was decided to retain the data from the paper version of the survey as this was completed by all of these respondents prior to the online version.

Other protocols included rules around the following:

- Ensuring that the respondent had correctly followed the routing instructions (and deleting responses to questions that they were not supposed to have answered).
- Rules for correcting multi-response questions where only one response should have been given.
- Differentiating a missing value as a result of a correctly followed routing instruction, from a missing value as a result of a respondent not answering a question that they should have.

It was also agreed that (where appropriate), Research New Zealand would recode 'other specify' comments back into the existing code frame, but that all verbatim comments were to be left 'as is'.

Limitations

All surveys of the general population will have some inherent biases relating to disproportionate sample selection, differential response rates (for example, females and older people are known to be more likely to respond to surveys, while younger males are less likely to do so), as well as the sample frame used. Where possible, such issues have been dealt with through the application of agreed weighting parameters and protocols.

In addition, issues associated with identifiable respondent errors in completing the survey questionnaire have been dealt with using agreed editing and missing data imputation protocols, as developed by the Bank. Where respondents' age and/or gender have been imputed, these have been flagged in the survey database.

Similarly, there are 212 respondents whose self-reported age does not align with age band data held in the Electoral Rolls. These records have also been flagged in the survey database.

One data quality limitation that cannot be addressed by issues such as weighting, editing protocols, data imputations and data cleaning relate to whether the named elector who was sampled from the Rolls was the person who completed the survey. As the degree to which this is an issue in the achieved survey is not known, adjustments have not been made