



Ministry of Social Development

Valuation of the Benefit System for Working-age Adults

As at 30 June 2016

Appendices



APPENDIX A GUIDE TO APPENDICES

The Appendices provide much of the technical detail of our approach. The following table describes the various appendices supplied with the report.

Table A.1 Description of appendices

#	Title	Description
Appendix A	Guide to Appendices	Describes appendices
B	Background	Provides the context behind the valuation
C	Projection assumptions	Details inflation, discounting, unemployment rate, overpayment recovery and recoverable assistance assumptions used in the valuation
D	Data supplied	Describes the datasets provide by MSD and used in the valuation
E	Valuation scope	Details the various payment types and benefit codes valued
F	Liability definition	Details the inclusion/exclusion of certain clients and payments in the valuation
G	Details on modelling approach	Provides further detail on the types of models used in the valuation and their explicit parameterisation
H	Model Coefficients [Separate Excel file]	Excel file of parameters for each of the models
I	Computation details	Gives some background as to the way we performed the computation of the projection of the welfare population
J	Actual versus expected comparisons for 2015/16	Tables of actual versus expected experience for the year to 30 June 2016
K	Change in liability from the previous valuation	A segment level reconciliation of the changes from the 2015 to 2016 valuation results
L	Sensitivity Analysis	A segment level detailing of sensitivity to unemployment, discounting and inflation rates
M	Other one-way tables	Showing current client liability across a number of different dimensions
N	Projected number of clients and payments [Separate Excel file]	Tables detailing the projected number of people in each state and their corresponding payments, over the duration of the projection

APPENDIX B BACKGROUND

Since 2011, the New Zealand Government has applied an investment approach to reducing long-term benefit receipt and its associated social and financial outcomes. Annual actuarial valuations of the benefit system are a key enabler of the investment approach. Valuations make visible the key drivers of the future cost— including policy and labour market changes—and quantify their impact on the future cost. Annual valuations, combined with monitoring and evaluation, also tell a performance story about how MSD is managing the future cost of the benefit system.

Taylor Fry has been working in partnership with MSD and the Treasury since June 2011 to help develop this investment approach in the benefit system. Further detail is provided in our initial report on the feasibility of an investment approach,¹ and in our five prior valuations of the benefit system.² All six reports are publicly available on MSD’s website.

In 2016, we undertook the first valuation of New Zealand’s social housing system (as at 30 June 2015)³. The valuation of the social housing system was undertaken with a combined benefit system- social housing system model; that is, clients’ benefit and social housing status are modelled simultaneously. The combined approach was taken due to the large overlap in population as well as strong predictive effects between the two systems; social housing history is highly predictive of future benefit system pathways (and vice versa).

This report is the first valuation of the benefit system using the combined model. While the projection model estimates future income-related rent subsidies to social housing tenants, these are **not** in the scope of the benefit system valuation.

B.1 Definition of liability in the welfare context

The investment approach borrows from insurance, where valuations of outstanding claims liabilities are required to ensure schemes’ financial solvency. With no precedent for valuing a welfare system, we worked closely with MSD and the Treasury in 2011 and 2012 to develop a valuation definition that best facilitates the investment approach for welfare.

Liability – for current clients – is defined as: The estimated future lifetime costs of all benefit payments and associated expenses for working-age clients who received a benefit payment in the 12 months up to and including the effective date of the valuation.

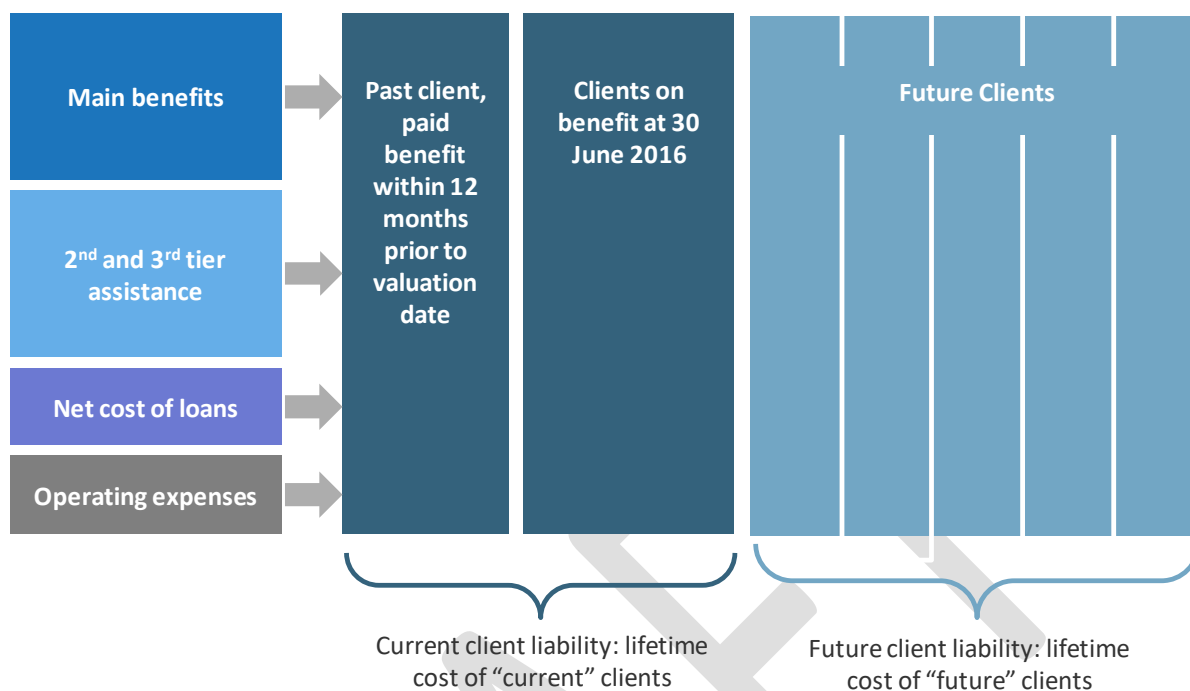
The main estimate of the liability in the benefit system, as defined above, is the lifetime cost of **current** clients. As illustrated in Figure B.1, we also include estimates of the lifetime costs associated with **future** clients— that is, the people we expect to enter the benefit system during the next five years, based on projections. Further details on the liability definition are provided in Appendix F.

¹ <https://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/evaluation/taylor-fry-ia-feasibility/taylor-fry-feasibility-of-an-ia-for-benefit-report.pdf>

² 2011 Valuation: <http://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2012/valuation-report.html>
2012 Valuation: <https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2013/taylor-fry-welfare-valuation.html>
2013 Valuation: <https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2014/taylor-fry-welfare-valuation.html>
2014 Valuation: <http://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2015/reforms-succeed.html>
2015 Valuation: <https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2016/2015-valuation-of-the-benefit-system-for-working-age-adults.html>

³ Not release at the time of writing

Figure B.1 Definition of liability



B.2 Current client population

The 2016 current client liability values the lifetime cost of about 550,000 working-age residents, representing one fifth of New Zealand's working-age population. The current client population is diverse. To discuss trends more meaningfully, this large population has been partitioned into more homogenous subgroups, particularly **Beneficiary segments** and **Work and Income regions**.

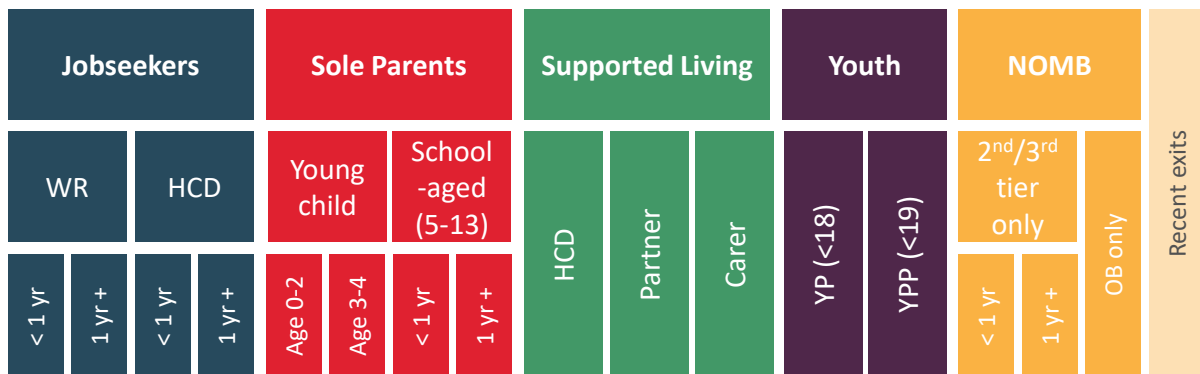
B.2.1 Beneficiary segments

Beneficiary segments are stable groupings of clients that are mutually exclusive; each client belongs to one and only one segment at any given time. This is particularly useful to give insight into different patterns of lifetime benefit receipt and risk factors, and enables system-wide operational control. In 2012 Taylor Fry worked with MSD to develop a segmentation that would be meaningful both statistically (differentiating clients with high and low lifetime cost) as well as operationally (useful in managing the benefit system). Further detail on the rationale for the segmentation is available in the 2012 valuation report. We have reported valuation results at these segments levels for the last four valuations. At the time, the intention was to periodically assess the relevance of the segmentation. In 2016, MSD decided to revisit the segmentation, in light of:

- » The new Better Public Services (BPS) target for reducing long-term welfare dependence
- » Changes to work requirements for youngest children
- » Changes to youth service.

The segmentation analysis has been completed and new draft segments exist, but have not yet been finalised. Hence, the bulk of this report has been completed using the original segments as shown in the figure below.

Figure B.2 Beneficiary segments



The top level of segmentation is based on a client’s main benefit on the valuation date. Beneath the top level, segments are based on factors specific to each client group. Jobseekers (JS), for example, are either ‘Work-ready (WR)’ or have deferred work expectations due to ‘health conditions, illnesses or disabilities (HCD).’ They are further split into those who have received benefits for less than a year or more than a year. Sole Parents (SPS) are segmented by the age of the youngest child, which affects their work and work preparation obligations.

B.2.2 Work and Income regions

Regional break-downs of the benefit population provide a useful overview of the benefit system. Within regions, clients can be further sub-divided into segments for detailed operational control at the regional level.

We have included region-specific unemployment rate indicators. This is particularly useful to distinguish between labour market impacts and performance at a regional level.

The introduction of social housing into the models required an even finer-grained view of location. The combined projection also makes use of Territorial Local Authority (TLA) level information, such as local rents. There are 65 TLAs of them, excluding Auckland; Auckland is a single TLA, so we split it further into its 20 local boards. These TLAs and boards are all listed in the table below with their associated Work and Income region. Note that these groupings are not entirely exact; some TLAs straddle more than one Work and Income region. In these cases we have assigned a ‘main’ region based on welfare populations.

Figure B.3 Work and income regions

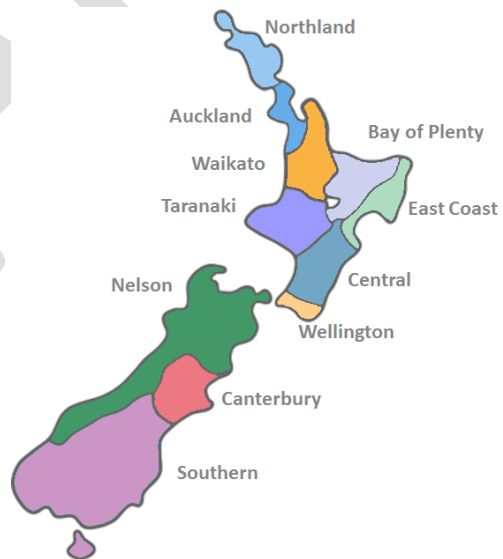


Table B.1 List of TLAs and Boards plus associated Work & Income region

Region	TLA/Board	Region	TLA/Board	Region	TLA/Board
Northland	Far North District	Central	Horowhenua District	Southern	Invercargill City
Northland	Kaipara District	Central	Kapiti Coast District	Southern	Mackenzie District
Northland	Whangarei District	Central	Manawatu District	Southern	Queenstown-Lakes District
Waikato	Hamilton City	Central	Masterton District	Southern	Southland District
Waikato	Hauraki District	Central	Palmerston North City	Southern	Timaru District
Waikato	Matamata-Piako District	Central	Rangitikei District	Southern	Waimate District
Waikato	Thames-Coromandel District	Central	Carterton District	Southern	Waitaki District
Waikato	Waikato District	Central	South Wairarapa District	Auckland	Albert-Eden Local Board Area
Waikato	Waipa District	Central	Tararua District	Auckland	Devonport-Takapuna Local Board Area
Bay of Plenty	Kawerau District	Wellington	Lower Hutt City	Auckland	Franklin Local Board Area
Bay of Plenty	Opotiki District	Wellington	Porirua City	Auckland	Henderson-Massey Local Board Area
Bay of Plenty	Rotorua District	Wellington	Upper Hutt City	Auckland	Hibiscus and Bays Local Board Area
Bay of Plenty	South Waikato District	Wellington	Wellington City	Auckland	Howick Local Board Area
Bay of Plenty	Taupo District	Nelson	Buller District	Auckland	Kaipatiki Local Board Area
Bay of Plenty	Tauranga City	Nelson	Grey District	Auckland	Mangere-Otahuhu Local Board Area
Bay of Plenty	Western Bay of Plenty District	Nelson	Kaikoura District	Auckland	Manurewa Local Board Area
Bay of Plenty	Whakatane District	Nelson	Marlborough District	Auckland	Maungakiekie-Tamaki Local Board Area
East Coast	Central Hawke's Bay District	Nelson	Nelson City	Auckland	Orakei Local Board Area
East Coast	Gisborne District	Nelson	Tasman District	Auckland	Otara-Papatoetoe Local Board Area
East Coast	Hastings District	Nelson	Westland District	Auckland	Papakura Local Board Area
East Coast	Napier City	Canterbury	Ashburton District	Auckland	Puketapapa Local Board Area
East Coast	Wairoa District	Canterbury	Christchurch City	Auckland	Rodney Local Board Area
Taranaki	New Plymouth District	Canterbury	Hurunui District	Auckland	Upper Harbour Local Board Area
Taranaki	Otorohanga District	Canterbury	Selwyn District	Auckland	Waiheke Local Board Area
Taranaki	Ruapehu District	Canterbury	Waimakariri District	Auckland	Waitakere Ranges Local Board Area
Taranaki	South Taranaki District	Southern	Central Otago District	Auckland	Waitemata Local Board Area
Taranaki	Stratford District	Southern	Clutha District	Auckland	Whau Local Board Area
Taranaki	Waitomo District	Southern	Dunedin City		
Taranaki	Wanganui District	Southern	Gore District		

B.3 Scope of valuation

The benefit system valuation considers the following component payments and expenses:

- » **Benefit payments:**
 - Main benefits: Principally Jobseeker Support (JS), Sole Parent Support (SPS), Supported Living Payment (SLP), and Youth/Young Parent Payments (YP/YPP)
 - Supplementary (SUP) and Hardship Assistance: Principally Accommodation Supplement (AS) and other supplementary assistance
- » **Net loans/debts:** Recoverable Assistance and over-payments, including fraud, net of recoveries
- » **Operating expenses:** MSD's investments in employment and work-readiness outcomes, and administrative expenses.

Some of these payment types combine a number of different subcomponents. Further details on this and the scope of the valuation are provided in Appendix E.

APPENDIX C PROJECTION ASSUMPTIONS

C.1 Benefit rate inflation

We model payments in June 2016 dollars. To do this, we inflate older payments to current levels using historical benefit inflation as per Table C.1.1 below. We also apply inflation to our projected payments in line with Treasury forecasts, presented in Table C.1.2.

Table C.1.1 Historic benefit rate increases

Date	Yearly increase	Scale up factor to June 2016
Apr-92		1.50
Apr-93	1.6%	1.48
Apr-94	1.6%	1.46
Apr-95	3.2%	1.41
Apr-96	3.3%	1.37
Apr-97	1.3%	1.35
Apr-98	0.1%	1.35
Apr-99	0.1%	1.35
Apr-00	0.5%	1.34
Apr-01	4.2%	1.28
Apr-02	1.9%	1.26
Apr-03	2.9%	1.22
Apr-04	1.6%	1.21
Apr-05	2.8%	1.17
Apr-06	3.3%	1.13
Apr-07	2.8%	1.10
Apr-08	3.3%	1.07
Apr-09	-1.2%	1.08
Apr-10	2.1%	1.06
Apr-11	1.2%	1.05
Apr-12	1.8%	1.03
Apr-13	0.8%	1.02
Apr-14	1.5%	1.01
Apr-15	0.5%	1.00
Apr-16	0.0%	1.00

Notes:

- (a) Changes have been based on the DPB/SPS rate for singles with one child. Most benefits move in the same proportions, but occasionally the increases will differ for different benefit types.
- (b) Increases are determined based on gross benefit rates, consistent with the report.
- (c) Increases have been checked for consistency with historical changes in CPI, on which changes should be based, as well as consistency across different benefit types.
- (d) Increases apply at the first of April each year.
- (e) The Apr-09 and Apr-11 results actually consist of a decrease of 4.7% (Jun-09) and 2.7% (Jun-11) that applied in the previous December quarter, followed by the usual CPI-related increase of 3.7% (Jun-09) and 4.0% (Jun-11) at the start of the June quarter. The decreases correspond to tax changes that affected the relationship between gross and net payments. We present the total impact over the year.

Table C.1.2 Projected benefit rate increases

Date	Yearly increase	Scale up factor
01-Apr-16		1.00
01-Apr-17	1.47%	1.01
01-Apr-18	1.47%	1.03
01-Apr-19	1.47%	1.04
01-Apr-20	1.47%	1.06
01-Apr-21	1.47%	1.08
01-Apr-22	1.47%	1.09
01-Apr-23	1.47%	1.11
01-Apr-24	1.47%	1.12
01-Apr-25	1.47%	1.14
01-Apr-26	1.47%	1.16
01-Apr-27	1.47%	1.17
01-Apr-28	1.47%	1.19
01-Apr-29	1.47%	1.21
01-Apr-30	1.47%	1.23
01-Apr-31	1.47%	1.24
01-Apr-32	1.47%	1.26
01-Apr-33	1.47%	1.28
01-Apr-34	1.49%	1.30
01-Apr-35	1.51%	1.32
01-Apr-36	1.54%	1.34
01-Apr-37	1.56%	1.36
01-Apr-38	1.59%	1.38
01-Apr-39	1.61%	1.41
01-Apr-40	1.64%	1.43
01-Apr-41	1.66%	1.45
01-Apr-42	1.69%	1.48
01-Apr-43	1.71%	1.50
01-Apr-44	1.73%	1.53
01-Apr-45	1.76%	1.55
01-Apr-46	1.78%	1.58
01-Apr-47	1.81%	1.61
01-Apr-48	1.83%	1.64
01-Apr-49	1.86%	1.67
01-Apr-50	1.88%	1.70
01-Apr-51	1.91%	1.74
01-Apr-52	1.93%	1.77
01-Apr-53	1.96%	1.80
01-Apr-54	1.98%	1.84
01-Apr-55	2.00%	1.88
01-Apr-56	2.00%	1.91
01-Apr-57	2.00%	1.95
Later	2.00%	

Notes:

- (a) Inflation increases assumed to apply at 1 April, consistent with current practice.
- (b) Assumptions based on Treasury projections of CPI as at Jun-16, in provided spreadsheet *disc-rates-jun16.xls*

Table C.1.3 Comparison with previous projected inflation rates

Date	Previous Valuation	Present Valuation	Difference
01-Apr-17	1.6%	1.5%	-0.2%
01-Apr-18	1.6%	1.5%	-0.2%
01-Apr-19	1.6%	1.5%	-0.2%
01-Apr-20	1.6%	1.5%	-0.2%
01-Apr-21	1.6%	1.5%	-0.2%
01-Apr-22	1.6%	1.5%	-0.2%
01-Apr-23	1.6%	1.5%	-0.2%
01-Apr-24	1.6%	1.5%	-0.2%
01-Apr-25	1.6%	1.5%	-0.2%
01-Apr-26	1.6%	1.5%	-0.2%
01-Apr-27	1.6%	1.5%	-0.2%
01-Apr-28	1.7%	1.5%	-0.2%
01-Apr-29	1.7%	1.5%	-0.3%
01-Apr-30	1.8%	1.5%	-0.3%
01-Apr-31	1.8%	1.5%	-0.3%
01-Apr-32	1.9%	1.5%	-0.4%
01-Apr-33	1.9%	1.5%	-0.4%
01-Apr-34	2.0%	1.5%	-0.5%
01-Apr-35	2.0%	1.5%	-0.5%
01-Apr-36	2.1%	1.5%	-0.5%
01-Apr-37	2.1%	1.6%	-0.5%
01-Apr-38	2.2%	1.6%	-0.6%
01-Apr-39	2.2%	1.6%	-0.6%
01-Apr-40	2.2%	1.6%	-0.6%
01-Apr-41	2.3%	1.7%	-0.6%
01-Apr-42	2.3%	1.7%	-0.7%
01-Apr-43	2.4%	1.7%	-0.7%
01-Apr-44	2.4%	1.7%	-0.7%
01-Apr-45	2.5%	1.8%	-0.7%
01-Apr-46	2.5%	1.8%	-0.7%
01-Apr-47	2.5%	1.8%	-0.7%
01-Apr-48	2.5%	1.8%	-0.7%
01-Apr-49	2.5%	1.9%	-0.6%
01-Apr-50	2.5%	1.9%	-0.6%
01-Apr-51	2.5%	1.9%	-0.6%
Later	2.5%	1.9%	-0.6%

Notes:

- (a) Previous valuation refers to 2015 actuarial valuation of the benefit system
- (b) The sum of previous valuation and difference columns may not give present valuation column due to rounding

C.2 Rental growth assumptions

The introduction of social housing into the projection model has led us to upgrade the approach to projecting Accommodation Supplement (AS) payments. Instead of an average loading for all clients, we now first simulate whether a person is receiving AS, and if so then project what level of support they receive. We have included the level of local weekly rents as a predictor of AS payment levels. One consequence is that we now project average AS payments to grow faster than CPI, as rents are projected to grow faster than CPI. This is consistent with a higher rate of uptake of AS and higher average support level over time because of higher rents in some regions.

We have used first quartile rent throughout our analysis – it is much close to average social housing rents than the average or median. We have assumed that growth in rents will be faster than AWE growth in the short to medium term. There are a number of reasons why rents can temporarily grow faster than average wages, as has indeed been the case over the past decade. First, average wages may mask higher wage growth in some regions such as major cities. Second, housing costs can grow as a proportion of total income. Third, housing supply constraints can squeeze both the owner-occupier and rental markets higher. These supply constraints can be further compounded by population growth, both from births and migration.

Longer-term, rents continuously growing faster than wages lead to implausible assumptions; beyond ten years we assume they both grow at the same rate.

Tables C.2.1 and C.2.2 show the historical and projected AWE increases and rental growth increases, both presented relative to CPI. The historical and projected rental growth assumptions are also presented (as a difference to CPI) in Tables C.2.3 and C.2.4.

Table C.2.1 Historic CPI, AWE and rental growth increase

Date	CPI Yearly increase	CPI Scale up factor to June 2016	AWE yearly increase (relative to CPI)	Rental growth yearly increase (relative to CPI)
01-Apr-95	4.0%	1.52	-1.5%	1.1%
01-Apr-96	2.2%	1.49	0.7%	3.3%
01-Apr-97	1.8%	1.46	2.1%	2.6%
01-Apr-98	1.3%	1.44	0.2%	0.5%
01-Apr-99	-0.2%	1.45	2.2%	-0.4%
01-Apr-00	1.5%	1.42	-0.1%	-0.7%
01-Apr-01	3.2%	1.38	-0.8%	-2.7%
01-Apr-02	2.6%	1.35	3.1%	1.0%
01-Apr-03	2.6%	1.31	0.7%	4.5%
01-Apr-04	1.6%	1.29	2.0%	5.8%
01-Apr-05	2.8%	1.26	0.2%	2.9%
01-Apr-06	3.3%	1.22	1.1%	1.7%
01-Apr-07	2.4%	1.19	3.1%	4.5%
01-Apr-08	3.5%	1.15	1.2%	3.6%
01-Apr-09	2.9%	1.12	2.7%	-0.5%
01-Apr-10	1.9%	1.09	-1.2%	-0.4%
01-Apr-11	4.5%	1.05	-0.4%	-1.3%
01-Apr-12	1.5%	1.03	2.2%	1.2%
01-Apr-13	0.9%	1.02	1.9%	2.4%
01-Apr-14	1.5%	1.01	1.8%	1.8%
01-Apr-15	0.3%	1.01	2.3%	2.5%
01-Apr-16	0.5%	1.00	1.6%	3.8%

Notes:

(a) Historical CPI increases based on Statistics New Zealand data from <http://www.stats.govt.nz/infoshare/> (CPI All Groups for New Zealand, Seasonally adjusted)

(b) Historical AWE increases based on Statistics New Zealand data from <http://www.stats.govt.nz/infoshare/> (Total All Ind. & Both Sexes - Seasonally Adj)

(c) Historical rent increases based on MBIE data from <http://www.mbie.govt.nz/info-services/housing-property/sector-information-and-statistics/rental-bond-data>

Table C.2.2 Projected CPI, AWE and rental growth increases

Date	CPI Yearly increase	CPI Scale up factor	AWE yearly increase relative to CPI	Rental growth yearly increase (National), relative to CPI
01-Apr-16		1.00		
01-Apr-17	1.47%	1.01	-0.57%	0.41%
01-Apr-18	1.47%	1.03	0.13%	1.02%
01-Apr-19	1.47%	1.04	0.30%	1.10%
01-Apr-20	1.47%	1.06	0.78%	1.48%
01-Apr-21	1.47%	1.08	0.91%	1.51%
01-Apr-22	1.47%	1.09	1.35%	1.84%
01-Apr-23	1.47%	1.11	1.49%	1.89%
01-Apr-24	1.47%	1.12	1.49%	1.79%
01-Apr-25	1.47%	1.14	1.49%	1.69%
01-Apr-26	1.47%	1.16	1.49%	1.58%
01-Apr-27	1.47%	1.17	1.49%	1.50%
01-Apr-28	1.47%	1.19	1.49%	1.49%
01-Apr-29	1.47%	1.21	1.49%	1.49%
01-Apr-30	1.47%	1.23	1.49%	1.49%
01-Apr-31	1.47%	1.24	1.49%	1.49%
01-Apr-32	1.47%	1.26	1.49%	1.49%
01-Apr-33	1.47%	1.28	1.49%	1.49%
01-Apr-34	1.49%	1.30	1.47%	1.47%
01-Apr-35	1.51%	1.32	1.47%	1.47%
01-Apr-36	1.54%	1.34	1.46%	1.46%
01-Apr-37	1.56%	1.36	1.47%	1.47%
01-Apr-38	1.59%	1.38	1.47%	1.47%
01-Apr-39	1.61%	1.41	1.48%	1.48%
01-Apr-40	1.64%	1.43	1.47%	1.47%
01-Apr-41	1.66%	1.45	1.48%	1.48%
01-Apr-42	1.69%	1.48	1.47%	1.47%
01-Apr-43	1.71%	1.50	1.48%	1.48%
01-Apr-44	1.73%	1.53	1.48%	1.48%
01-Apr-45	1.76%	1.55	1.47%	1.47%
01-Apr-46	1.78%	1.58	1.48%	1.48%
01-Apr-47	1.81%	1.61	1.47%	1.47%
01-Apr-48	1.83%	1.64	1.48%	1.48%
01-Apr-49	1.86%	1.67	1.47%	1.47%
01-Apr-50	1.88%	1.70	1.48%	1.48%
01-Apr-51	1.91%	1.74	1.47%	1.47%
01-Apr-52	1.93%	1.77	1.48%	1.48%
01-Apr-53	1.96%	1.80	1.47%	1.47%
01-Apr-54	1.98%	1.84	1.48%	1.48%
01-Apr-55	2.00%	1.88	1.48%	1.48%
01-Apr-56	2.00%	1.91	1.50%	1.50%
01-Apr-57	2.00%	1.95	1.50%	1.50%
Later	2.00%		1.50%	1.50%

Notes:

(a) CPI and AWE increases assumed to apply at 1 April

(b) Rent assumed to apply quarterly

(c) CPI assumptions are as previously presented in table C.1.2 and based on Treasury projections of CPI as at Jun-16, in provided spreadsheet *disc-rates-jun16.xls*

Table C.2.3 Historical rental growth increases by region

Date	Yearly rental growth rate					
	Northland	Auckland	Waikato	Plenty	East coast	Taranaki
01-Apr-95	2.3%	3.9%	1.9%	-0.6%	-1.0%	-2.8%
01-Apr-96	4.8%	6.4%	3.6%	2.6%	0.0%	1.6%
01-Apr-97	4.8%	4.0%	4.8%	-1.3%	-0.6%	0.7%
01-Apr-98	0.4%	-0.4%	1.3%	1.5%	0.3%	0.3%
01-Apr-99	1.7%	-1.5%	-0.7%	0.7%	-2.4%	1.2%
01-Apr-00	-2.7%	-0.5%	-1.3%	-0.9%	-2.1%	-0.1%
01-Apr-01	-4.1%	-2.4%	-3.1%	-2.1%	-5.3%	-0.5%
01-Apr-02	-0.1%	2.0%	-0.3%	-1.4%	1.4%	0.2%
01-Apr-03	3.9%	5.9%	2.8%	0.8%	8.9%	1.0%
01-Apr-04	6.9%	4.2%	8.0%	8.3%	3.3%	2.7%
01-Apr-05	5.2%	0.9%	3.3%	5.2%	6.6%	0.9%
01-Apr-06	3.3%	0.2%	1.5%	2.9%	4.3%	4.0%
01-Apr-07	3.3%	3.8%	4.6%	5.1%	7.6%	3.9%
01-Apr-08	4.1%	3.2%	2.8%	2.9%	4.3%	3.7%
01-Apr-09	-1.1%	-1.0%	-1.3%	-0.8%	1.7%	0.8%
01-Apr-10	-0.5%	-0.6%	-0.1%	0.2%	-0.2%	-0.8%
01-Apr-11	-0.7%	-0.8%	-1.8%	-2.0%	-3.3%	-1.4%
01-Apr-12	-0.7%	1.6%	1.4%	0.6%	1.1%	0.8%
01-Apr-13	0.9%	2.9%	0.9%	2.4%	2.4%	1.9%
01-Apr-14	2.1%	2.5%	0.7%	-0.9%	0.2%	0.9%
01-Apr-15	2.4%	3.5%	3.3%	1.5%	1.6%	1.8%
01-Apr-16	4.4%	4.3%	8.1%	3.9%	3.5%	3.3%

Date	Yearly rental growth rate					
	Central	Wellington	Nelson	Canterbury	Southern	Total
01-Apr-95	1.8%	-1.5%	1.1%	0.5%	7.9%	1.1%
01-Apr-96	3.5%	0.5%	3.1%	-1.8%	10.9%	3.3%
01-Apr-97	4.9%	2.6%	3.1%	-5.1%	4.7%	2.6%
01-Apr-98	2.8%	1.4%	0.0%	-2.5%	-2.5%	0.5%
01-Apr-99	2.4%	0.0%	-2.5%	0.7%	-4.5%	-0.4%
01-Apr-00	1.3%	0.1%	-1.2%	2.3%	-0.9%	-0.7%
01-Apr-01	-3.0%	-3.1%	-2.2%	-0.6%	-2.7%	-2.7%
01-Apr-02	-0.3%	3.3%	2.6%	3.3%	2.9%	1.0%
01-Apr-03	1.6%	8.8%	5.6%	7.7%	8.7%	4.5%
01-Apr-04	1.2%	8.1%	9.2%	9.0%	2.6%	5.8%
01-Apr-05	0.7%	1.2%	3.0%	3.5%	-1.6%	2.9%
01-Apr-06	-0.3%	0.8%	1.5%	-0.9%	-1.6%	1.7%
01-Apr-07	8.4%	3.9%	3.3%	2.3%	2.4%	4.5%
01-Apr-08	3.7%	4.2%	3.1%	2.7%	2.8%	3.6%
01-Apr-09	1.0%	1.6%	-3.1%	-1.0%	-1.2%	-0.5%
01-Apr-10	0.0%	0.5%	-1.3%	-0.2%	-0.6%	-0.4%
01-Apr-11	-3.3%	-2.9%	1.2%	2.3%	-0.2%	-1.3%
01-Apr-12	0.0%	1.7%	4.5%	-0.4%	2.5%	1.2%
01-Apr-13	0.4%	1.0%	7.6%	3.1%	3.6%	2.4%
01-Apr-14	1.8%	-0.3%	7.9%	4.3%	2.0%	1.8%
01-Apr-15	1.4%	1.0%	2.7%	1.9%	5.1%	2.5%
01-Apr-16	3.0%	2.1%	-2.9%	5.2%	5.3%	3.8%

Notes:

(a) Historical rental increases based on MBIE data from <http://www.mbie.govt.nz/info-services/housing-property/sector-information-and-statistics/rental-bond-data>

Table C.2.4 Projected rental growth rates by region

Date	Quarterly rental growth rate					
	Northland	Auckland	Waikato	Plenty	East coast	Taranaki
30-Sep-16	0.79%	0.48%	0.60%	0.96%	-0.04%	-0.12%
31-Dec-16	0.74%	0.47%	0.57%	0.89%	0.00%	-0.07%
31-Mar-17	0.69%	0.45%	0.54%	0.82%	0.04%	-0.02%
30-Jun-17	0.64%	0.43%	0.51%	0.75%	0.08%	0.03%
30-Sep-17	0.45%	0.29%	0.35%	0.54%	0.00%	-0.04%
31-Dec-17	0.39%	0.26%	0.31%	0.45%	0.05%	0.02%
31-Mar-18	0.33%	0.24%	0.27%	0.37%	0.10%	0.08%
30-Jun-18	0.26%	0.22%	0.24%	0.29%	0.15%	0.14%
30-Sep-18	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
31-Dec-18	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
31-Mar-19	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%
30-Jun-19	0.28%	0.28%	0.28%	0.28%	0.28%	0.28%
30-Sep-19	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
31-Dec-19	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
31-Mar-20	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%
30-Jun-20	0.38%	0.38%	0.38%	0.38%	0.38%	0.38%
30-Sep-20	0.38%	0.38%	0.38%	0.38%	0.38%	0.38%
31-Dec-20	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%
31-Mar-21	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%
30-Jun-21 & Later	0.36%	0.36%	0.36%	0.36%	0.36%	0.36%

Date	Quarterly rental growth rate					
	Central	Wellington	Nelson	Canterbury	Southern	Total
30-Sep-16	0.34%	0.25%	-0.16%	-0.78%	0.92%	0.37%
31-Dec-16	0.34%	0.26%	-0.10%	-0.66%	0.86%	0.37%
31-Mar-17	0.34%	0.26%	-0.05%	-0.54%	0.79%	0.36%
30-Jun-17	0.34%	0.27%	0.00%	-0.42%	0.73%	0.36%
30-Sep-17	0.21%	0.16%	-0.06%	-0.40%	0.52%	0.23%
31-Dec-17	0.21%	0.17%	0.01%	-0.25%	0.44%	0.22%
31-Mar-18	0.21%	0.18%	0.07%	-0.10%	0.36%	0.21%
30-Jun-18	0.20%	0.19%	0.14%	0.05%	0.28%	0.21%
30-Sep-18	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
31-Dec-18	0.30%	0.30%	0.30%	0.30%	0.30%	0.30%
31-Mar-19	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%
30-Jun-19	0.28%	0.28%	0.28%	0.28%	0.28%	0.28%
30-Sep-19	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
31-Dec-19	0.40%	0.40%	0.40%	0.40%	0.40%	0.40%
31-Mar-20	0.39%	0.39%	0.39%	0.39%	0.39%	0.39%
30-Jun-20	0.38%	0.38%	0.38%	0.38%	0.38%	0.38%
30-Sep-20	0.38%	0.38%	0.38%	0.38%	0.38%	0.38%
31-Dec-20	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%
31-Mar-21	0.37%	0.37%	0.37%	0.37%	0.37%	0.37%
30-Jun-21 & Later	0.36%	0.36%	0.36%	0.36%	0.36%	0.36%

C.3 Discounting

Future cash flows are discounted to present value using the risk-free rate. This is taken to be the NZ government bond rate, as published by Treasury.

Table C.3.1 Discounting assumptions

Date	Treasury (monthly) forward rate	Discount factor applied to cashflows
30-Jun-17	2.02%	98.2%
30-Jun-18	1.92%	96.3%
30-Jun-19	1.96%	94.5%
30-Jun-20	2.09%	92.6%
30-Jun-21	2.23%	90.7%
30-Jun-22	2.37%	88.6%
30-Jun-23	2.54%	86.5%
30-Jun-24	2.71%	84.3%
30-Jun-25	2.89%	82.0%
30-Jun-26	3.06%	79.7%
30-Jun-27	3.20%	77.3%
30-Jun-28	3.33%	74.8%
30-Jun-29	3.44%	72.4%
30-Jun-30	3.53%	70.0%
30-Jun-31	3.60%	67.5%
30-Jun-32	3.65%	65.2%
30-Jun-33	3.69%	62.9%
30-Jun-34	3.74%	60.6%
30-Jun-35	3.79%	58.4%
30-Jun-36	3.84%	56.3%
30-Jun-37	3.89%	54.2%
30-Jun-38	3.94%	52.2%
30-Jun-39	3.99%	50.2%
30-Jun-40	4.04%	48.3%
30-Jun-41	4.09%	46.4%
30-Jun-42	4.14%	44.5%
30-Jun-43	4.19%	42.8%
30-Jun-44	4.24%	41.0%
30-Jun-45	4.29%	39.4%
30-Jun-46	4.34%	37.7%
30-Jun-47	4.39%	36.2%
30-Jun-48	4.44%	34.6%
30-Jun-49	4.49%	33.2%
30-Jun-50	4.54%	31.7%
30-Jun-51	4.59%	30.3%
30-Jun-52	4.64%	29.0%
30-Jun-53	4.69%	27.7%
30-Jun-54	4.74%	26.5%
30-Jun-55	4.75%	25.3%
30-Jun-56	4.75%	24.1%
30-Jun-57	4.75%	23.0%
Later	4.75%	

Notes:

(a) Discounting assumptions apply to the middle of each quarter. Although the table only shows the discount factor for each June quarter, in practice, separate discount factors are calculated for each quarter.

(b) Assumptions based on Treasury projections of monthly forward rates as at Jun-16, in spreadsheet titled *disc-rates-jun16.xls*. Forward rates are as provided Treasury.

Table C.3.2 Comparison with previous projected discount rates

Year (monthly forward rate at 30th June)	Previous Valuation	Present Valuation	Difference
2017	2.8%	2.0%	-0.7%
2018	2.9%	1.9%	-1.0%
2019	3.1%	2.0%	-1.1%
2020	3.3%	2.1%	-1.2%
2021	3.5%	2.2%	-1.3%
2022	3.8%	2.4%	-1.4%
2023	4.0%	2.5%	-1.5%
2024	4.2%	2.7%	-1.5%
2025	4.4%	2.9%	-1.5%
2026	4.5%	3.1%	-1.4%
2027	4.6%	3.2%	-1.4%
2028	4.6%	3.3%	-1.3%
2029	4.7%	3.4%	-1.2%
2030	4.7%	3.5%	-1.2%
2031	4.8%	3.6%	-1.2%
2032	4.8%	3.7%	-1.2%
2033	4.9%	3.7%	-1.2%
2034	4.9%	3.7%	-1.2%
2035	5.0%	3.8%	-1.2%
2036	5.0%	3.8%	-1.2%
2037	5.1%	3.9%	-1.2%
2038	5.1%	3.9%	-1.2%
2039	5.2%	4.0%	-1.2%
2040	5.2%	4.0%	-1.2%
2041	5.3%	4.1%	-1.2%
2042	5.3%	4.1%	-1.2%
2043	5.4%	4.2%	-1.2%
2044	5.4%	4.2%	-1.2%
2045	5.5%	4.3%	-1.2%
2046	5.5%	4.3%	-1.2%
Later	5.5%	4.4%	-1.1%

Notes:

(a) Previous valuation refers to 2015 actuarial valuation of the benefit system

C.4 Unemployment rate

Table C.4.1 Historic national unemployment rate

Unemployment rate				
Year	31 Mar	30 Jun	30-Sep	31-Dec
1991	9.8%	10.5%	11.2%	11.0%
1992	11.0%	10.4%	10.6%	10.6%
1993	10.1%	10.2%	9.6%	9.4%
1994	9.3%	8.5%	8.0%	7.6%
1995	6.8%	6.4%	6.3%	6.4%
1996	6.4%	6.1%	6.5%	6.2%
1997	6.7%	6.8%	7.0%	7.0%
1998	7.4%	7.9%	7.7%	8.0%
1999	7.5%	7.3%	7.0%	6.4%
2000	6.4%	6.3%	6.0%	5.8%
2001	5.5%	5.4%	5.4%	5.6%
2002	5.3%	5.3%	5.6%	5.0%
2003	5.0%	4.8%	4.5%	4.7%
2004	4.3%	4.2%	3.9%	3.7%
2005	3.9%	3.9%	3.8%	3.8%
2006	4.1%	3.7%	3.9%	3.8%
2007	3.9%	3.6%	3.6%	3.3%
2008	3.7%	3.8%	4.0%	4.4%
2009	5.0%	5.7%	6.1%	6.5%
2010	5.9%	6.5%	6.0%	6.2%
2011	6.0%	6.0%	5.9%	6.0%
2012	6.3%	6.4%	6.7%	6.3%
2013	5.7%	6.0%	5.7%	5.6%
2014	5.5%	5.3%	5.2%	5.5%
2015	5.4%	5.5%	5.5%	5.0%
2016	5.2%	5.1%		

Notes:

(a) Rates supplied by NZ Treasury, sourced from Infoshare, table reference HLF097AA. Figures are seasonally adjusted.

(b) These figures may differ from those previously presented as Statistics NZ has revised the way in which they report the unemployment rate. On the new basis, recent rates are approximately 0.4% lower than on the old basis.

Table C.4.2 Projected national unemployment rate

Unemployment rate				
Year	31 Mar	30 Jun	30-Sep	31-Dec
2016			5.0%	4.9%
2017	4.8%	4.8%	4.8%	4.8%
2018	4.7%	4.6%	4.5%	4.4%
2019	4.3%	4.3%	4.3%	4.3%
2020	4.3%	4.3%	4.3%	4.3%
Later	4.3%	4.3%	4.3%	4.3%

Notes:

(a) Annual unemployment forecasts provided by Treasury in their HYEFU 2016 economic forecasts to June 2021.

Table C.4.3.1 Historical regional unemployment rates in the Northland region

Unemployment rate in Northland				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	13.1%	13.6%	13.6%	14.8%
1992	16.3%	12.3%	12.7%	12.1%
1993	10.0%	16.0%	15.8%	14.3%
1994	12.7%	12.9%	14.8%	14.3%
1995	13.6%	10.0%	10.1%	11.7%
1996	12.0%	11.4%	9.2%	6.9%
1997	8.7%	10.4%	9.3%	10.1%
1998	12.7%	11.5%	11.5%	14.2%
1999	13.3%	14.1%	9.2%	9.7%
2000	9.7%	8.9%	9.2%	9.1%
2001	7.9%	6.9%	8.5%	9.6%
2002	11.1%	8.9%	8.8%	8.8%
2003	10.2%	7.6%	8.7%	7.2%
2004	4.4%	5.0%	5.4%	4.4%
2005	4.4%	7.4%	5.9%	5.0%
2006	5.7%	6.0%	5.7%	3.6%
2007	5.2%	3.5%	5.5%	2.7%
2008	4.7%	4.1%	7.1%	6.5%
2009	8.5%	7.7%	8.9%	9.0%
2010	8.8%	8.9%	7.8%	8.2%
2011	9.3%	7.2%	8.2%	7.8%
2012	8.1%	8.7%	9.0%	9.0%
2013	9.3%	6.8%	9.0%	8.2%
2014	7.5%	7.3%	8.3%	7.8%
2015	8.8%	7.4%	8.1%	6.0%
2016	8.4%	10.6%		

Table C.4.3.2 Historical regional unemployment rates in the Auckland region

Unemployment rate in Auckland				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	10.9%	11.3%	12.3%	11.9%
1992	13.0%	12.0%	10.9%	10.9%
1993	10.8%	10.6%	9.9%	8.7%
1994	10.1%	8.0%	7.3%	6.7%
1995	5.9%	5.8%	5.4%	5.2%
1996	5.1%	5.3%	5.7%	5.1%
1997	6.4%	7.0%	7.3%	7.0%
1998	7.7%	7.8%	6.7%	6.7%
1999	7.0%	6.3%	6.3%	5.0%
2000	6.5%	6.0%	5.2%	5.1%
2001	5.4%	5.7%	4.3%	4.7%
2002	5.0%	5.2%	5.0%	4.1%
2003	4.6%	4.1%	3.5%	3.9%
2004	4.5%	3.9%	3.9%	3.4%
2005	4.3%	3.4%	3.5%	3.7%
2006	3.9%	3.2%	3.8%	3.9%
2007	4.6%	3.3%	3.6%	3.6%
2008	4.6%	4.1%	4.1%	5.0%
2009	6.3%	6.1%	6.2%	7.2%
2010	7.5%	8.1%	6.7%	6.9%
2011	7.0%	6.6%	6.2%	6.1%
2012	7.2%	6.8%	7.7%	6.4%
2013	6.7%	6.3%	5.9%	5.6%
2014	6.6%	5.8%	5.7%	5.6%
2015	6.5%	5.9%	5.6%	5.1%
2016	6.1%	4.7%		

Table C.4.3.3 Historical regional unemployment rates in the Waikato region

Unemployment rate in Waikato				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	10.7%	10.8%	11.6%	10.9%
1992	12.1%	11.2%	11.0%	10.5%
1993	12.1%	12.1%	9.6%	9.7%
1994	9.8%	9.4%	7.7%	7.8%
1995	8.8%	6.8%	6.3%	6.6%
1996	8.2%	6.5%	7.5%	6.5%
1997	8.3%	7.5%	6.7%	7.4%
1998	8.3%	8.4%	8.4%	9.2%
1999	10.3%	8.7%	7.6%	6.4%
2000	7.9%	5.9%	6.2%	6.1%
2001	6.6%	6.0%	5.9%	6.3%
2002	6.3%	5.0%	5.6%	5.6%
2003	5.7%	5.2%	3.3%	4.4%
2004	4.0%	3.1%	2.9%	3.2%
2005	4.2%	4.9%	3.9%	4.2%
2006	4.5%	2.9%	3.7%	2.8%
2007	4.4%	3.7%	3.3%	3.3%
2008	4.1%	3.9%	4.3%	4.4%
2009	5.6%	6.5%	6.0%	5.7%
2010	5.2%	5.7%	6.5%	5.5%
2011	6.7%	5.7%	6.6%	6.0%
2012	8.0%	6.5%	5.8%	5.4%
2013	5.4%	5.4%	5.7%	6.3%
2014	6.2%	6.1%	5.6%	5.4%
2015	6.0%	4.6%	6.2%	4.9%
2016	5.4%	4.8%		

Table C.4.3.4 Historical regional unemployment rates in the Bay of Plenty region

Unemployment rate in Bay of Plenty				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	13.5%	11.4%	12.9%	13.3%
1992	13.5%	12.8%	12.9%	12.6%
1993	13.5%	10.6%	9.6%	11.8%
1994	13.2%	10.7%	10.1%	9.7%
1995	10.1%	9.6%	7.0%	8.3%
1996	9.3%	6.6%	8.1%	9.2%
1997	10.6%	9.1%	8.3%	9.1%
1998	9.9%	12.2%	11.2%	11.7%
1999	11.9%	10.9%	9.2%	8.6%
2000	7.5%	8.9%	8.4%	6.7%
2001	9.0%	7.9%	8.6%	8.2%
2002	7.5%	8.3%	7.4%	6.9%
2003	7.9%	7.0%	5.3%	6.2%
2004	7.0%	5.3%	3.2%	4.5%
2005	4.7%	3.1%	4.3%	4.2%
2006	5.1%	3.9%	4.2%	3.6%
2007	4.0%	2.9%	3.4%	3.7%
2008	4.9%	3.8%	4.1%	4.3%
2009	5.9%	5.7%	7.6%	6.9%
2010	7.7%	7.7%	8.3%	6.8%
2011	7.1%	6.6%	7.3%	7.8%
2012	8.1%	5.8%	6.8%	8.2%
2013	7.7%	5.8%	6.8%	8.8%
2014	6.7%	5.4%	6.3%	5.4%
2015	7.5%	6.3%	5.8%	5.9%
2016	4.7%	5.1%		

Table C.4.3.5 Historical regional unemployment rates in the East Coast region

Unemployment rate in East Coast				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	12.1%	12.5%	11.3%	9.7%
1992	11.4%	10.0%	11.3%	13.6%
1993	9.9%	11.8%	10.3%	12.8%
1994	12.7%	8.8%	8.9%	9.4%
1995	9.2%	7.1%	7.7%	6.3%
1996	7.0%	7.4%	9.1%	7.9%
1997	8.9%	8.1%	10.2%	8.2%
1998	9.3%	9.2%	10.7%	8.1%
1999	7.0%	7.4%	7.6%	9.3%
2000	7.3%	6.3%	7.7%	8.0%
2001	7.0%	6.6%	6.0%	7.3%
2002	4.9%	5.0%	5.2%	6.0%
2003	6.3%	4.3%	5.3%	5.7%
2004	6.1%	4.4%	5.5%	5.0%
2005	4.7%	4.8%	7.0%	4.9%
2006	3.9%	3.8%	4.9%	4.8%
2007	4.8%	5.0%	4.2%	4.7%
2008	5.8%	4.4%	6.7%	6.3%
2009	6.8%	7.2%	9.7%	8.2%
2010	6.5%	8.2%	7.0%	6.9%
2011	7.8%	6.8%	7.0%	6.7%
2012	7.8%	6.0%	8.7%	8.4%
2013	8.0%	7.3%	8.1%	7.1%
2014	7.9%	6.5%	6.8%	7.8%
2015	7.2%	7.7%	6.9%	6.6%
2016	8.0%	5.0%		

Table C.4.3.6 Historical regional unemployment rates in the Taranaki region

Unemployment rate in Taranaki				
Year	31 Mar	30 Jun	30-Sep	31-Dec
1991	9.6%	11.4%	13.2%	14.6%
1992	13.6%	10.1%	10.3%	12.2%
1993	13.4%	8.6%	11.2%	10.0%
1994	10.0%	8.2%	8.1%	7.8%
1995	7.8%	6.3%	8.2%	6.5%
1996	7.6%	6.4%	8.1%	7.4%
1997	8.3%	7.0%	8.0%	6.5%
1998	6.6%	8.1%	6.9%	7.3%
1999	6.9%	6.2%	6.8%	8.9%
2000	10.2%	8.2%	6.3%	5.3%
2001	6.2%	4.8%	5.9%	6.1%
2002	5.1%	4.6%	5.8%	5.7%
2003	5.1%	5.6%	5.1%	4.5%
2004	5.3%	3.8%	4.3%	4.4%
2005	3.9%	2.9%	3.4%	4.2%
2006	5.1%	2.3%	3.6%	2.7%
2007	4.1%	4.0%	2.6%	2.6%
2008	3.5%	3.0%	3.3%	3.1%
2009	2.7%	4.3%	3.7%	5.9%
2010	4.8%	4.5%	4.8%	4.8%
2011	4.6%	5.1%	5.0%	3.5%
2012	4.5%	3.5%	4.4%	5.0%
2013	5.1%	5.1%	5.1%	5.6%
2014	6.3%	5.0%	4.4%	4.8%
2015	6.0%	7.3%	4.6%	3.9%
2016	5.7%	4.9%		

Table C.4.3.7 Historical regional unemployment rates in the Central region

Unemployment rate in Central				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	11.8%	11.4%	11.8%	11.1%
1992	12.4%	10.4%	12.0%	13.0%
1993	12.1%	11.3%	9.3%	9.6%
1994	9.5%	8.9%	9.2%	8.7%
1995	6.0%	6.2%	8.2%	8.0%
1996	7.5%	6.3%	6.3%	6.1%
1997	6.0%	5.9%	5.5%	5.7%
1998	8.0%	6.9%	8.3%	5.6%
1999	7.5%	5.7%	7.3%	7.9%
2000	6.8%	6.8%	6.8%	5.5%
2001	6.7%	4.6%	4.3%	5.4%
2002	6.2%	5.4%	5.3%	4.0%
2003	4.8%	5.3%	5.4%	3.8%
2004	5.9%	4.3%	3.0%	4.3%
2005	4.8%	4.2%	4.5%	4.3%
2006	5.4%	4.8%	4.0%	4.4%
2007	5.0%	5.2%	5.1%	5.3%
2008	5.0%	4.4%	3.6%	3.7%
2009	4.7%	4.6%	5.4%	7.8%
2010	6.9%	6.8%	6.2%	6.5%
2011	6.5%	6.7%	6.1%	6.1%
2012	8.7%	6.9%	7.7%	8.0%
2013	7.0%	8.3%	7.1%	5.1%
2014	7.4%	6.7%	6.5%	8.8%
2015	7.2%	6.5%	6.3%	6.1%
2016	6.9%	5.6%		

Table C.4.3.8 Historical regional unemployment rates in the Wellington region

Unemployment rate in Wellington				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	8.7%	8.4%	8.2%	8.3%
1992	10.1%	8.0%	9.6%	10.0%
1993	10.0%	8.9%	9.2%	9.5%
1994	9.3%	9.3%	8.0%	7.7%
1995	7.6%	6.4%	6.5%	6.9%
1996	7.6%	6.4%	5.4%	6.0%
1997	6.6%	5.3%	5.0%	5.8%
1998	5.8%	5.4%	5.7%	7.1%
1999	6.7%	6.7%	5.1%	4.2%
2000	6.4%	5.4%	5.1%	4.8%
2001	4.5%	3.3%	4.7%	4.8%
2002	5.9%	4.6%	4.9%	5.0%
2003	6.2%	4.9%	4.8%	5.6%
2004	4.8%	4.8%	4.0%	4.0%
2005	4.7%	4.2%	3.2%	3.1%
2006	5.8%	5.9%	3.7%	4.5%
2007	4.7%	3.4%	3.3%	2.4%
2008	5.0%	3.1%	3.4%	3.5%
2009	4.7%	5.3%	5.6%	6.0%
2010	5.1%	4.8%	4.5%	4.8%
2011	6.4%	4.8%	5.0%	6.6%
2012	5.6%	5.9%	6.4%	7.1%
2013	6.2%	5.8%	5.4%	6.0%
2014	5.1%	5.0%	5.2%	5.5%
2015	5.7%	5.1%	6.2%	5.3%
2016	5.9%	5.3%		

Table C.4.3.9 Historical regional unemployment rates in the Nelson region

Unemployment rate in Nelson				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	9.3%	8.0%	7.1%	9.7%
1992	9.4%	6.1%	7.3%	9.1%
1993	8.3%	9.4%	7.9%	9.4%
1994	9.9%	6.8%	6.0%	6.5%
1995	7.7%	4.2%	5.5%	4.2%
1996	4.9%	5.9%	6.1%	7.2%
1997	5.2%	5.9%	4.8%	4.8%
1998	5.5%	7.3%	5.9%	5.3%
1999	6.2%	5.7%	6.8%	6.3%
2000	4.9%	5.4%	4.6%	4.7%
2001	3.0%	2.5%	4.6%	4.1%
2002	3.5%	4.0%	2.3%	4.3%
2003	3.5%	3.0%	3.8%	3.6%
2004	2.8%	3.3%	1.9%	2.2%
2005	2.8%	2.4%	2.6%	3.3%
2006	4.2%	2.1%	3.2%	3.2%
2007	2.3%	3.4%	2.5%	2.6%
2008	3.3%	2.9%	3.2%	3.3%
2009	2.9%	3.2%	4.0%	4.4%
2010	4.7%	3.2%	3.7%	4.4%
2011	5.0%	4.0%	3.7%	4.6%
2012	5.5%	4.3%	4.3%	5.7%
2013	4.6%	4.0%	3.8%	4.1%
2014	4.9%	3.9%	3.2%	6.1%
2015	4.3%	4.4%	5.0%	4.0%
2016	5.0%	5.8%		

Table C.4.3.10 Historical regional unemployment rates in the Canterbury region

Unemployment rate in Canterbury				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	8.7%	9.0%	9.8%	9.8%
1992	8.8%	9.3%	8.9%	8.5%
1993	9.7%	7.4%	6.6%	8.0%
1994	8.2%	7.2%	5.9%	6.5%
1995	6.0%	5.9%	5.2%	6.0%
1996	6.8%	6.0%	5.6%	6.3%
1997	7.2%	6.1%	6.8%	6.2%
1998	8.0%	7.6%	7.1%	8.5%
1999	7.8%	7.2%	7.1%	6.7%
2000	5.9%	6.2%	5.5%	5.4%
2001	6.0%	5.8%	5.2%	5.0%
2002	5.5%	4.7%	5.6%	4.2%
2003	4.4%	4.3%	4.4%	3.7%
2004	4.4%	4.0%	3.6%	3.1%
2005	4.0%	2.6%	3.0%	2.4%
2006	3.8%	2.7%	2.9%	2.9%
2007	3.3%	3.1%	2.7%	2.4%
2008	2.6%	3.1%	3.0%	3.3%
2009	4.5%	4.7%	5.2%	4.9%
2010	5.3%	4.5%	4.8%	5.4%
2011	4.9%	5.3%	4.9%	4.4%
2012	4.8%	6.0%	4.8%	4.4%
2013	4.0%	4.0%	3.9%	3.1%
2014	3.2%	2.7%	3.1%	3.4%
2015	2.8%	3.0%	3.5%	3.3%
2016	2.7%	3.2%		

Table C.4.3.11 Historical regional unemployment rates in the Southern region

Unemployment rate in Southern				
Year	31-Mar	30-Jun	30-Sep	31-Dec
1991	7.2%	7.9%	9.6%	9.7%
1992	7.8%	8.6%	8.6%	7.6%
1993	7.2%	7.1%	8.0%	7.1%
1994	5.6%	6.5%	6.5%	6.0%
1995	4.9%	5.1%	3.8%	6.3%
1996	4.9%	5.5%	4.9%	4.7%
1997	4.8%	5.1%	5.4%	6.2%
1998	6.7%	6.6%	7.6%	7.3%
1999	7.1%	6.7%	6.5%	6.1%
2000	6.7%	5.8%	5.1%	5.7%
2001	4.5%	5.1%	5.4%	4.3%
2002	5.5%	4.7%	5.6%	4.9%
2003	5.1%	4.9%	4.9%	5.1%
2004	3.9%	3.9%	4.2%	3.4%
2005	4.2%	3.5%	2.6%	3.1%
2006	4.7%	2.9%	3.2%	3.2%
2007	3.2%	3.3%	2.9%	2.7%
2008	2.3%	3.6%	2.8%	2.8%
2009	3.6%	4.5%	4.7%	3.9%
2010	5.0%	4.3%	3.7%	4.6%
2011	4.0%	4.3%	4.2%	4.5%
2012	4.5%	4.1%	4.8%	4.1%
2013	3.9%	5.3%	4.8%	4.6%
2014	4.4%	3.1%	3.3%	3.6%
2015	3.5%	4.3%	4.3%	4.1%
2016	4.5%	4.7%		

Notes:

(a) Regional unemployment rates sourced from Stats NZ. Figures are not seasonally adjusted.

(b) Southern region rates are the population weighted average of two Statistics NZ regions; Southland and Otago.

(c) These figures may differ from those previously presented as Statistics NZ has revised the way in which they report the unemployment rate.

C.5 Methodology for projecting regional unemployment rates

C.5.1 Regional unemployment rate approach – historical series

Our valuation models use a seasonally adjusted unemployment rate for New Zealand and its regions. Regional rates are only available in raw form, i.e. not seasonally adjusted. Therefore, for consistency in our modelling process, it is necessary to first produce seasonally-adjusted series of regional unemployment rates. We also remove some of the quarterly volatility via smoothing.

Our approach to producing adjusted regional unemployment rate series is as follows:

- » Source raw data from Statistics NZ
- » Calculate de-seasonalisation factors, taken as the average amount that quarter of year is above or below the average for a five-year moving window centred at that date. For example, the 1991Q2 de-seasonalisation factor is the average unemployment rate for Q2 in '89, '90, '91, '92, and '93 compared to the overall average in those five years
- » Centre the de-seasonalisation factors so that each rolling year of factors is centred at 100%
- » Use these centred de-seasonalisation factors to produce seasonally adjusted time series
- » Smooth the time series by using neighbouring quarters:

$$UE(t) = 0.25 UE(t - 1) + 0.5 UE(t) + 0.25 UE(t + 1)$$

C.5.2 Regional unemployment rate approach – projection series

The following approach is used to derive regional forecasts:

- » Find regional weights using the average total labour force over 2015/16.
- » Assume the quarters from 2005Q3 through to 2008Q2 represent a period of 'full employment', and calculate the average unemployment in each region over this period.
- » Calculate the difference between the regional average and national average over that period. These differentials are used in the regional long term rate assumption.
 - Currently Treasury uses 4.3% as the national long term unemployment rate. For example, a differential of +1.1% was calculated for Northland (over 2005-2008), so the Northland long term rate is 5.4%.
- » Mirror the Treasury projection shape for each region, taking the unemployment rate from the current level to the long-term average rate over 5 years.
 - Manual adjustment was made to the Canterbury projection; Canterbury's rate was judged to be lower than full employment, and a slow increase to 3.3% was assumed.
- » Add a correction factor to each future quarter, to ensure that the weighted average unemployment rate equals that used at the national level.

The forecast regional unemployment rates are shown below.

Table C.4.1 Projected regional unemployment rates

Date	Unemployment rate					
	Northland	Auckland	Waikato	Plenty	East coast	Taranaki
30-Sep-16	8.9%	5.0%	5.0%	5.0%	5.9%	4.7%
31-Dec-16	8.6%	4.9%	4.9%	5.0%	5.9%	4.7%
31-Mar-17	8.4%	4.9%	4.9%	4.9%	5.8%	4.6%
30-Jun-17	8.3%	4.9%	4.9%	4.9%	5.8%	4.6%
30-Sep-17	8.3%	4.9%	4.9%	4.9%	5.8%	4.6%
31-Dec-17	8.0%	4.8%	4.8%	4.9%	5.8%	4.5%
31-Mar-18	7.5%	4.8%	4.7%	4.8%	5.7%	4.4%
30-Jun-18	7.2%	4.7%	4.6%	4.8%	5.7%	4.4%
30-Sep-18	6.4%	4.6%	4.5%	4.6%	5.6%	4.2%
31-Dec-18	5.8%	4.5%	4.4%	4.6%	5.5%	4.1%
31-Mar-19	5.5%	4.4%	4.3%	4.5%	5.4%	4.0%
30-Jun-19	5.2%	4.4%	4.3%	4.5%	5.4%	4.0%
30-Sep-19	5.2%	4.4%	4.3%	4.5%	5.4%	4.0%
31-Dec-19	5.2%	4.4%	4.3%	4.5%	5.4%	4.0%
31-Mar-20	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%
30-Jun-20	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%
30-Sep-20	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%
31-Dec-20	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%
31-Mar-21	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%
30-Jun-21 & Later	5.4%	4.4%	4.3%	4.5%	5.4%	4.0%

Date	Unemployment rate					
	Central	Wellington	Nelson	Canterbury	Southern	Total
30-Sep-16	5.9%	5.4%	5.2%	3.1%	4.4%	5.0%
31-Dec-16	5.9%	5.3%	5.1%	3.1%	4.4%	4.9%
31-Mar-17	5.8%	5.3%	5.0%	3.1%	4.3%	4.9%
30-Jun-17	5.8%	5.3%	5.0%	3.1%	4.3%	4.8%
30-Sep-17	5.8%	5.3%	4.9%	3.1%	4.3%	4.8%
31-Dec-17	5.8%	5.2%	4.8%	3.1%	4.3%	4.8%
31-Mar-18	5.7%	5.1%	4.5%	3.2%	4.1%	4.7%
30-Jun-18	5.6%	5.0%	4.4%	3.2%	4.1%	4.6%
30-Sep-18	5.5%	4.8%	4.0%	3.2%	3.9%	4.5%
31-Dec-18	5.4%	4.7%	3.7%	3.3%	3.8%	4.4%
31-Mar-19	5.3%	4.6%	3.6%	3.3%	3.7%	4.3%
30-Jun-19	5.3%	4.6%	3.4%	3.3%	3.7%	4.3%
30-Sep-19	5.3%	4.6%	3.4%	3.3%	3.7%	4.3%
31-Dec-19	5.3%	4.6%	3.4%	3.3%	3.7%	4.3%
31-Mar-20	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%
30-Jun-20	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%
30-Sep-20	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%
31-Dec-20	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%
31-Mar-21	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%
30-Jun-21 & Later	5.3%	4.6%	3.5%	3.3%	3.7%	4.3%

Notes:

(a) The "Total" column in the table above represents the national unemployment rate, consistent with Appendix C.3.2

C.6 Expense rates

Table C.6.1 Projected expense rates with comparison to previous rates

Year	Previous Valuation	Present Valuation	Difference
2017	12.2%	12.2%	0.0%
2018	12.2%	12.6%	0.3%
2019	12.3%	12.9%	0.5%
2020	12.4%	13.2%	0.8%
2021	12.4%	13.5%	1.1%
2022	12.3%	13.3%	1.0%
2023	12.2%	13.2%	1.0%
2024	12.2%	13.1%	0.9%
2025	12.1%	13.0%	0.8%
2026	12.1%	12.8%	0.7%
2027	12.1%	12.7%	0.6%

Notes:

- (a) Previous valuation refers to 2015 actuarial valuation of the benefit system
- (b) Expense rate is expressed as a percentage of total future payments excluding overpayments and recoverable assistance

C.7 Overpayments and Recoverable Assistance

For each of overpayments and recoverable assistance we must estimate:

1. The amount of new debts raised
2. The level and speed of recovery of debts

For overpayments, both items are estimated by an aggregate analysis of historical numbers. For recoverable assistance, new amounts are modelled at an individual level and recoveries are estimated using an aggregate analysis.

The overall rates estimated using aggregate analysis are shown in the table below.

Table C.6.1 Assumptions related to incurred overpayments and recoverable assistance recoveries

	Previous Valuation	Present Valuation	Difference
Overpayment – rate of new debts raised	3.20%	3.40%	0.20%
Overpayment – overall rate of recovery	85.1%	86.8%	1.7%
Recovery rate for recoverable assistance	91.6%	87.3%	-4.35%

Notes:

- (a) Previous valuation refers to 2015 actuarial valuation of the benefit system
- (b) Overpayment proportion refers to the percentage of extra benefit payments paid that relate to overpayments/fraud
- (c) Recovery rate for recoverable assistance refers to the percentage of recoverable assistance that is recovered each quarter

Prior to 2015 the rate of overpayments was estimated including Superannuation-related debts. These were split out in 2015, allowing us to better estimate the (lower) recovery rate on recoverable assistance. We staggered the decrease over two valuations, with the 87.3% in the table above close to the average observed over the last 12 months. The change is also discussed in Section 7.4 of the report.

Overpayments also require a timing schedule. We model both increases (new debts for the same individual) and decreases (write-offs and recoveries) over 15 years. The adopted schedule for the first 10 years is shown below.

Table C.6.2 Overpayments (and fraud) payment and recovery schedule

Duration (a)	Raised (b)	Recovery Rate (c)	Write off Rate (d)	Amount recovered or written off (e)	Amount Written off (f)	Overpays paid by MSD (g)	Overpayments recovered by MSD (h)	Overpayments outstanding (i)
0	0.714	47.9%	1.3%	34.2%	0.004	71.4%	33.7%	0.372
1	0.804	36.0%	4.3%	16.6%	0.007	8.9%	15.9%	0.296
2	0.845	22.1%	4.3%	7.5%	0.003	4.1%	7.1%	0.262
3	0.872	15.9%	4.3%	4.6%	0.002	2.7%	4.4%	0.244
4	0.896	11.9%	4.3%	3.2%	0.001	2.4%	3.0%	0.235
5	0.912	10.8%	4.3%	2.7%	0.001	1.7%	2.6%	0.225
6	0.924	9.2%	4.3%	2.2%	0.001	1.2%	2.1%	0.215
7	0.935	8.5%	4.3%	1.9%	0.001	1.1%	1.8%	0.207
8	0.943	7.9%	4.3%	1.7%	0.001	0.8%	1.6%	0.198
9	0.950	7.4%	4.3%	1.5%	0.001	0.7%	1.4%	0.189
10	0.956	6.9%	4.3%	1.3%	0.001	0.6%	1.3%	0.182
11	0.961	6.4%	4.3%	1.2%	0.001	0.5%	1.1%	0.175
12	0.964	5.9%	4.3%	1.1%	0.000	0.3%	1.0%	0.167
13	0.968	5.5%	4.3%	0.9%	0.000	0.4%	0.9%	0.162
14	0.970	5.1%	4.3%	0.8%	0.000	0.2%	0.8%	0.156
15	0.973	4.8%	4.3%	0.8%	0.000	0.2%	0.7%	0.151
16	0.975	4.4%	4.3%	0.7%	0.000	0.2%	0.6%	0.146
17	0.978	4.1%	4.3%	0.6%	0.000	0.3%	0.6%	0.143
18	0.980	3.8%	4.3%	0.6%	0.000	0.2%	0.5%	0.139
19	0.981	3.6%	4.3%	0.5%	0.000	0.2%	0.5%	0.135
20	0.983	3.3%	4.3%	0.5%	0.000	0.2%	0.4%	0.133
21	0.984	3.1%	4.3%	0.4%	0.000	0.1%	0.4%	0.130
22	0.985	2.9%	4.3%	0.4%	0.000	0.1%	0.4%	0.127
23	0.986	2.7%	4.3%	0.3%	0.000	0.1%	0.3%	0.125
24	0.987	2.5%	4.3%	0.3%	0.000	0.1%	0.3%	0.123
25	0.989	2.3%	4.3%	0.3%	0.000	0.1%	0.3%	0.121
26	0.990	2.2%	4.3%	0.3%	0.000	0.2%	0.3%	0.120
27	0.991	2.0%	4.3%	0.2%	0.000	0.1%	0.2%	0.119
28	0.992	1.9%	4.3%	0.2%	0.000	0.1%	0.2%	0.117
29	0.993	1.7%	4.3%	0.2%	0.000	0.1%	0.2%	0.117
30	0.994	1.6%	4.3%	0.2%	0.000	0.1%	0.2%	0.115
31	0.995	1.5%	4.3%	0.2%	0.000	0.1%	0.2%	0.114
32	0.995	1.4%	4.3%	0.2%	0.000	0.1%	0.2%	0.113
33	0.997	1.3%	4.3%	0.1%	0.000	0.1%	0.1%	0.113
34	0.997	1.2%	4.3%	0.1%	0.000	0.0%	0.1%	0.112
35	0.998	1.1%	4.3%	0.1%	0.000	0.0%	0.1%	0.111
36	0.998	1.0%	4.3%	0.1%	0.000	0.0%	0.1%	0.111
37	0.998	1.0%	4.3%	0.1%	0.000	0.0%	0.1%	0.110
38	0.999	0.9%	4.3%	0.1%	0.000	0.0%	0.1%	0.109
39	0.999	0.8%	4.3%	0.1%	0.000	0.0%	0.1%	0.109
40	0.999	10.0%	95.0%	1.1%	0.010	0.0%	0.1%	0.098

Notes:

- (a) Number of quarters since the initial debt raised
- (b) The amount of total eventual overpayments attributable to a cash flow, by duration - expressed per notional \$1 of overpayments
- (c) The percentage of outstanding overpayments that is either recovered or written off
- (d) The percentage of overpayments recovered that are actually written off
- (e) Column (c) times the change in column (b) from the previous row
- (f) Column (d) times (e)
- (g) Change in column (b) from the previous row
- (h) Column (e) minus (f)
- (i) Previous row of (i) plus (g) minus (e)

APPENDIX D DATA SUPPLIED

D.1 SAS datasets

The following SAS datasets relating to benefit receipt supplied by MSD were used to conduct the valuation. These datasets include information up to 30 June 2016 but were extracted as at 31 July 2016:

- » **rate_period_20160630.sas7bdat:** Rate file with one record per client and benefit spell that contains:
 - Client identification number
 - Benefit type code (plus codes for supplementary benefits)
 - Gross and net payment amounts for primary benefit
 - Payment amounts for any supplementary benefits
 - Spell start and end date

The dataset covered spells from March 1993 through to 30 June 2016, the valuation date.

- » **ahpy_lumpsum1_20160630.sas7bdat:** Lump sum file which covers those payment types recorded on system in a lump sum fashion (single date, rather than spell start and end dates). Fields include:
 - Client identification number
 - Benefit type code
 - Gross and net payment amounts
 - Input date
- » **ahpy_ccs_20160630.sas7bdat:** Similar to the ahpy_lumpsum1 file, except specific to the child care subsidy benefit, which was not included on the original lump sum file.
- » **rate_cda_20160630.sas7bdat:** Similar to the rate_period file, but specific to the child disability allowance benefit, which was not included on the original rate_period file.
- » **spel_20160630.sas7bdat:** File with one row per spell per client, containing a variety of fields related to the spell. The “oldcomdt” field contained the first payment date for the spell, which was used to overwrite spell commencement dates before the 1993 system change.
- » **swn_20160630.sas7bdata:** File with one row per client, with a range of static variables. This dataset was used to determine age, gender, education level and ethnicity for each client.
- » **swns_with_dob_eth_20160630.sas7bdat:** File with one row per client, containing client ID and age for all clients. This data set was used to fill in this information for those clients where it was not included in swn20160630.sas7bdat.
- » **chd_20160630.sas7bdat:** File containing one record for every ‘child spell’ per client. This effectively provides child records to attach to all benefit spells which depend on the age and number of children. Child age is also included.
- » **dist_20160630.sas7bdat:** File containing one record for every district per spell per client. This allows the assignment of each client spell to their district and region.
- » **dist_changes_20160801.sas7bdat:** File containing further records on districts by client and spell. Used to fill in information for client spells where it was not included in dist_20160630.sas7bdat.
- » **yp_ypp_regions_20160801.sas7bdat:** File similar in structure to the rate file, but only for clients in the new youth payment or young parent payment. An additional field indicates which of the two payments the client actually received.

- » **ptnr_20160630.sas7bdat:** File containing one record for every ‘partner spell’ per client. This allows the assignment of each client’s partner details on the historical data. The partner’s identification number is also included.
- » **incp_20160630.sas7bdat:** File containing one record for every ‘incapacity spell’ per client. This allows the assignment of each incapacity details such as type and number of incapacities to JS-HCD and SLP-HCD clients.
- » **Slpreass_20161213.sas7bdat:** File contained the required HCD reassessment frequency for SLP-HCD clients as at 30 June 2011, as at 30 June 2015 and 30 June 2016. This was primarily provided for segmentation work and testing for possible inclusion in future modelling.
- » **cyf_summary_20160630.sas7bdat:** File containing one record per client per child protection (CP) or youth justice (YJ) spell. This allowed the calculation of CP and YJ related variables for each client including the age of first entry into the CP and YJ and total number of CP and YJ events.
- » **mmc_period_20160630.sas7bdat:** File containing one record per client per corrections sentence served. This allowed the calculation of criminal history related variables for each client including the percentage of time spent in prison over the last year and the percentage of time serving sentences over the last ten years excluding those for driving offences.
- » **Dmatch_id_20160921.sas7bdat:** File linking anonymous identities from different sources including children registered to parents while on benefits, corrections identities, CP/YJ identities and social housing identities. The matches in this file were used to attach CP/YJ, criminal history, intergenerational and social housing related variables to beneficiaries.

The 2016 valuation uses a combined benefit system – social housing model, we were also supplied with historical data for social housing. Responsibility for all social housing data (tenancies, register applications, houses) moved from Housing New Zealand (HNZ) to MSD in August 2015. We have been provided with records from HNZ from 2001 through to August 2015 in the following SAS datasets:

- » **new_applications.sas7bdat:** File with one record per new application to the social housing register from outside the social housing system.
- » **new_applications_household.sas7bdat:** File with one record per household member for each new application to the social housing register from outside the social housing system.
- » **transfer_applications.sas7bdat:** File with one record per transfer application to the social housing register from within the social housing system.
- » **transfer_applications_household.sas7bdat:** File with one record per household member for each transfer application to the social housing register from within the social housing system.
- » **register_snapshot.sas7bdat:** File with one record per application on the social housing register per end-of-month snapshot date. Includes information on application date, reasons for application, household size, type and current location of the applicant household and housing requirements such as number of bedrooms and preferred locations.
- » **register_household_snapshot.sas7bdat:** File with one record per household member on the social housing register per end-of-month snapshot date. Includes information on the relationship to primary applicant and demographic variables.
- » **register_exit.sas7bdat:** File with one record per exit from the social housing register.
- » **houses_snapshot.sas7bdat:** File with one record per social house per end-of-month snapshot date. Includes information on location, house details, and market rent.

- » **tenancy_snapshot.sas7bdat:** File with one record per social house tenancy per end-of-month. Includes information on the size, type and weekly income of the tenant household, the dates of entry into social housing, the current social house and details of income-related rent and subsidies that make up the market rent of the house.
- » **tenancy_household_snapshot.sas7bdat:** File with one record per household member in a social house tenancy per end-of-month snapshot date. Includes information on the relationship to primary householder and demographic variables.
- » **tenancy_exit.sas7bdat:** File with one record per exit from a social house.

We have also been provided with records from MSD which cover social housing information for the period from August 2015 to June 2016:

- » **register_snapshot_20160630.sas7bdat:** File with one record per application on the social housing register per end-of-month snapshot date. Includes information on application date, reasons for application, household size, type and current location of the applicant household and housing requirements such as number of bedrooms and preferred locations.
- » **register_hh_snapshot_20160630.sas7bdat:** File with one record per household member on the social housing register per end-of-month snapshot date. Includes information on the relationship to primary applicant and demographic variables.
- » **houses_snapshot_cid_tr_20160630.sas7bdat:** File with one record per social house per end-of-month snapshot date. Includes information on location, house details, and market rent.
- » **tenancy_snapshot_20160630.sas7bdat:** File with one record per social house tenancy per end-of-month. Includes information on the size, type and weekly income of the tenant household, the dates of entry into social housing, the current social house and details of income-related rent and subsidies that make up the market rent of the house. This also distinguished between HNZ and CHP providers.
- » **tenancy_hh_snapshot_20160630.sas7bdat:** File with one record per household member in a social house tenancy per end-of-month snapshot date. Includes information on the relationship to primary householder and demographic variables.
- » **evidence_items_20160921.sas7bdat:** File with records for social housing clients which dropped out of the data on migration. Included their start and end dates of social housing spells and associated households. Approximate age was also provided. These clients are mostly children with some additional occupants and not in receipt of benefits.
- » **mig_map_register_20160629.sas7bdat:** File with register applications at August 2015 mapped from the HNZ to MSD systems. Used in combination with other migration mappings, Dmatch_id_20160921.sas7bdat to construct the longitudinal series for modelling.
- » **mig_map_register_hh_20160629.sas7bdat:** File with individuals on register applications at August 2015 mapped from the HNZ to MSD systems. Used in combination with other migration mappings, Dmatch_id_20160921.sas7bdat to construct the longitudinal series for modelling.
- » **mig_map_tenancy_20160622.sas7bdat:** File with households in social housing at August 2015 mapped from the HNZ to MSD systems. Used in combination with other migration mappings, Dmatch_id_20160921.sas7bdat to construct the longitudinal series for modelling.
- » **mig_map_tenancy_hh_20160701.sas7bdat:** File with individuals in social housing at August 2015 mapped from the HNZ to MSD systems. Used in combination with other migration mappings, Dmatch_id_20160921.sas7bdat to construct the longitudinal series for modelling.

D.2 Loan data

Data on client loans in the form of recoverable assistance was provided in a SAS dataset, **dv_debt_summary_20160923.sas7bdat**. Fields include:

- » Client identification number
- » Debt number (a unique number for each debt)
- » Breach type (Overpayment, Fraud, or Recoverable Assistance)
- » Year and quarter
- » Debt established
- » Total recoverable for debt and quarter
- » Total adjustment for debt and quarter
- » Total write-off for debt and quarter

There is an entry for every client who had a debt balance at 1 July 2007, plus one entry per client per change to their debt status (e.g. repayment made or debt issued) from 1 July 2007 to 30 June 2016. Pre-1 July 2007 data is not split by breach type.

The file **prov9yr_20160630.sas7bdat** was also provided. It is a data table giving the outstanding provision for debts owed to MSD as at 30 June 2016. It contains one row per client, their aggregated debt plus a range of other static variables.

D.3 Benefit rates

Our analysis requires the conversion of historical payments to “current values”. A series of pdf documents **BenefitRateSummary_1999-04-01.pdf**, **BenefitRateSummary_2000-04-01.pdf** etc. has previously been provided showing all benefit rates whenever they were updated (typically 1 April, and occasionally 1 September, each year). A spreadsheet **Benefit Rates pre 1999.XLS** has also previously been provided with values applicable before 1999. All but the most recent benefit rate information was carried across from the previous valuation. The most recent information was provided in **benefit-rates-april-2016.pdf**.

D.4 Historical and forecast economic variables

- » **hyefu16-charts-data.xls**: Treasury fiscal strategy model, 2016 version. Excel spreadsheet containing historical quarterly values as well as Treasury forecasts for the next five years for each of population, employment and unemployment rates.
- » **disc-rates-jun16.xls**: Excel spreadsheet containing Treasury assumptions for government accounts for future discount and inflation rates as at June 2016.

D.5 Miscellaneous files

Several other files were either supplied or carried across from the prior valuations that aided investigation and interpretation, but did not directly feed into the valuation:

- » **benefit_cancellations.sas7bdat**: Contains identifiers for codes related to reasons for leaving benefits
- » **benefit_codes.sas7bdat**: Contains identifiers for different benefit codes
- » **district_codes.sas7bdat**: Contains identifiers for district codes and corresponding regions

Various other summary files, file descriptors and overviews were also provided on an ad hoc basis.

APPENDIX E VALUATION SCOPE

The current and future client liabilities comprise of a number of different types of payments and costs. These are summarised in the following figure:

Figure E.1 Summary of payment categories included in the valuation

Tier 1 benefits			Tier 2 benefits	Tier 3 benefits	Other costs
Jobseeker - WR	Jobseeker -HCD	Emergency benefit	Accommodation supplement	Hardship payments	
Youth Payment	Sole Parent Support	Young Parent Payment	Disability allowance	Recoverable assistance	
Supported Living Payment - HCD	Supported Living Payment - Carer	Orphans/ U/supp child	Child disability allowance		
Work-focused investments			Childcare subsidy	Employment interventions	Expenses
Income support administration					Expenses, overpayments, write-offs

The table below gives further details on this categorisation. In particular, it identifies into which components some of the smaller payments have been allocated. Note that all payments to beneficiaries aged over 65 have been excluded from scope. In this table we have attempted consistency with Treasury appropriations for 2015/16⁴.

Multi-Category Expenses and Capital Expenditure	Allocation
Administering Income Support (M63) This category is limited to assessing, paying, reviewing entitlements and collecting balances owed by clients for income support, supplementary assistance, grants and allowances.	Income support administration (Benefit processing)
Improving Employment Outcomes – Service Provision (M63) This category is limited to providing services, including services provided in accordance with criteria set out in delegated legislation under the Social Security Act 1964, to facilitate transitions to work for people who are receiving or likely to receive working age benefits or youth support payments and are work ready to help them move into sustainable employment,	Income support administration (work-focused case management, work brokerage, etc.)
Improving Work Readiness – Service Provision (M63) This category is limited to providing services, including services provided in accordance with criteria set out in delegated legislation under the Social Security Act 1964, to address barriers to employment (such as literacy, numeracy, health, skills, drug or alcohol use, confidence and motivation) for people who are receiving or likely to receive working age benefits or youth support payments to help them become work ready.	Income support administration (work-focused case management, work brokerage, etc.)
MCA - Improving Employment outcomes – Assistance (M63)	Work-focused

⁴ <http://www.treasury.govt.nz/budget/2016/suppestimates/suppest16socdev.pdf>

<p>This category is limited to providing specified assistance, including services provided in accordance with criteria set out in delegated legislation under the Social Security Act 1964, to facilitate transitions to work to help people who are receiving or likely to receive working age benefits or youth support payments and are work ready to move into sustainable employment</p>	<p>investment (training)</p>
<p>Departmental Output Expenses</p>	<p>Allocation</p>
<p>Investigation of Overpayments and Fraudulent Payments and Collection of Overpayments (M63) This appropriation is limited to services to minimise errors, fraud and abuse of the benefit system and Income Related Rent, and services to manage the collection of overpayments, recoverable assistance loans and other balances owed by former clients.</p>	<p>Income support administration NB: NZ Super and student costs excluded</p>
<p>Collection of Balances Owed by Former Clients and Non-beneficiaries Services to manage the collection of overpayments and recoverable assistance loans from former clients and other balances owed comprising of Student Allowance overpayments, Liable Parent Contributions, and court ordered Maintenance. (Wound into Investigation of overpayment and fraudulent payments and collections of overpayment June 2015.)</p>	<p>Income support administration (Collections) NB: NZ Super and student costs excluded</p>
<p>Services to Protect the Integrity of the Benefit System Services to minimise errors, fraud and abuse of the benefit system. (Wound into Investigation of overpayment and fraudulent payments and collections of overpayment June 2015.)</p>	<p>Income support administration (Integrity Services)</p>
<p>Tailored Sets of Services This appropriation is limited to delivering tailored sets of services to individuals to help them into sustainable employment, participate more fully in their community or achieve a greater level of social independence; and the management of related non-departmental output contracts. The composition of each set of services is determined by the individual's needs and selected from a mix of employment readiness training and support, employment placement, social support services, payment of income support and training support benefits, and referrals to other employment or social support providers. (Wound into MCA Jan 2014)</p>	<p>Income support administration (Benefit processing) and Work-focused investments (work-focused case management, work brokerage, etc.)</p>
<p>Vocational Skills Training This appropriation is limited to vocationally based skills training for working-age people through the Training Opportunities Programme. (Closed in December 2013).</p>	<p>Work-focused investment (training)</p>
<p>Non-Departmental Output Expenses</p>	<p>Allocation</p>
<p>Vocational Services for People with Disabilities Provision of vocational services for people with disabilities including community participation and employment services.</p>	<p>Work-focused investment (training)</p>
<p>Benefits and Other Unrequited Expenses</p>	<p>Allocation</p>
<p>Emergency Benefit (M63) This appropriation is limited to the provision of means tested income support for people who are eligible for an Emergency Benefit as set out in the Social Security Act 1964 and delegated legislation made under that Act. Benefit code 611.</p>	<p>Other Tier 1 Benefits – Emergency benefit</p>
<p>Jobseeker Support – Health Condition, Injury or Disability (M63) Provision of means-tested income support for people who are not in full-time employment and are limited in their capacity for work, or who are in</p>	<p>Key Tier 1 Benefits – JS-HCD</p>

employment but working at a reduced level, because of sickness, injury, disability or pregnancy. Paid in accordance with the criteria set out in the Social Security Act 1964. Benefit codes 600 and 601.	
Jobseeker Support – Work Ready (M63) This appropriation is limited to the provision of means tested income support for unemployed people who are able to work full time and taking steps to look for work. Eligibility for Jobseeker Support is set out in the Social Security Act 1964 and delegated legislation made under that Act. Benefit codes 115, 125, 603, 604, 605, 608 and 610.	Key Tier 1 Benefits – JS-WR
Orphan's Benefit (M63) Provision of income support for people charged with the responsibility for the care of a child whose parents are dead or cannot be located, or suffer a serious long-term disablement that renders them unable to care for the child, or where there has been a breakdown in the child's family. Paid in accordance with criteria set out in the Social Security Act 1964. Benefit codes 040, 044, 340 and 344.	Other Tier 1 Benefits – Orphan's/Unsupported Child
Sole Parents Support (M63) Provision of income support for sole parents, caregivers of sick or infirm people or women alone, whose domestic circumstances exclude them from fully participating in the labour force. Paid in accordance with criteria set out in the Social Security Act 1964. Benefit codes 313, 365, 613, 665.	Key Tier 1 Benefits – SPS
Supported Living Payment – Health Condition, Injury or Disability Provision of means-tested income support for people who are totally blind, or permanently and severely restricted in their capacity for work due to sickness, injury or disability. Paid in accordance with the criteria set out in the Social Security Act 1964. Benefit codes 020 and 320.	Key Tier 1 Benefits – SLP-HCD
Supported Living Payment – Carer Provision of income support for people who are caring full time for someone at home who is not their husband, wife or partner and, who would otherwise need to receive hospital or residential-level care. Paid in accordance with the criteria set out in the Social Security Act 1964. Benefit codes 367 and 667.	Key Tier 1 Benefits – SLP-Carer
Youth Payment and Young Parent Payment (M63) This appropriation is limited to the provision of income support and incentive payments for people aged 16, 17 or 18 years who are currently unemployed but are in or available for full-time education, training or work-based learning and where it is inappropriate for them to obtain financial support from their parents, and 16-, 17-, 18- and 19-year-old parents who are currently unemployed but are in or available for full-time education, training or work-based learning. Paid in accordance with criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act.	Key Tier 1 Benefits – YP and YPP
Accommodation Supplement (M63) This appropriation is limited to the Accommodation Supplement, Special Transfer Allowance, and Away From Home Allowance to persons to cover accommodation costs, paid in accordance with the criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act. Benefit codes 471, 470, 472, 473, 474 and 832.	Tier 2 – Accommodation supplement

<p>Child Disability Allowance (M63) This appropriation is limited to the Disability Allowance to the caregivers of children with a serious disability, paid in accordance with the criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act. Benefit code 065.</p>	Tier 2 – Child disability allowance
<p>Disability Allowance (M63) This appropriation is limited to the Disability Allowance to persons with disability costs, paid in accordance with the criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act. Benefit codes 425, 836, 837, 838, and 843.</p>	Tier 2 –Disability allowance
<p>Hardship Assistance (M63) This appropriation is limited to Civil Defence payments, Funeral Grants, Live Organ Donors Assistance, Special Benefit, Special Needs Grants and Temporary Additional Support to provide means-tested temporary financial assistance to persons with emergency or essential costs, paid in accordance with the criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act. Benefit codes 190, 191, 192, 193, 440, 450, 460, 461, 596, 621, 653, 654, 655, 830, 865 and 840.</p>	Tier 3 Benefits – Hardship Payments
<p>Special Circumstance Assistance (M63) This appropriation is limited to financial assistance to people in special circumstances and comprises the Clothing Allowance, and providing assistance for community costs, domestic violence and witness protection relocation, home help, social rehabilitation assistance, telephone costs paid in accordance with criteria set out in the Social Security Act 1964, and delegated legislation under that Act; and Civilian Amputees Assistance, paid in accordance with criteria set out in the Disabled Persons Community Welfare Act 1975.</p>	Tier 3 Benefits – Hardship Payments
<p>Childcare Assistance (M63) Provision of assistance for the costs of pre-school childcare that meets specific quality guidelines, where parents meet activity and income criteria set out in the Social Security Act 1964 and delegated legislation issued under that Act. Benefit code 062.</p>	Childcare subsidy
<p>Assistance to transition into employment (M63) Provision of payments to beneficiaries, low income earners, students and ex beneficiaries, who meet certain criteria, to assist in the transition from benefit to employment and the continuation of employment. Criteria are set out in relevant Welfare Programmes and Ministerial Directions pursuant to the Social Security Act 1964.</p>	Employment interventions
Non-Departmental Other Expenses	
Allocation	
<p>Debt Write-downs (M63) Provision for write-downs of Crown debt administered by the Ministry of Social Development due to debt write offs or debt provisions resulting from the need to value debt in accordance with generally accepted accounting practice.</p>	Tier 3 Benefits – Loans
<p>Improving Employment Outcomes – Assistance (M63) Provision of assistance to help address barriers faced by job seekers so they can become work ready, move into employment and stay in employment for longer periods of time. This employment assistance is governed by the Cabinet and Ministerial Guidelines for Employment and Training Assistance.</p>	Work-focused investments (training)
<p>Employment Assistance This appropriation is limited to the provision of transition support, further training, education and employment activities for all school leavers aged 15 to 20 years. This was wound into MCA in January 2014.</p>	Work-focused investment (training)

<p>Mainstream The Mainstream Employment Programme provides a package of subsidies, training, and other support to help people with significant disabilities get work in the State sector. This was wound into MCA in January 2014.</p>	<p>Work-focused investment (training)</p>
<p>Out of School Care Programmes (M63) Provision of assistance to CYF approved OSCAR programmes to assist with the establishment and/or operating costs of OSCAR programmes.</p>	<p>Work-focused investments (OSCAR)</p>
<p>Non-Departmental Capital Expenditure</p>	
<p>Recoverable Assistance (M63) Facility for low-income earners and beneficiaries to access means-tested assistance to enable them to meet essential and immediate needs, or costs in specific circumstances. Criteria are set out in relevant Welfare Programmes and Ministerial Directions pursuant to the Social Security Act 1964.</p>	<p>Allocation Loans NB: net of recoveries on an annual basis</p>

APPENDIX F LIABILITY DEFINITION

Appendix B introduced the definitions of liability:

- » The **current client liability** consists of the estimated future lifetime costs of all benefit payments and associated expenses for working-age clients who received a benefit payment in the 12 months up to and including the effective date of the valuation.
- » The **future client liability** in each of the next five future years consists of all future benefit payments and associated expenses for working-age clients who enter the benefit system in the next five years either for the first time, or after being off benefit for more than 1 year at the previous 30 June.

F.1 Inclusion of recent recipients in current client liability

The current client liability includes those recipients who are currently receiving benefits as well as those who are not currently receiving but have received benefits sometime in the previous 12 months. We use this definition for the following reasons:

- » **Reducing spell definition issues:** Defining those people on benefit at a specific point in time can cause complications. For instance, some benefits are provided in lump sum form so the spell duration is not obvious and some benefits can have small breaks in spells. These factors have the potential to bias the liability upwards or downwards.
- » **Recently off-benefit clients have a higher probability of returning to benefits:** Of the former clients that have returned to Tier 1 benefits, we calculate that about 40% of them had been out of the system for less than a year. This high percentage means it is appropriate to still consider them at risk. By contrast, in 2015/16 only 18% of clients returning were in their second year off benefits and 11% in their third in that time.
- » **Reducing the potential for seasonal impacts:** The choice of the 30 June valuation date has relevance as there are many benefits that show seasonal effects, with differing numbers on various benefits on each quarter due to annual cycles in the economy. The 12-month rule helps mitigate this seasonality.

F.2 Working-age beneficiary assumption

The definition only includes those recipients of working-age; at least 16 and less than 65. We recognise that a small but not insignificant amount of benefits go to people beyond age 65, but have not valued this because:

- » These payments are highly interrelated with New Zealand Superannuation, which is outside the scope of this valuation
- » MSD intends to manage the liability by achieving better employment outcomes amongst current recipients. This objective has less relevance amongst clients over age 65
- » Limiting attention to ages below 65 significantly simplifies the analysis and reporting of the liability

Benefits payable to youths (aged 16-17) such as the Youth Payment (YP) and Young Parent Payment (YPP) have been included within the definition of working-age. This is because understanding the transitions and lifetime costs of clients entering the benefit system at a very young age provides important insight into the management of their liabilities.

F.3 Treatment of partners

Some benefits depend on relationship status and there are cases where both partners are on benefit. In theory, it would be possible to value couples as a unit as their future lifetime cost are likely to be dependent. However, in the valuation we have treated all clients individually, so that a primary client and their partner have separate lifetime cost estimates.

One practical implication for this approach is that much of MSD's reporting is based around counting couples as single units. Thus, there will be some differences in attempting to reconcile numbers in this report to other published numbers. It also means that partners of the primary recipients need to be allocated to segments, requiring us to generate our own measure of continuous duration, rather than using a measure supplied by MSD, which does not incorporate partner spells.

F.4 Future benefits different to those currently received

The definition above includes benefits payable in the future of a different type to those currently being received. For instance, a person who is currently receiving Jobseeker Support may in the future receive Supported Living Payment; these cash flows have been included and attributed to that client. The purpose of incorporating all future cash flows regardless of benefit type is to provide a basis for understanding long term benefit dependency and to provide a framework for investment decisions to reduce such dependency.

We recognise that this property can cause a “gearing” effect in the valuation, in that distant liabilities that MSD may have little current control over are included or excluded from the liability depending on current circumstances. For instance, suppose it is expected that a person will begin receiving Supported Living Payment in 20 years' time:

- » If the person has not been on a benefit during the last 12 months, these cash flows are excluded from the liability
- » However, if the person is currently or has been during the last 12 months on a different benefit (Jobseeker say), these future cash flows are included.

Thus, helping a Jobseeker Support recipient off benefits today would have a compound effect of removing both their Jobseeker Support payments and other benefits from the current client liability as measured at a future valuation one year from now, even if those later benefits will still occur.

Some alternative liability definitions exist that would not be subject to this effect. For example, the liability could be defined as payments until a client is off benefits for 12 months. While we recognise some advantages to alternative definitions, we believe the current one is to be preferred for the following reasons:

- » **Clients who are “in the social welfare system” are more likely to make use of other benefits:** For instance, in the example above a Jobseeker Support recipient is more likely to make use of the Supported Living Payment Benefit in the future than someone who has never been in the system. It is important to capture these effects to be able to manage long term dependency.
- » **Robustness:** The current definition is likely to be applicable under possible MSD policy and system changes, whereas this may be more difficult under more complex definitions.
- » **Given the level of switching between benefits, it encourages a holistic view of client liability:** Under the current definition the key means of reducing the liability is to encourage people to leave the system entirely, rather than simply leaving their current benefit. We believe this most closely ties in with MSD's philosophy of encouraging long-term employment outcomes.
- » **Simplicity:** More complex definitions would be harder to communicate effectively and reconcile from year to year.

F.5 Relative size of future client liabilities

As agreed with MSD, we have calculated the future liability for each of the next five years where the future liability is the lifetime cost relating to all clients that receive a benefit in each future year who had not received a benefit in the previous 12 months.

A practical issue that arises with this definition is that there is some double counting of cash flows in the current and future liabilities. To illustrate this, consider a client who:

- » Had received JS-WR in March 2016
- » Was not on benefits at the valuation date
- » Received no benefits over the 2016/17 year
- » Received further JS-WR benefits in 2017/18

In this example, cash flows relating to the client are now included in both the current liability and the future liability for 2017/18. Thus, if the cash flows (or liabilities) related to this client were added without adjustment there would be some double counting. In general, all future liability years apart from the first future year, will have some degree of double counting of liabilities.

Therefore, in our results sections where we present future cash flows and numbers on benefits, combining current and future liabilities, we have adjusted the projections related to the current client liability to remove this double counting.

F.6 Exclusion of Jobseeker Support – Student Hardship

As in the previous valuation, it was judged that the Jobseeker Support – Student Hardship was not an appropriate benefit type to include in the valuation for the following reasons:

- » All other financial assistance provided to students is excluded.
- » The benefit is highly seasonal - students only receive the benefit if they cannot find employment in the summer holidays. This pattern is less amenable to management, as the concept of a long-term beneficiary is not applicable.
- » The relationship between this benefit and other key benefits is fairly uncertain and has the possibility of skewing the main valuation transition models.

Therefore, client spells on this benefit have been ignored, both in terms of projecting cash flows and determining qualifying clients to include in the cohort to be valued.

F.7 Valuation of CCS, EI and HS components

The estimation of liabilities for Childcare Subsidy (CCS), Employment Interventions (EI) and Hardship Assistance (HS) are treated somewhat differently as it is considered that clients receiving these benefits should only be judged as being in the benefit system if they were also receiving another benefit. For CCS, there were three main reasons behind this decision, both theoretical and practical:

- » (Theoretical) The receipt of CCS only is not a strong indicator of a greater chance of receiving the main benefits.
- » (Practical) It is useful to separate those receiving CCS only from those receiving CCS in conjunction with another benefit. For example, MSD might want to reduce overall benefits being paid by increasing the number receiving CCS.
- » (Practical) The data for CCS is in an ad hoc file with no spell information.

Similar points apply to the other two benefit types, EI and HS. Additionally, both these benefits cover a range of payment codes whose relationship to the other Tier 1 and 2 benefits varies. For this reason, it was judged simplest to exclude them from the definition of the valuation cohort.

APPENDIX G DETAILS ON MODELLING APPROACH

G.1 Generalised linear models

Most of the models used in the valuation are generalised linear models so we give a brief overview of the theory behind these models here.

G.1.1 Overview

A generalised linear model ('GLM') is a generalisation of ordinary least squares regression that can deal with non-normally distributed response variables. Given a response variable y and a set of independent variables or predictors x_1, x_2, \dots, x_n , a GLM models the dependency as:

$$y = h^{-1} \left(\sum_{i=1}^n \beta_i x_i \right) + \varepsilon_i \quad (\text{F.1})$$

And

$$E(y) = \mu = h^{-1} \left(\sum_{i=1}^n \beta_i x_i \right) \quad (\text{F.2})$$

Where

$h^{-1}()$ is the **link function**

β_i ($i=1, 2, \dots, n$) is the **parameter** corresponding to the dependent variable x_i

ε_i is an **error** term.

Note that

$$\eta = \sum_{i=1}^n \beta_i x_i \quad (\text{F.3})$$

is referred to as the **linear predictor** and that the GLM may be written as:

$$y = h^{-1}(\eta) + \varepsilon_i \quad (\text{F.4})$$

Thus, a GLM consists of three components:

- » A probability distribution
- » A link function
- » A linear predictor.

G.1.2 Further detail

Probability distribution

In the equations (F.1) and (F.4) above, the error term ε_i is determined by the probability distribution of the response variable. Common distributions that may be used include:

- » Normal

- » Poisson
- » Gamma
- » Inverse Gaussian
- » Binomial

The choice of distribution is informed by the response variable. For example, counts are naturally modelled by a Poisson distribution while strictly positive continuous quantities may be appropriately handled by a Gamma or Inverse Gaussian distribution depending on the distribution of the response values. Probabilities may be modelled using a Binomial distribution.

Link function

The link function $h^{-1}()$ gives the relationship between the mean of the distribution and the linear predictor. There are many possibilities for the link function including (but not limited to):

- » Identity link: $h^{-1}(\eta) = \eta$
- » Log link: $h^{-1}(\eta) = \exp(\eta)$
- » Logit link: $h^{-1}(\eta) = \exp(\eta)/(1 + \exp(\eta))$

It is usually convenient to choose a link function which matches the domain of the link function to the range of the response variable's mean. In other words, if a response must be positive (for example, an average benefit payment), then a log link will ensure that the fitted value μ in equation (F.2) is positive. If the modelled quantity is a probability (for example, the probability of transitioning off benefit in the next quarter), then the logit link ensures that the fitted value lies between 0 and 1, as probabilities must.

Linear predictor

The linear predictor (equation F.3) is the quantity which incorporates the information about the independent variables into the model and is typically denoted by η . η is expressed as a linear combination of unknown parameters β_i and independent variables x_i ($i=1, 2, \dots$), which are known.

In all cases, once the probability distribution and the link function have been selected, the linear predictor (F.3) needs to be constructed. The steps to doing this include:

- » Identify the list of independent variables or predictors (x_i) to be considered.
- » Using data exploration, modelling techniques, statistical tests and prior knowledge, identify those x_i that are useful for predicting the response variable. Note that this may include functions of the predictors, rather than the raw predictors themselves.
- » Estimate the parameters β_i using GLM software.

The list of variables considered for the key benefits is given in Section G.5.

Functions of the predictors

The predictors or independent variables may be used as follows.

- » In their raw forms: For example, gender with two levels F and M.
- » As categorical groupings of the original variable: For example, age may be banded into several groups (<18, 18-29, 30-39 etc.).
- » As indicator functions depending on the value of the original variable where one condition is assigned the value 1 and the complementary position 0: For example, letting $I(\text{age} \geq 30)$ be 1 for age ≥ 30 and 0 otherwise would fit a step term at age 30.
- » As a spline for underlying raw predictors which are numeric or ordinal (e.g. age, benefit quarter, duration on benefit): The dependency of a linear predictor on duration could be modelled (if

appropriate) by a combination of several line segments. For instance, if the linear predictor varied in a linear fashion with duration with one slope from duration 1 to 4, a different slope from 4 to 12 and a third slope from 12 onwards, then using three line pieces (1-4, 4-12 and 12+) would capture this dependency. The points 4 and 12 where the resulting fitted spline bends are referred to as knot points.

- » As interaction terms: All of the above may be used as interaction terms. For example, a duration effect may be well fitted by one spline for those aged under 30 and another for those aged 30 and above. This could be accommodated by interacting the spline with the $I(\text{age} \geq 30)$ term.

G.1.3 Model fitting approach

Our typical approach to fitting a model includes the following:

- » First fit a saturated model including most, if not all, raw predictors as well as any known interactions. For continuous predictors like age, or categorical ordered predictors like duration, we would usually fit the predictor as a grouped version (e.g. for age which is in quarter years, we might fit it as integer years).
- » Simplify the model by:
 - Removing insignificant parameters
 - Grouping together related parameters with similar estimated values
 - Using splines where this is warranted
- » Using diagnostics check to see if there is evidence of poor fitting which may suggest the need for some interactions. Add additional terms as required until a satisfactory fit is obtained.

G.1.4 References

The following books give a complete introduction to GLMs:

- » McCullagh P. and Nelder J. (1989). Generalized linear models, second edition. Chapman and Hall, London UK.
- » Dobson A. J. (2002). An introduction to generalized linear models, second edition. Chapman & Hall/CRC, Florida USA.

For a discussion on the application of GLMs in contexts like the modelling of the MSD benefit liabilities (e.g. claim size and claim numbers modelling in insurance), the following papers provide some starting points.

- » England, P. D. and Verrall, R. J. (2002). Stochastic claims reserving in general insurance. British Actuarial Journal, 8 443-544.
- » Haberman, S. and Renshaw, A. E. (1996). Generalized linear models and actuarial science. The Statistician, 45 407-436.
- » Mulquiney, P. and Taylor, G. (2007). Modelling Mortgage Insurance as a multi-state process. Variance 1, 81-102.
- » Taylor, G. and McGuire, G (2004). Loss reserving with GLMs: a case study. Casualty Actuarial Society Discussion Paper Program 2004. Available at <http://www.casact.org/pubs/dpp/dpp04/04dpp327.pdf>

G.2 Transition models

Previously the modelling involved producing probability estimates for transitioning from any given benefit state to any other each quarter. With the combined benefit system – social housing projection the modelling involves producing probability estimates for

- » transitioning from any given benefit state to any other each quarter
- » transitioning from any given housing state to any other each quarter
- » making a register application or moving off the register.

In this context, 'benefit state' refers to the current main benefit received by the client, or a state of 'SUP' or 'NOB' if a client is receiving supplementary benefits only or is not on benefits respectively. 'Housing state' refers to if a client is in a social house (SH), receiving Accommodation Supplement (AS) or neither (Nil). These probabilities will depend on a client's state as well as other modelling variables, listed in Section G.5. The transition models are fitted using generalised linear models; further detail on their exact parameterisations is given in Appendix H – spreadsheet appendix.

The transition model approach focuses on understanding how people move through the system over time. It is worth mentioning here that there exist alternatives to such an approach (see for instance, the snapshot based approaches used in Section 15 of the 2012 valuation report for the segmentation analysis). However, we have chosen the transition approach for several reasons:

- » **Responsiveness:** Changes in movement behaviour observed in recent years can be correctly reflected in the models.
- » **Long range accuracy:** We can leverage the behaviour of clients at various stages of the welfare system to make appropriate long range assumptions. For instance, the behaviour of older clients can be used to model the behaviour of the younger clients in the distant future.
- » **Intuitive appeal:** A focus on measures such as probability of entering/exiting benefits is natural, and will allow easier drill down analysis.
- » **Consistency:** The approach worked well in both the first aggregate level (Level I) valuation and the segment level (Level II) valuations performed on 2011 and 2012 data.

The nine benefit states are illustrated diagrammatically in Figure G.1. While most of the 81 (i.e. 9 x 9) different benefit state transition types are observed in each quarter, it is worth noting that the likelihood of many of these transitions is very small. We also estimate probabilities for the 9 housing state transitions.

The most frequent benefit transitions are:

- » A client remaining in their current benefit state
- » A client moving from benefits to no benefits (moving into the NOB state)
- » A client moving from no benefits back to benefits (moving out of the NOB state)

We use a series of probability models which focus on these most probable transitions. We also note that the benefit population is not equally distributed across the various states. The largest six states are JS-WR, JS-HCD, SPS, SLP-HCD, SUP and NOB. Overall liability results will tend to be dominated by changes to these clients, by sheer weight of numbers.

Figure G.1 Benefit states in the valuation quarterly transition model

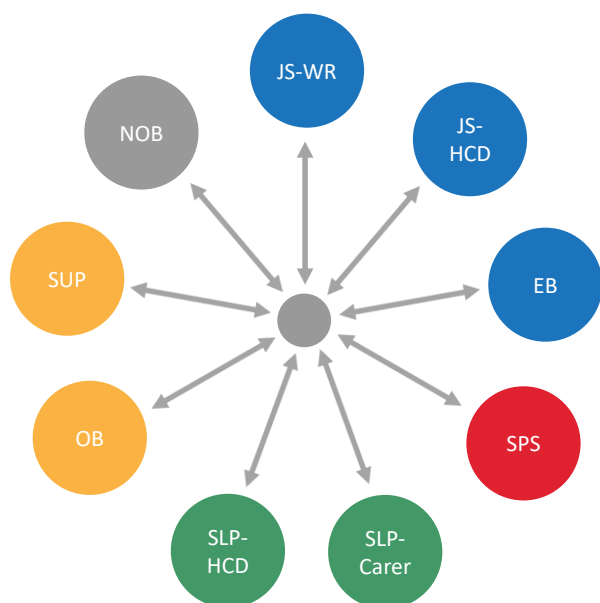


Table G.1 shows the models that have been fitted to describe the transition behaviour in the welfare system. Detailed parameter values for these models are given in Appendix H, with a brief guide to these provided in Section G.8. All models were GLMs with the standard logistic link, apart from eight multinomial models. These multinomial models used the multinomial extension to logistic regression.

Table G.1 List of benefit state transition models used in the valuation

Benefit state	Type	Model ID	Description
JS-WR	Logistic	jwr_tra	Probability that a client remains in JS-WR in the next quarter
JS-WR	Logistic	jwr_nob	Probability that a client moves from JS-WR to NOB, given that they leave JS-WR
JS-WR	Multi-nomial	jwr_mul	Multinomial probability of moving to JS-HCD, SLP-HCD, SPS and OTH, conditional on leaving JS-WR and not entering NOB
JS-HCD	Logistic	jhd_tra	Probability that a client remains in JS-HCD in the next quarter
JS-HCD	Logistic	jhd_nob	Probability that a client moves from JS-HCD to NOB, given that they leave JS-HCD
JS-HCD	Multi-nomial	jhd_mul	Multinomial probability of moving to JS-WR, SLP-HCD, SPS and OTH, conditional on leaving JS-HCD and not entering NOB
SPS	Logistic	sps_tra	Probability that a client remains in SPS in the next quarter
SPS	Logistic	sps_nob	Probability that a client moves from SPS to NOB, given that they leave SPS
SPS	Multi-nomial	sps_mul	Multinomial probability of moving to JS-WR, SLP-HCD, JS-HCD and OTH, conditional on leaving SPS and not entering NOB
SLP-HCD	Logistic	slh_tra	Probability that a client remains in SLP-HCD in the next quarter
SLP-HCD	Logistic	slh_nob	Probability that a client moves from SLP-HCD to NOB, given that they leave SLP-HCD
SLP-HCD	Multi-nomial	slh_mul	Multinomial probability of moving to JS-WR, JS-HCD, SPS and OTH, conditional on leaving SLP-HCD and not entering NOB
NOB	Logistic	nob_tra	Probability that a client remains in NOB in the next quarter

Benefit state	Type	Model ID	Description
NOB	Multi-nomial	nob_mul	Multinomial probability of moving to JS-WR, JS-HCD, SPS, SLP-HCD and OTH, conditional on leaving NOB
Other – inwards	Logistic	oi_sup	Probability that someone entering OTH is entering SUP
Other - inwards	Multi-nomial	oi_mulm	Multinomial probability that someone entering OTH but not SUP enters EB, SLP-Carer or OB
Other	Logistic	o_tra	Probability that someone in OTH leaves their current state
Other	Logistic	o_nob	Probability that someone in OTH moves to NOB, given that they leave their current state
Other	Logistic	o_key	Probability that someone in OTH moves to one of JS-WR, JS-HCD, SPS or SLP-HCD, given that they leave their current state and do not move to NOB
Other	Multi-nomial	o_mulk	Multinomial probability of moving from OTH to each of JS-WR, JS-HCD, SPS and SLP-HCD, given that they move to one of these states
Other	Multi-nomial	o_mul2	Multinomial probability of moving within OTH to each of SUP, EB, SLP-Carer and OB, given that they move to one of these states

Notes:

(a) Other (OTH) in the table refers to benefits other than the main Tier 1 benefits, i.e. SUP, EB, SLP-Carer and OB

The structure of the transition models may appear somewhat convoluted at first glance, but it has the attractive feature of placing greater emphasis on the most important transitions: remaining in the current benefit and moving out of the welfare system. These transitions are handled by the models with “tra” and “nob” suffixes respectively.

G.3 Combining the transition models

The transition models are combined to permit calculation of moving into any state. The diagrams below show the steps involved in calculating these probabilities for:

- » Starting in a key benefit state (JS-WR/JS-HCD/SPS/SLP-HCD, here JS-WR)
- » Starting off benefits (NOB) and
- » Starting from a non-key benefit state (SUP/SLP-Carer/EB/OB, here SLP-Carer)

Figure G.2 Transition diagram for a client starting in a key benefit – here JS-WR

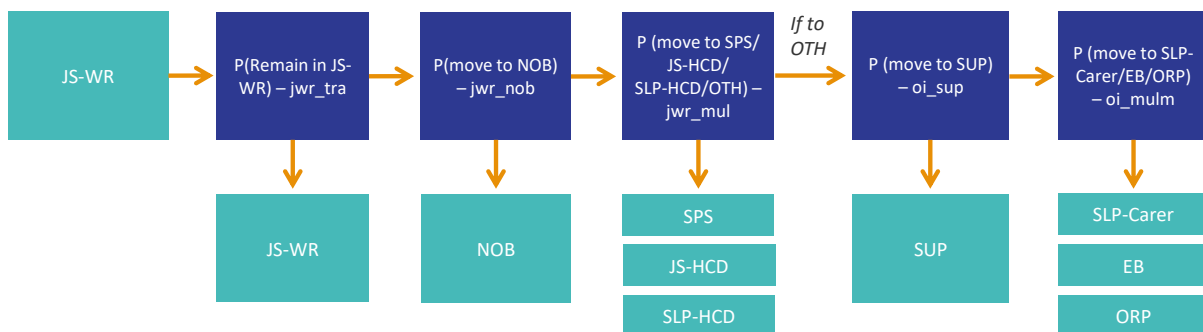


Figure G.3 Transition diagram for a client starting in NOB

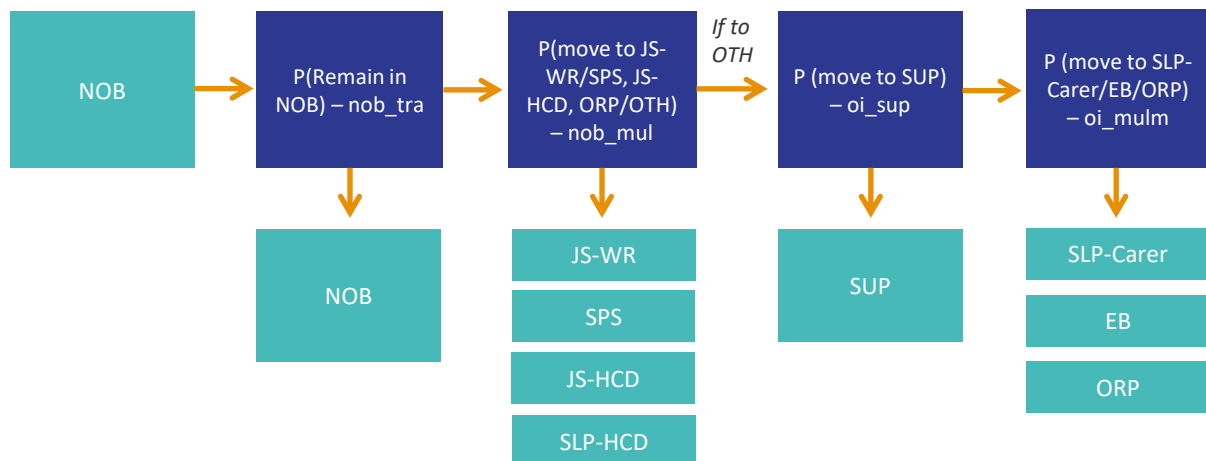
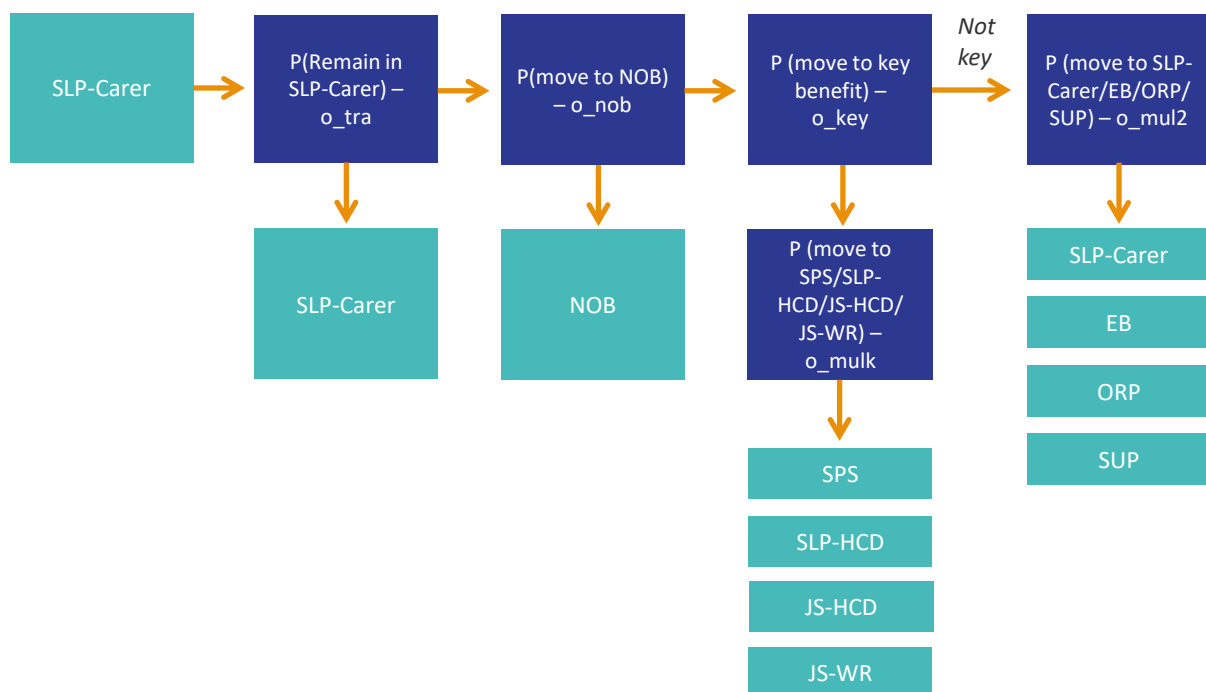


Figure G.4 Transition diagram for a client starting in a non-key benefit state– here SLP-Carer



G.4 Payment models

Clients in each benefit state can receive several different benefit types simultaneously:

- » Their main Tier 1 payment
- » Orphans (or child living alone) Benefit (OB)
- » Accommodation supplement (AS)
- » Disability allowance (DA)
- » Child disability allowance (CDA)
- » Childcare subsidy (CCS)
- » Hardship assistance (HS)
- » Employment intervention payments (EI)

» Recoverable assistance (LOA in this section)

If we want to be able to distinguish between these various benefits, then separate models are required to estimate each benefit type. The models also need to be sensitive to the current state of a client, as well as all their other characteristics listed in Section G.5.

These models are summarised in Table G and Table G, which shows the payment models required for each of the states. With the combined benefit system – social housing projection we have explicitly modelled the receipt of AS as a social housing state. This allows for these payments to be more accurate on an individual level than in previous valuations. Although it is impossible to receive AS while in a social house, it is possible to receive AS before or after being in a social house within a quarter – hence the need to have an AS model for both the SH and AS social housing states.

Note that the LOA1 model refers to recoverable assistance payments made to clients. These are later partly offset by recoveries of recoverable assistance – see Section 9.4. Note also, OB may be received as a T1 main benefit

Table G.5 Payment models attributable to each state

Benefit state	Benefit type							
	Main T1 (excl OB)	OB	DA	CDA	CCS	HS	EI	LOA
SPS	●	●	●	●	●	●	●	●
SLP-HCD	●	●	●	●	●	●	●	●
JS-HCD	●	●	●	●	●	●	●	●
JS-WR	●	●	●	●	●	●	●	●
SLP-Carer	●	●	●	●	●	●	●	●
EB	●	●	●	●	●	●	●	●
OB		●	●	●	●	●	●	●
SUP			●	●	●	●	●	●
NOB					●	●	●	●

Table G.6 Accommodation supplement payment models

Housing state	AS
SH	●
AS	●
Nil	

While there are many payment models, we note that the relative significance of each differs greatly. Main benefits plus accommodation support make up 90% of benefit payments in the current client liability payments, so these payment types are modelled in greater detail.

It is therefore possible to rationalise the number of models by combining payments of a particular type across recipients in different benefit states. The models fitted are shown in Table G.. Each of the main benefit models are fitted separately as are the larger components of Tier 2 payments (e.g. AS for JS-WR recipients, DA for JS-HCD and SLP-HCD recipients).

Table G.7 Payment models attributable to each state

Benefit state	Main T1 (excl. OB)	OB	Payment type								
			SH	AS AS	Nil	DA	CDA	CCS	HS	EI	LOA
JS-WR	jwr_abp	jwr_orp	hou_as	acc_pmt		a_da	a_cda	a_ccs	jwr_hs	x_ei	jwr_loa
JS-HCD	jhd_abp	jhd_orp	hou_as	acc_pmt		jhd_da	a_cda	a_ccs	jhd_hs	a_ei	jhd_loa
SPS	sps_abp	sps_orp	hou_as	acc_pmt		sps_da	sps_cda	sps_ccs	sps_hs	x_ei	sps_loa
SLP-HCD	slh_abp	slh_orp	hou_as	acc_pmt		slh_da	a_cda	a_ccs	slp_hs	a_ei	slh_loa
EB	emb_abp	a_orp	hou_as	acc_pmt		a_da	a_cda	a_ccs	a_hs	x_ei	a_loa
SLP-Carer	slc_abp	a_orp	hou_as	acc_pmt		a_da	z_cda	z_ccs	a_hs	a_ei	a_loa
OB		orp_abp	hou_as	acc_pmt		a_da	z_cda	z_ccs	a_hs	a_ei	a_loa
SUP			hou_as	acc_pmt		z_da	z_cda	z_ccs	z_hs	a_ei	z_loa
NOB								nob_ccs	nob_hs	nob_ei	nob_loa

Some detailed comments on the payment models follow:

- » Payments are allocated by client quarter, or proportionally if payment spells span multiple quarters. Further, all payments are scaled to June 2016 benefit levels, using the CPI index applied to benefit payments over the past 23 years. We have used past increases in DPB/SPS payment levels to infer these CPI increases.
- » All models were Poisson with a log link. The choice of distribution was found to have a very minor effect on predictions in the payment models.
- » As implied above, some payment models are ‘shared’ across benefit states– for example, the disability allowance for clients on JS-WR, EB, SLP-Carer and OB all use the ‘a_da’ payment model. This sharing is done when the individual models are believed to share similarities to improve the efficiency of modelling. In these cases, the current benefit state is also used as a predictor to ensure that any differences between states are still modelled.
- » It is possible to receive more than one Tier 1 benefit in a quarter. We have dealt with this by reallocating all Tier 1 payments to the current state; for example, if someone is allocated to JS-WR in a quarter but they receive both JS-WR and JS-HCD, all payments are summed and treated as JS-WR. The overall impact of this allocation is very small, since:
 - The amounts involved are generally small compared to a full quarter’s benefit
 - The allocations largely offset each other (e.g. for every client with a JS-HCD payment allocated to JS-WR there is another with a JS-WR payment allocated to JS-HCD)
 - The average number of quarters before transitions is high enough that such a reallocation occurs in a relatively small proportion of quarters.
- » NOB requires payment models for CCS, HS and EI because clients only in receipt of these benefits are assigned to the NOB state.
- » There is an important point to note regarding the non-main payment models (that is, every column of models except Main T1 and AS in Table G.). These payments represent an **average** value across people in each benefit state; to take an example, the DA model for those in the JS-WR state estimates the average DA paid to clients receiving JS-WR, conditional on all their attributes like age, gender etc. However in reality some JS-WR clients receive DA and some do not, so at an individual level these payment models are misleading since the actual DA payments will usually be much higher (if the client receives DA) or much lower (if they do not). These payment levels are appropriate for the aggregate and segment level valuation, but must be interpreted carefully when inspected at an individual level. Distinguishing between the cases of receipt of supplementary payments at an individual level is beyond the scope of this valuation.

G.5 Model predictors

A list of independent variables or predictors used in the various GLM models includes:

- » Age
- » Gender
- » Benefit history, including number of quarters in various benefit states, duration in current state and benefit of previous spell
- » Regional unemployment rates
- » Region
- » Ethnicity
- » Education level
- » Family benefit history ('intergenerational') variables including match type with a parent beneficiary and intensity of the parent's benefit receipt while the client was aged 13-18 (note that this data is available only for those aged 25 or under)
- » Relevant client characteristics which depend upon the benefit being received (e.g. Health condition or disability for JS-HCD or SLP-HCD, number and ages of children for SPS, partner information for several benefits etc.).
- » Child protection and youth justice history variables which measure a client's exposure to these services as a child
- » Criminal conviction history variables which measure a client's convictions and related recent and longer-term exposure to correctional services

A number of social housing related variables were newly introduced into the 2016 valuation as part of the combined projection approach. We model two new housing 'state' variables. The first indicate whether someone is in social housing, on AS, or neither. The second indicates whether the person is on a register application for social housing. These state variables, and related variables, are incorporated into the benefit system transition and payment models. As discussed in Section 9.2.2 of the report new information includes:

- » Current Social Housing state variables used in the modelling include whether a client is currently:
 - In a social house and some associated variables; being the primary householder, a signatory, the household size, etc.
 - In receipt of AS.
 - On a register application and some associated variables; being the primary applicant, the needs assessment score of the application, etc.
 - The duration of the given social housing state; that is, time in social housing or time receiving AS.
- » Social housing history related variables used in the modelling include:
 - Count of quarters spent in social housing
 - Count of quarters of AS receipt
 - The social housing situation preceding the current.

In theory, there are a very large number of variables that would impact on a client's lifetime welfare cost that do not feature in the list above (including health system information, employment history, family status etc.). The omission of a variable does not imply that they are unimportant. Rather, it indicates that our results should be considered as an average over that variable.

For projection purposes, the variables may be separated into two categories:

- » **Static variables:** those that remain fixed at all points in time. Examples include gender and date of birth.

- » **Dynamic variables:** those that change over time. These may be further subdivided into:
 - Those that vary in a known (deterministic manner). Examples include benefit quarter, age, the various duration measures, unemployment rate (given our assumptions of a single set of forecasts for future unemployment rate by future benefit quarter and region).
 - Those that vary in an unknown (stochastic manner). A client's region, the number of children and age of youngest child for SPS recipients and the incapacity type for HCD clients (JS and SLP) are examples of these predictors.

We generally refer to the last category as “semi-dynamic”, recognising that while they change over time, changes are generally slow; the value does not change for most clients every quarter. For example, most clients remain in the same region in the subsequent quarter, but a small proportion do move between regions.

A full list of the semi-dynamic variables is given here together with an overview of their updating method. Some detailed examples are then given.

G.5.1 List of semi-dynamic predictors

Children variables

The number of children (1, 2 or 3+) is stored for SPS recipients, as is the age of the youngest child.

Region and TLA

The client's region is stored for every client on benefit. With the introduction of the combined projection approach, regional information is also stored at the Territorial Local Authority (and Local Board in Auckland) level. Information on the region when last on benefit is retained for those not on benefit.

Partner flag

This is stored for clients in EB, SLP-HCD, JS-HCD and JS-WR. It is not stored for all other benefit types.

Incapacity variables

The variables relating to incapacity group, the number of incapacities and a flag for whether the incapacity relates to a partner (for cases where the client has a partner) are stored for SLP-HCD and JS-HCD only.

Child protection and youth justice

Variables specifying whether the client, as a child, was involved in child protection or youth justice services (or both), the number of events, days in child protection and age at first entry into the system are stored for clients up to age 25. These can potentially change for clients up to age 18, but are fixed thereafter.

Criminal conviction history variables

We used for variables related to criminal conviction and related sentences, available for all clients. These were the percentage of time in prison over the last year, serving any sentence over the last year excluding those for driving offences, serving any sentence over the last ten years excluding driving offences, and in serving a sentence specifically related to theft over the last ten years.

Social housing register status

Information on any register applications active during the quarter is stored for all clients.

Other social housing variables

The Income related rent subsidy level and the market rent of the house for the area is stored for all clients in social housing.

G.5.2 Updating semi-dynamic predictors

This section discusses the updating methods for each of the semi-dynamic variables. Note that GLMs and probability tables referred to here are presented in the electronic appendices.

Children variables - number of children and age of youngest child – SPS only

These variables are updated as follows:

Entering SPS: Values for the number of children are sampled from a table of probabilities based on the client's age. Values for the age of the youngest child are sampled from a zero-inflated beta model (**aye**).

Remaining in SPS: At each quarter

- » A GLM is run to calculate the probability of a new youngest child
- » If no new youngest child, then the age of the youngest child increments by 0.25 years
- » If there is a new youngest child, then the age of this child is sampled from a zero-inflated beta model. If the model returns 0 as the value, the age of the child is spread over 0, 0.25 and 0.5 years by the probabilities 0.2, 0.7 and 0.1 respectively.
- » For all SPS clients, the change in the total number of children is sampled from a multinomial GLM. Note probabilities are different depending on whether there is a new youngest child or not

Leaving SPS: child variable information is forgotten.

Region – all benefits

For clients not in a social house, region is updated as follows:

Switching between benefits: A model is run to determine whether the region changes. If it changes, then the region is sampled from a table of probabilities. The new TLA is then sampled from a second table of probabilities. If the region does not change a second model is run to determine if the TLA changes. If it changes, then the new TLA is sampled from another table of probabilities.

Returning to benefit after being off benefit for at least one quarter: a binomial GLM gives the probability that a client's region (last updated when they were last on benefits) has changed while they were off benefit. In each simulation, we sample if the region has changed and if so, the new region is sampled from a table of probabilities. The new TLA is then sampled from a second table of probabilities. If the region has not changed a second model is run to determine if the TLA has changed. If it has, then the new TLA is sampled from another table of probabilities.

Leaving benefits: the region is not changed but the current value is stored.

For clients in a social house, region and TLA are stored regardless of benefit state. Furthermore, their region and TLA may only change if the client is simulated to apply to the transfer register for rehousing. In this case, a binomial GLM gives the probability that the client applies to the transfer register. The register characteristics (including TLA) are sampled from typical characteristics of clients entering the register. If the register application is successful in the simulation, the client's TLA and region are updated accordingly.

Partner flag – EB, SLP-HCD, JS-HCD and JS-WR only

The partner flag variable is updated as follows:

Moving into any of EB/SLP-HCD/JS-HCD/JS-WR from one of the other benefits: a binomial GLM gives the probability that the client has a partner.

Remaining in any of EB/SLP-HCD/JS-HCD/JS-WR: a binomial GLM gives the probability that the partner flag switches (i.e. if the client has a partner they switch to having no partner and vice versa).

Leaving EB/SLP-HCD/JS-HCD/JS-WR and moving into one of the other benefits: partner information is dropped.

Incapacity variables – JS-HCD and SLP-HCD only

The incapacity variables are updated as follows:

Entry into JS-HCD or SLP-HCD from other benefits: The incapacity group is sampled from a probability table. After that a second probability table is used to simulate the number of incapacities and (if the client has a partner) a third probability table is used to determine whether the incapacity relates to the partner or not.

There are different probability tables for each of the situations: entry into JS-HCD from all benefits apart from SLP-HCD, entry into SLP-HCD from all benefits apart from JS-HCD, switching from JS-HCD to SLP-HCD and switching from SLP-HCD to JS-HCD.

Leaving JS-HCD / SLP-HCD: incapacity variables are forgotten.

Child, Youth and Family variables

The Child, Youth and Family (CYF) variables are updated (for clients under age 18) as follows:

- » A binomial GLM is run for the probability of at least one CYF event occurring in the quarter. If yes:
 - A lookup table is used to update the type of interaction (i.e. child protection or youth justice).
 - Another lookup table is used to simulate the number of new events in the quarter (one or more).
 - If it is the first event for a person, the age of entry into CYF is recorded.
- » For both outcomes of the initial GLM, a binomial GLM is used to simulate the probability that the number of days in a CYF child protection placement changes in the quarter. This is always no if the CYF history does not include child protection.
 - If yes, then two lookup tables are used to simulate how many additional days in placement are applicable.

Criminal conviction history variables

The proportion of time in prison, non-prison theft sentences and other sentences are stored for the previous 40 quarters, making 120 variables in total. This is sufficient for calculating the four variables used in the transition and payment models. For each successive quarter, we delete the oldest of the 40 quarters and simulate the newest one:

- » If there **was no** sentence served in the previous quarter, a binomial GLM is used to simulate the probability that a new sentence is served in the quarter. The GLM uses a number of demographic characteristics of the individual.
 - If no, then the sentence served variables for the new quarter are set to zero.

- If yes, then a table is used to allocate which type of sentence is served (prison, theft or other). A second lookup table is then used to allocate the proportion of the quarter served for each non-zero variable.
- » If there **was** a sentence served in the previous quarter, a binomial GLM is used to simulate the probability that a new sentence continues in the new quarter.
 - If no, then the sentence served variables for the new quarter are set to zero.
 - If yes, then an additional binomial GLM is used model the probability that the type of sentence being served changes. Lookup tables for the type and proportion are then used to simulate the new non-zero variables for that quarter.

This allows the 120 variables encoding sentence history to be updated for the new quarter. The four variables used in the models are then re-calculated before transition and payment models are applied.

Social housing register status

The social housing register status of clients is updated as follows:

- » If a client has an active social housing register application:
 - For those not in social housing, a model is used to determine the relative likelihood that clients move from the register to social housing. The allocation step uses the likelihood, collective demand for houses of that size and location, and available supply. If they do not move from the register to social housing a second model is used to determine the probability they exit the register not to social housing.
 - A similar pair of models are used for clients already in social housing with an active transfer register application.
- » If the client does not have an active social housing register application:
 - For those not in social housing, a model is used to determine the probability a client makes a new application in the quarter. If so a further model and probability table determines the priority of the application and requested location respectively.
 - A similar pair of models and table are used for clients already in social housing who may make a transfer register application.

G.6 Overlay models

Due to the benefit state definition of being on a benefit (SPS say) in a quarter, additional information is needed for benefit system segment allocation to know if:

- » The client is on the benefit at the end of the quarter and
- » The client has been on benefits continuously throughout the quarter.

We project this using models referred to as ‘overlay models,’ as they do not affect the main projection results, so they can be regarded as by-products of the simulation.

The overlay models include a full multinomial allocation of benefit type received by a client at the end of a benefit quarter. The process is:

- » The benefit state for the current (“ben_now”) and next quarter (“ben_next”) are determined using the core transition models
- » If ben_now or ben_next are NOB (not on benefit), then end of quarter benefit status (“ben_end”) is set to NOB
- » If not, then a binomial GLM is used for the probability that ben_end is the same as either ben_now or ben_next. If yes, then a lookup table is used to allocate
- » If not, and either ben_now or ben_next are SUP, then ben_end = NOB
- » If not, then binomial GLM is used for the probability that the end of quarter benefit is NOB. If yes, set to NOB

- » If not, then binomial GLM is used for the probability that the end of quarter benefit is SUP. If yes, set to SUP
- » If not, then a lookup table is used to simulate the remaining possibilities for ben_end

Once this chain of logic has been completed, we then update continuous duration. If ben_end is NOB, then the continuous duration is set to zero. Otherwise a binomial GLM is used to decide whether continuous duration is incremented by 1 (i.e. the client has had no 14 day breaks off benefits in the quarter) or reset to zero (i.e. they did have a 14-day break).

G.7 Number of new clients model

We use a model to determine the number of new clients in each benefit type in each quarter of the next 5 years. Some of these clients will also make a social housing register application in the same quarter. This model explicitly depends on regional unemployment rates, and implicitly allows for other demographic factors such as population growth and age distribution on a regional level.

Since we model number of entries explicitly, time trends that are not explained by changes in the regional unemployment rate will typically be reflecting the changing population demographics of the region.

For each new client in each benefit type we randomly sample client characteristics from the equivalent population of people entering the system in 2015/16. After that, the projection of liability happens in a similar manner to that of the current liability.

This approach treats client returns and new entries simultaneously (the sampling population from 2015/16 includes both returning and new clients). It assumes that the relative numbers of new entrants versus returns will be similar to that seen in 2015/16.

Total results are obtained by aggregating the 20 quarterly cohorts of future client entries into five annual cohorts and discounting their lifetime liabilities into the middle of each year.

Another change in the 2016 model is that the projection is integrated and combines current and future (new) cohorts. This affects slightly how we treat double counting; a person can by definition be part of the current cohort and one of the future cohorts too if they leave for a period and then return. Previously, current and future cohorts were separate projections and double counting handled by allowing numbers in each projection to be higher than they would be if the doubles were excluded. In 2016, we have only one projection pathway per person (i.e. no doubles), but tag a pathway if it qualifies for current and future liabilities and count it towards both.

G.8 Guide to electronic Appendix H

The file Appendix H.xlsx contains tables of the parameters for:

- » Each of the models listed in Table G.1 and Table G.
- » The models for dynamic predictors described in Section G.5.2
- » The overlay models used for simulating continuous duration (Section G.6)
- » The number of future new clients (Section G.7).

Many of the parameters correspond to functions of the predictors rather than the raw predictors (see Section G.1.3); thus, each table is accompanied by the formulae giving the derivation of the predictor.

Several models use offsets in their fitting. These help lock-in effects (for example, fixing the unemployment rate sensitivity to the same level as previously), as well as encode some of the projection assumptions described in Section 3.8 of the report. A description of these offsets is also included in the Appendix.

APPENDIX H MODEL COEFFICIENTS

Please see the separate spreadsheet for model parameterisations.

APPENDIX I COMPUTATION DETAILS

I.1 Introduction

A large amount of data was provided to us by MSD. This creates a range of computationally intensive stages for the project:

- » Processing the data to make it suitable for modelling;
- » Fitting models; and
- » Applying models to project future client numbers and cash flows.

The third point – the projection of the liability was particularly intensive. In this appendix, we give some detail of how this was done, plus some brief comments on each of the other stages.

I.2 Projections for the key benefit liability

The methodology for liability projection differs from previous years in that the current and future client liabilities are projected simultaneously.

The current liability is the liability for all those on benefit at 30 June of the valuation year, or who have been on benefits within the 12 months leading up to the valuation date.

The future client liability is projected for the cohort of those newly on benefit for each quarter in the next five years. Newly on benefit is defined in this instance to mean those new to the benefit system or those returning after being off benefit for more than a year.

I.2.1 Projection variables

In building the valuation models, the following variables were allowed for:

- » Benefit quarter and the corresponding unemployment rate
- » Client age
- » Gender
- » Number of quarters:
 - On current benefit
 - Since first benefit
 - Spent in each of the various benefit states
- » Ethnicity
- » Region
- » Education level
- » Youngest child age and number of registered children (for SPS clients)
- » Partner flag (SLP-HCD, JS-HCD, JS-WR and EB clients)
- » Incapacity type (SLP-HCD and JS-HCD clients)
- » Whether the incapacity belongs to the client's partner (SLP-HCD and JS-HCD clients)
- » Benefit of last spell (if any)
- » Intergenerational variables
- » Variables related to a history with child protection and youth justice services
- » Criminal conviction related variables
- » Social housing history variables:
 - Past time in social housing
 - Past AS receipt
- » Current social housing status:

- In social housing, receiving AS or neither
- If in social housing: primary householder, signatory householder, household size.
- Part of an active register application or not

1.2.2 Simulation Approach

As discussed in Section 9.4.2 of the report, there are many possible combinations of these variables that make an analytic projection – i.e. the calculation of the expected cash flows associated with all possible future states – computationally infeasible. Thus, we have continued to use a simulation approach for the valuation of the 2016 liabilities.

Many of the variables above are dynamic in that their values change over time. Some change in a deterministic way (e.g. the benefit quarter, age, the number of quarters on benefit etc.) but many will evolve stochastically over the course of the projection (e.g. region, children ages and number of children, incapacity type etc.) so their evolution over time must be modelled (our approach is described in Appendix G) and then included in the simulation.

An outline of the simulation approach is as follows, starting in benefit quarter b :

- » The first step is to calculate the expected payments for benefit quarter b based on the current benefit state, current housing state and the current state of all the modelling variables. The expected payments together with the benefit received and any other variables of interest are saved.
- » Following this, new entrants are added into the data representing those who newly enter the benefit system in quarter $b+1$, or who re-enter after being off benefits for more than a year as at the valuation date. Furthermore, new entrants to the social housing system, who are not otherwise receiving welfare benefits, are also added.
- » The next step is to update the dynamic variables to quarter $b+1$ for all those in the data set at quarter b (i.e. new entrants in quarter $b+1$ are not included in this step since their dynamic variables are already updated to the end of $b+1$). Those that are modelled are updated using a simulation approach. For example, to update a client's region, the following is carried out:
 - First calculate the probability that there is a change of region and then using this, sample whether a change in region occurs
 - If a change in region occurs then sample the new region from a table of probabilities for each new region. Further sample a new TLA from a table of probabilities for each new TLA.
 - If a change in region does not occur then calculate the probability of a TLA change and then using this, sample whether a change in TLA occurs. If a TLA change occurs then sample a new TLA from a table of probabilities for each new TLA.
- » Once the dynamic variables have been updated, calculate the benefit state transition probabilities based on the current state of the models. Then, using a sampling approach, select the benefit for the next quarter. The one exception to this is when a client is at the assumed retirement age (64.75) – in the next quarter they transition to off benefit with probability 1 under the working age assumption described in Section F.2.
- » Once benefit state has been updated calculate the social housing state transition probabilities based on the current state of the models. Then, using a sampling approach, select the social housing state for the next quarter and register exits both to and not to social housing.
- » The process then repeats until all members of the current and future cohorts are retired.

Even taking the simulation approach rather than the exact approach leads to a computationally intensive task. To make the process manageable, a number of steps were taken:

- » The projection code was written using various time-saving programming methods including the efficient use of memory to speed up the calculations as much as possible.
- » The simulations were distributed across a number of machines.

To illustrate the computational burden, 20 simulations of the current and future client liability projection use about 150 CPU hours in total.

I.3 Other computational considerations

I.3.1 Modelling transition probabilities

The modelling datasets for some of the benefits were particularly large, notably the probability of remaining in the same state for JS-WR and NOB. This was handled by means of stratified sampling, where the rarer response was sampled at a higher rate to the common response to minimise the corresponding decrease in accuracy. Observations were weighted to ensure the overall rates of transition remained correct.

This approach was used in cases where the available data was already very large, and so the potential impact on model performance was immaterial.

I.3.2 Data preparation

Processing the original datasets to convert them to a form amenable to modelling took a reasonable amount of computer time, perhaps around 10 hours to produce modelling datasets for each of the benefit types. Given this needs to be run just once, this was judged acceptable and was not further optimised or distributed.

I.3.3 GLM fitting in SAS

We use a suite of custom-built SAS macros to carry out all GLM fitting, model diagnostics and validation. These macros substantially extend the available tools within SAS as well as optimise the use of SAS's inbuilt GLM fitting capabilities.

APPENDIX J ACTUAL VERSUS EXPECTED COMPARISONS FOR 2015/16

J.1 Actual versus expected results by client benefit state

J.1.1 Number receiving benefits at some point in the quarter⁵

J.1.1.1 Of those in the 2015 current client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
SPS	75,442	75,557	100%	72,553	74,100	98%	70,710	72,723	97%	67,472	70,229	96%	71,544	73,152	98%
SLP-HCD	95,964	95,978	100%	94,710	94,747	100%	93,574	93,717	100%	92,573	92,780	100%	94,205	94,306	100%
JS-HCD	67,329	67,291	100%	63,818	65,065	98%	61,116	62,264	98%	58,469	59,513	98%	62,683	63,533	99%
JS-WR	87,585	85,782	102%	79,635	75,054	106%	73,665	72,482	102%	67,286	65,768	102%	77,043	74,772	103%
SLP-Carer	8,993	8,997	100%	8,715	8,748	100%	8,507	8,520	100%	8,339	8,354	100%	8,639	8,655	100%
EB	4,240	3,938	108%	3,772	3,405	111%	3,232	2,958	109%	2,730	2,554	107%	3,494	3,214	109%
OB	5,233	5,220	100%	5,063	4,980	102%	4,850	4,740	102%	4,801	4,583	105%	4,987	4,881	102%
SUP	99,724	99,975	100%	95,507	93,534	102%	90,852	87,582	104%	87,760	82,420	106%	93,461	90,878	103%
Total	444,510	442,738	100%	423,773	419,633	101%	406,506	404,986	100%	389,430	386,201	101%	416,055	413,390	101%

J.1.1.2 Of those in the 2015 future client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
SPS	1,776	1,801	99%	3,614	3,549	102%	5,413	5,211	104%	6,805	6,520	104%	4,402	4,270	103%
SLP-HCD	832	865	96%	1,626	1,731	94%	2,309	2,510	92%	3,032	3,300	92%	1,950	2,102	93%
JS-HCD	4,869	4,537	107%	8,834	8,010	110%	11,166	10,200	109%	12,862	11,711	110%	9,433	8,615	109%
JS-WR	10,952	10,244	107%	19,942	19,116	104%	25,961	25,482	102%	27,952	26,992	104%	21,202	20,459	104%
SLP-Carer	303	263	115%	540	499	108%	717	699	103%	879	863	102%	610	581	105%
EB	969	597	162%	1,198	1,021	117%	1,192	1,161	103%	969	1,179	82%	1,082	990	109%
OB	288	248	116%	552	455	121%	819	669	122%	1,018	825	123%	669	549	122%
SUP	5,059	5,229	97%	9,148	10,570	87%	13,059	16,239	80%	15,816	18,890	84%	10,771	12,732	85%
Total	25,048	23,784	105%	45,454	44,951	101%	60,636	62,171	98%	69,333	70,280	99%	50,118	50,297	100%

⁵ Using Taylor Fry's 'benefit state during quarter' definition. If a client receives a main benefit during the quarter, this will take precedence over OB or supplementary only spells in the allocation

J.1.1.3 All clients

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
SPS	77,218	77,358	100%	76,167	77,649	98%	76,123	77,934	98%	74,277	76,749	97%	75,946	77,423	98%
SLP-HCD	96,796	96,843	100%	96,336	96,478	100%	95,883	96,227	100%	95,605	96,080	100%	96,155	96,407	100%
JS-HCD	72,198	71,828	101%	72,652	73,075	99%	72,282	72,464	100%	71,331	71,224	100%	72,116	72,148	100%
JS-WR	98,537	96,026	103%	99,577	94,170	106%	99,626	97,964	102%	95,238	92,760	103%	98,245	95,230	103%
SLP-Carer	9,296	9,260	100%	9,255	9,247	100%	9,224	9,219	100%	9,218	9,217	100%	9,248	9,236	100%
EB	5,209	4,535	115%	4,970	4,426	112%	4,424	4,119	107%	3,699	3,733	99%	4,576	4,203	109%
OB	5,521	5,468	101%	5,615	5,435	103%	5,669	5,409	105%	5,819	5,408	108%	5,656	5,430	104%
SUP	104,783	105,204	100%	104,655	104,104	101%	103,911	103,821	100%	103,576	101,310	102%	104,231	103,610	101%
Total	469,558	466,522	101%	469,227	464,584	101%	467,142	467,157	100%	458,763	456,481	100%	466,173	463,686	101%

J.1.2 Average benefits received per client⁶

J.1.2.1 Of those in the 2015 current client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$m)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
SPS	5,364	5,354	100%	5,380	5,344	101%	5,316	5,250	101%	5,731	5,303	108%	5,448	5,313	103%
SLP-HCD	4,312	4,343	99%	4,334	4,357	99%	4,306	4,301	100%	4,342	4,312	101%	4,323	4,328	100%
JS-HCD	3,519	3,506	100%	3,567	3,555	100%	3,539	3,490	101%	3,611	3,530	102%	3,559	3,520	101%
JS-WR	2,888	2,893	100%	2,906	2,910	100%	2,970	2,896	103%	3,064	2,923	105%	2,957	2,905	102%
SLP-Carer	4,953	4,930	100%	4,999	4,957	101%	4,987	4,898	102%	5,183	4,928	105%	5,031	4,928	102%
EB	2,112	2,310	91%	2,176	2,359	92%	2,338	2,370	99%	2,410	2,424	99%	2,259	2,366	95%
OB	3,550	3,484	102%	3,583	3,496	102%	3,557	3,455	103%	3,603	3,512	103%	3,573	3,487	102%
SUP	891	864	103%	892	859	104%	870	842	103%	926	869	107%	895	858	104%
Total	3,305	3,305	100%	3,339	3,354	100%	3,346	3,336	100%	3,478	3,392	103%	3,364	3,345	101%

J.1.2.2 Of those in the 2015 future client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
SPS	2,607	2,628	99%	3,736	3,611	103%	4,052	3,885	104%	4,658	4,148	112%	3,763	3,568	105%
SLP-HCD	1,713	1,624	105%	2,568	2,429	106%	2,898	2,667	109%	3,068	2,830	108%	2,562	2,387	107%
JS-HCD	1,585	1,650	96%	2,232	2,241	100%	2,409	2,395	101%	2,585	2,504	103%	2,203	2,197	100%
JS-WR	1,501	1,521	99%	1,871	1,856	101%	2,075	2,047	101%	2,215	2,129	104%	1,915	1,888	101%
SLP-Carer	1,931	2,006	96%	2,961	2,853	104%	3,158	3,121	101%	3,432	3,270	105%	2,870	2,812	102%
EB	1,004	1,240	81%	1,376	1,492	92%	1,603	1,607	100%	1,867	1,686	111%	1,462	1,506	97%
OB	1,558	1,607	97%	2,361	2,287	103%	2,542	2,420	105%	2,752	2,627	105%	2,303	2,235	103%
SUP	449	567	79%	596	641	93%	604	654	92%	705	698	101%	589	640	92%
Total	1,377	1,422	97%	1,864	1,806	103%	2,037	1,927	106%	2,235	2,039	110%	1,984	1,880	106%

⁶ Average benefits throughout this Appendix are the total payments divided by the number of clients on benefit

J.1.2.3 All clients

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$m)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
SPS	5,300	5,290	100%	5,302	5,265	101%	5,226	5,159	101%	5,633	5,205	108%	5,365	5,230	103%
SLP-HCD	4,290	4,318	99%	4,304	4,322	100%	4,272	4,258	100%	4,302	4,261	101%	4,292	4,290	100%
JS-HCD	3,389	3,389	100%	3,405	3,411	100%	3,365	3,335	101%	3,426	3,361	102%	3,396	3,374	101%
JS-WR	2,734	2,746	100%	2,699	2,696	100%	2,737	2,675	102%	2,815	2,692	105%	2,746	2,702	102%
SLP-Carer	4,855	4,847	100%	4,880	4,844	101%	4,844	4,763	102%	5,016	4,773	105%	4,899	4,807	102%
EB	1,906	2,169	88%	1,983	2,159	92%	2,140	2,155	99%	2,268	2,191	104%	2,074	2,169	96%
OB	3,446	3,399	101%	3,463	3,394	102%	3,410	3,327	102%	3,455	3,377	102%	3,443	3,375	102%
SUP	869	849	102%	866	837	103%	836	813	103%	893	837	107%	866	834	104%
Total	3,203	3,209	100%	3,196	3,205	100%	3,176	3,148	101%	3,290	3,183	103%	3,216	3,186	101%

J.1.3 Total payments⁷

J.1.3.1 Of those in the 2015 current client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	405	405	100%	390	396	99%	376	382	98%	387	372	104%	389	389	100%
SLP-HCD	414	417	99%	410	413	99%	403	403	100%	402	400	100%	407	408	100%
JS-HCD	237	236	100%	228	231	98%	216	217	100%	211	210	101%	223	224	100%
JS-WR	253	248	102%	231	218	106%	219	210	104%	206	192	107%	227	217	105%
SLP-Carer	45	44	100%	44	43	100%	42	42	102%	43	41	105%	43	43	102%
EB	9	9	98%	8	8	102%	8	7	108%	7	6	106%	8	8	103%
OB	19	18	102%	18	17	104%	17	16	105%	17	16	107%	18	17	105%
SUP	89	86	103%	85	80	106%	79	74	107%	81	72	114%	84	78	107%
Total	1,469	1,463	100%	1,415	1,408	101%	1,360	1,351	101%	1,354	1,310	103%	1,400	1,383	101%

J.1.3.2 Of those in the 2015 future client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	5	5	98%	14	13	105%	22	20	108%	32	27	117%	18	16	111%
SLP-HCD	1	1	101%	4	4	99%	7	7	100%	9	9	100%	5	5	100%
JS-HCD	8	7	103%	20	18	110%	27	24	110%	33	29	113%	22	20	111%
JS-WR	16	16	106%	37	35	105%	54	52	103%	62	57	108%	42	40	106%
SLP-Carer	1	1	111%	2	1	112%	2	2	104%	3	3	107%	2	2	107%
EB	1	1	131%	2	2	108%	2	2	102%	2	2	91%	2	2	104%
OB	0	0	113%	1	1	125%	2	2	129%	3	2	129%	2	1	127%
SUP	2	3	77%	5	7	81%	8	11	74%	11	13	85%	7	8	80%
Total	34	34	102%	85	81	104%	124	120	103%	155	143	108%	99	95	105%

⁷ Payments to clients not on benefit excluded from this table. This gives slightly lower total and average payments than other tables in Appendix J

J.1.3.3 All clients

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	409	409	100%	404	409	99%	398	402	99%	418	399	105%	407	405	101%
SLP-HCD	415	418	99%	415	417	99%	410	410	100%	411	409	100%	413	414	100%
JS-HCD	245	243	101%	247	249	99%	243	242	101%	244	239	102%	245	243	101%
JS-WR	269	264	102%	269	254	106%	273	262	104%	268	250	107%	270	257	105%
SLP-Carer	45	45	101%	45	45	101%	45	44	102%	46	44	105%	45	44	102%
EB	10	10	101%	10	10	103%	9	9	107%	8	8	103%	9	9	103%
OB	19	19	102%	19	18	105%	19	18	107%	20	18	110%	19	18	106%
SUP	91	89	102%	91	87	104%	87	84	103%	92	85	109%	90	86	104%
Total	1,504	1,497	100%	1,500	1,489	101%	1,484	1,471	101%	1,509	1,453	104%	1,499	1,477	101%

J.2 Actual versus expected results by benefit type⁸

J.2.1 Of those in the 2015 current client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	299	300	100%	288	294	98%	279	283	99%	290	273	106%	289	288	101%
SLP-HCD	344	345	100%	340	341	100%	334	333	100%	333	329	101%	338	337	100%
JS-HCD	179	178	100%	171	174	98%	162	163	100%	159	157	101%	168	168	100%
JWR	198	195	102%	180	170	106%	171	163	105%	161	148	109%	177	169	105%
SLC	36	36	100%	35	35	100%	34	33	102%	35	33	106%	35	34	102%
EB	6	6	101%	6	5	103%	5	5	108%	4	4	108%	5	5	105%
OB	28	27	103%	28	26	105%	26	25	105%	26	25	107%	27	26	105%
Total T1	1089	1086	100%	1047	1046	100%	1011	1004	101%	1008	969	104%	1039	1026	101%
AS	240	236	102%	232	228	102%	222	218	102%	214	213	100%	227	224	101%
DA	29	31	95%	29	31	94%	28	30	94%	28	29	95%	28	30	94%
CDA	21	21	97%	20	21	96%	20	20	98%	20	20	99%	20	21	98%
CCS	29	31	96%	29	28	101%	24	25	95%	33	29	113%	29	28	102%
Total T2	320	319	100%	309	308	101%	293	293	100%	294	291	101%	304	303	100%
EI	5	5	94%	4	4	91%	3	4	73%	3	4	84%	4	4	86%
HS	62	59	105%	61	56	108%	58	56	103%	58	53	108%	59	56	106%
Total T3	66	64	104%	64	60	106%	61	60	101%	61	57	106%	63	60	104%
Grand total	1475	1469	100%	1421	1414	100%	1366	1357	101%	1363	1318	103%	1406	1389	101%

⁸ These payment totals include payments to clients not on main benefits in the quarter, in contrast to the tables in Section J.1.3

J.2.2 Of those in the 2015 future client liability

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	4	4	98%	10	10	101%	17	16	105%	25	21	116%	14	13	108%
SLP- uro	1	1	101%	4	4	98%	6	6	99%	8	8	98%	5	5	98%
JS-HCD	6	5	109%	15	14	110%	21	19	110%	26	23	114%	17	15	112%
JWR	13	12	109%	30	28	105%	43	42	103%	50	46	108%	34	32	106%
SLC	1	0	111%	1	1	111%	2	2	102%	3	3	106%	2	2	106%
EB	1	1	146%	1	1	116%	1	1	106%	1	1	97%	1	1	110%
OB	0	0	105%	1	1	113%	2	2	118%	3	2	122%	2	1	118%
Total	26	24	108%	64	60	106%	93	89	105%	116	105	110%	75	69	107%
AS	6	7	81%	14	15	97%	21	22	97%	26	26	100%	17	17	96%
DA	0	0	86%	1	1	88%	1	1	87%	1	1	93%	1	1	90%
CDA	0	0	134%	1	1	94%	1	1	91%	1	1	91%	1	1	93%
CCS	1	1	89%	1	1	93%	2	2	90%	3	3	105%	2	2	97%
Total	6	8	82%	16	17	96%	25	26	96%	32	32	100%	20	21	96%
EI	0	0	88%	1	1	90%	1	1	79%	1	1	94%	1	1	88%
HS	2	2	115%	4	3	122%	5	5	111%	7	5	121%	4	4	118%
Total	2	2	111%	5	4	117%	6	6	105%	8	7	116%	5	5	112%
Grand total	34	34	102%	85	81	104%	124	120	103%	156	144	108%	100	95	105%

J.2.3 All clients

Benefit	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SPS	302	304	100%	298	304	98%	296	299	99%	315	295	107%	303	300	101%
SLP- uro	345	346	100%	344	345	100%	340	339	100%	341	338	101%	343	342	100%
JS-HCD	185	183	101%	186	188	99%	183	182	101%	185	180	103%	185	183	101%
JWR	211	207	102%	210	199	106%	214	205	104%	211	194	108%	211	201	105%
SLC	36	36	100%	36	36	101%	36	35	102%	37	35	106%	36	36	102%
EB	7	7	104%	7	6	105%	6	6	108%	6	6	105%	7	6	106%
OB	28	27	103%	29	27	105%	29	27	106%	29	27	109%	29	27	106%
Total	1,115	1,110	100%	1,111	1,106	100%	1,105	1,093	101%	1,124	1,074	105%	1,113	1,096	102%
AS	246	243	101%	246	242	101%	243	239	101%	240	239	100%	243	241	101%
DA	30	31	95%	29	31	93%	29	31	94%	29	30	95%	29	31	94%
CDA	21	22	97%	21	22	96%	21	21	98%	21	21	99%	21	21	97%
CCS	30	31	96%	30	29	101%	26	27	95%	36	32	112%	30	30	101%
Total	326	327	100%	326	325	100%	318	318	100%	326	323	101%	324	323	100%
EI	5	5	94%	4	5	91%	4	5	74%	4	5	86%	4	5	86%
HS	64	61	105%	65	60	108%	63	61	104%	64	59	109%	64	60	107%
Total	69	66	104%	69	64	107%	67	66	102%	69	64	107%	68	65	105%
Grand total	1,509	1,503	100%	1,506	1,495	101%	1,489	1,477	101%	1,518	1,461	104%	1,506	1,484	101%

J.3 Actual versus expected results by client age at 30 June 2015

J.3.1 Number receiving benefits at some point in the quarter

J.3.1.1 Of those in the 2015 current client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
16-17	3,312	3,294	101%	3,150	3,150	100%	2,917	3,059	95%	2,734	2,853	96%	3,028	3,089	98%
18-19	14,229	14,159	100%	12,978	12,584	103%	12,214	12,222	100%	11,295	11,222	101%	12,679	12,547	101%
20-24	51,900	51,860	100%	48,841	48,226	101%	46,423	46,829	99%	43,801	43,655	100%	47,741	47,643	100%
25-29	52,736	52,485	100%	50,075	49,658	101%	47,991	48,090	100%	45,715	45,614	100%	49,129	48,962	100%
30-34	48,857	48,609	101%	46,616	46,158	101%	44,797	44,614	100%	42,949	42,461	101%	45,805	45,461	101%
35-39	47,213	47,055	100%	45,305	44,899	101%	43,809	43,329	101%	42,141	41,527	101%	44,617	44,203	101%
40-44	51,234	51,058	100%	49,461	48,940	101%	47,864	47,225	101%	46,278	45,478	102%	48,709	48,175	101%
45-49	48,989	48,819	100%	47,258	46,858	101%	45,687	45,286	101%	44,204	43,695	101%	46,535	46,165	101%
50-54	45,338	45,195	100%	43,882	43,507	101%	42,552	42,245	101%	41,360	41,102	101%	43,283	43,012	101%
55-59	41,006	40,781	101%	39,782	39,488	101%	38,721	38,589	100%	37,838	37,657	100%	39,337	39,129	101%
60-64	39,696	39,423	101%	36,425	36,165	101%	33,531	33,498	100%	31,115	30,937	101%	35,192	35,006	101%
Total	444,510	442,738	100%	423,773	419,633	101%	406,506	404,986	100%	389,430	386,201	101%	416,055	413,390	101%

J.3.1.2 Of those in the 2015 future client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
16-17	908	863	105%	1,602	1,783	90%	2,330	2,623	89%	2,833	3,168	89%	1,918	2,109	91%
18-19	2,692	3,014	89%	5,381	5,568	97%	7,618	7,572	101%	8,315	8,310	100%	6,002	6,116	98%
20-24	4,355	4,224	103%	8,393	7,744	108%	10,981	10,486	105%	11,387	11,101	103%	8,779	8,389	105%
25-29	3,297	3,130	105%	5,970	5,890	101%	7,921	8,162	97%	8,893	9,021	99%	6,520	6,551	100%
30-34	2,659	2,534	105%	4,770	4,874	98%	6,384	6,945	92%	7,463	8,045	93%	5,319	5,600	95%
35-39	2,227	2,133	104%	4,022	4,041	100%	5,350	5,778	93%	6,333	6,575	96%	4,483	4,632	97%
40-44	2,064	1,821	113%	3,560	3,552	100%	4,719	4,924	96%	5,640	5,699	99%	3,996	3,999	100%
45-49	1,781	1,571	113%	3,120	3,099	101%	4,144	4,283	97%	4,962	4,962	100%	3,502	3,479	101%
50-54	1,879	1,610	117%	3,200	2,968	108%	4,093	4,086	100%	4,856	4,783	102%	3,507	3,362	104%
55-59	1,693	1,459	116%	2,861	2,852	100%	3,744	3,874	97%	4,538	4,581	99%	3,209	3,192	101%
60-64	1,493	1,425	105%	2,575	2,580	100%	3,352	3,438	97%	4,113	4,035	102%	2,883	2,870	100%
Total	25,048	23,784	105%	45,454	44,951	101%	60,636	62,171	98%	69,333	70,280	99%	50,118	50,297	100%

J.3.1.3 All clients

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
16-17	4,220	4,157	102%	4,752	4,933	96%	5,247	5,682	92%	5,567	6,021	92%	4,947	5,198	95%
18-19	16,921	17,173	99%	18,359	18,152	101%	19,832	19,794	100%	19,610	19,532	100%	18,681	18,663	100%
20-24	56,255	56,084	100%	57,234	55,970	102%	57,404	57,315	100%	55,188	54,756	101%	56,520	56,031	101%
25-29	56,033	55,615	101%	56,045	55,548	101%	55,912	56,252	99%	54,608	54,635	100%	55,650	55,513	100%
30-34	51,516	51,143	101%	51,386	51,032	101%	51,181	51,559	99%	50,412	50,506	100%	51,124	51,060	100%
35-39	49,440	49,188	101%	49,327	48,940	101%	49,159	49,107	100%	48,474	48,102	101%	49,100	48,834	101%
40-44	53,298	52,879	101%	53,021	52,492	101%	52,583	52,149	101%	51,918	51,177	101%	52,705	52,174	101%
45-49	50,770	50,390	101%	50,378	49,957	101%	49,831	49,569	101%	49,166	48,657	101%	50,036	49,643	101%
50-54	47,217	46,805	101%	47,082	46,475	101%	46,645	46,331	101%	46,216	45,885	101%	46,790	46,374	101%
55-59	42,699	42,240	101%	42,643	42,340	101%	42,465	42,463	100%	42,376	42,238	100%	42,546	42,320	101%
60-64	41,189	40,848	101%	39,000	38,745	101%	36,883	36,936	100%	35,228	34,972	101%	38,075	37,875	101%
Total	469,558	466,522	101%	469,227	464,584	101%	467,142	467,157	100%	458,763	456,481	100%	466,173	463,686	101%

J.3.2 Average benefits received per client

J.3.2.1 Of those in the 2015 current client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
16-17	3,019	2,990	101%	3,096	3,041	102%	3,135	3,038	103%	3,377	3,154	107%	3,156	3,056	103%
18-19	2,719	2,712	100%	2,847	2,850	100%	2,923	2,890	101%	3,176	3,057	104%	2,916	2,877	101%
20-24	3,251	3,229	101%	3,321	3,327	100%	3,369	3,335	101%	3,636	3,477	105%	3,394	3,342	102%
25-29	3,501	3,491	100%	3,552	3,546	100%	3,556	3,520	101%	3,788	3,604	105%	3,599	3,540	102%
30-34	3,292	3,300	100%	3,326	3,350	99%	3,327	3,331	100%	3,513	3,400	103%	3,364	3,345	101%
35-39	3,205	3,196	100%	3,228	3,228	100%	3,217	3,209	100%	3,367	3,260	103%	3,254	3,223	101%
40-44	3,202	3,205	100%	3,209	3,239	99%	3,201	3,220	99%	3,319	3,257	102%	3,233	3,230	100%
45-49	3,271	3,277	100%	3,296	3,315	99%	3,295	3,298	100%	3,385	3,332	102%	3,312	3,305	100%
50-54	3,442	3,437	100%	3,464	3,480	100%	3,463	3,452	100%	3,531	3,483	101%	3,475	3,463	100%
55-59	3,520	3,540	99%	3,545	3,573	99%	3,537	3,537	100%	3,578	3,565	100%	3,545	3,554	100%
60-64	3,426	3,455	99%	3,444	3,487	99%	3,447	3,445	100%	3,463	3,464	100%	3,445	3,463	99%
Total	3,318	3,319	100%	3,353	3,369	100%	3,359	3,350	100%	3,499	3,412	103%	3,379	3,361	101%

J.3.2.2 Of those in the 2015 future client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
16-17	1,455	1,473	99%	2,266	1,983	114%	2,398	2,210	109%	2,696	2,392	113%	2,204	2,015	109%
18-19	1,260	1,249	101%	1,560	1,621	96%	1,774	1,781	100%	2,017	1,914	105%	1,653	1,641	101%
20-24	1,370	1,281	107%	1,682	1,619	104%	1,850	1,749	106%	2,087	1,876	111%	1,747	1,631	107%
25-29	1,462	1,485	98%	1,920	1,844	104%	2,088	1,950	107%	2,316	2,067	112%	1,947	1,837	106%
30-34	1,343	1,433	94%	1,868	1,772	105%	2,031	1,856	109%	2,240	1,949	115%	1,871	1,752	107%
35-39	1,334	1,468	91%	1,889	1,853	102%	2,100	1,931	109%	2,290	2,049	112%	1,904	1,825	104%
40-44	1,434	1,512	95%	1,963	1,899	103%	2,132	2,015	106%	2,288	2,102	109%	1,954	1,882	104%
45-49	1,438	1,575	91%	2,022	1,967	103%	2,219	2,097	106%	2,367	2,202	108%	2,011	1,960	103%
50-54	1,403	1,569	89%	2,061	2,038	101%	2,216	2,121	104%	2,356	2,220	106%	2,009	1,987	101%
55-59	1,366	1,525	90%	2,032	1,948	104%	2,196	2,107	104%	2,313	2,195	105%	1,977	1,944	102%
60-64	1,323	1,397	95%	1,923	1,846	104%	2,095	1,951	107%	2,183	2,028	108%	1,881	1,806	104%
Total	1,377	1,422	97%	1,865	1,808	103%	2,041	1,931	106%	2,244	2,047	110%	1,988	1,884	106%

J.3.2.3 All clients

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
16-17	2,682	2,675	100%	2,816	2,659	106%	2,808	2,656	106%	3,030	2,753	110%	2,834	2,686	106%
18-19	2,486	2,455	101%	2,470	2,473	100%	2,482	2,466	101%	2,684	2,571	104%	2,531	2,491	102%
20-24	3,106	3,082	101%	3,080	3,091	100%	3,079	3,045	101%	3,316	3,152	105%	3,145	3,092	102%
25-29	3,381	3,378	100%	3,378	3,365	100%	3,348	3,292	102%	3,549	3,351	106%	3,414	3,346	102%
30-34	3,191	3,207	99%	3,190	3,199	100%	3,165	3,132	101%	3,325	3,169	105%	3,218	3,177	101%
35-39	3,121	3,121	100%	3,119	3,114	100%	3,096	3,059	101%	3,226	3,094	104%	3,140	3,097	101%
40-44	3,133	3,147	100%	3,125	3,148	99%	3,106	3,106	100%	3,207	3,129	102%	3,143	3,133	100%
45-49	3,207	3,224	99%	3,217	3,231	100%	3,205	3,194	100%	3,283	3,217	102%	3,228	3,217	100%
50-54	3,360	3,372	100%	3,369	3,388	99%	3,354	3,335	101%	3,407	3,351	102%	3,373	3,362	100%
55-59	3,435	3,471	99%	3,444	3,463	99%	3,419	3,406	100%	3,443	3,417	101%	3,435	3,439	100%
60-64	3,349	3,383	99%	3,344	3,378	99%	3,324	3,306	101%	3,314	3,298	100%	3,333	3,341	100%
Total	3,214	3,222	100%	3,209	3,218	100%	3,188	3,161	101%	3,310	3,201	103%	3,230	3,201	101%

J.3.3 Total payments

J.3.3.1 Of those in the 2015 current client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
16-17	10	10	101%	10	10	102%	9	9	98%	9	9	103%	10	9	101%
18-19	39	38	101%	37	36	103%	36	35	101%	36	34	105%	37	36	102%
20-24	169	167	101%	162	160	101%	156	156	100%	159	152	105%	162	159	102%
25-29	185	183	101%	178	176	101%	171	169	101%	173	164	105%	177	173	102%
30-34	161	160	100%	155	155	100%	149	149	100%	151	144	105%	154	152	101%
35-39	151	150	101%	146	145	101%	141	139	101%	142	135	105%	145	142	102%
40-44	164	164	100%	159	159	100%	153	152	101%	154	148	104%	157	156	101%
45-49	160	160	100%	156	155	100%	151	149	101%	150	146	103%	154	153	101%
50-54	156	155	100%	152	151	100%	147	146	101%	146	143	102%	150	149	101%
55-59	144	144	100%	141	141	100%	137	136	100%	135	134	101%	139	139	100%
60-64	136	136	100%	125	126	99%	116	115	100%	108	107	101%	121	121	100%
Total	1,475	1,469	100%	1,421	1,414	100%	1,366	1,357	101%	1,363	1,318	103%	1,406	1,389	101%

J.3.3.2 Of those in the 2015 future client liability

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
16-17	1	1	104%	4	4	103%	6	6	96%	8	8	101%	5	5	100%
18-19	3	4	90%	8	9	93%	14	13	100%	17	16	105%	11	11	100%
20-24	6	5	110%	14	13	113%	20	18	111%	24	21	114%	16	14	112%
25-29	5	5	104%	11	11	106%	17	16	104%	21	19	110%	13	13	107%
30-34	4	4	98%	9	9	103%	13	13	101%	17	16	107%	11	10	103%
35-39	3	3	95%	8	7	101%	11	11	101%	15	13	108%	9	9	103%
40-44	3	3	107%	7	7	104%	10	10	101%	13	12	108%	8	8	105%
45-49	3	2	103%	6	6	103%	9	9	102%	12	11	108%	7	7	105%
50-54	3	3	104%	7	6	109%	9	9	105%	11	11	108%	7	7	107%
55-59	2	2	104%	6	6	105%	8	8	101%	10	10	104%	7	6	103%
60-64	2	2	99%	5	5	104%	7	7	105%	9	8	110%	6	5	106%
Total	34	34	102%	85	81	104%	124	120	103%	156	144	108%	100	95	105%

J.3.3.3 All clients

Age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
16-17	11	11	102%	13	13	102%	15	15	98%	17	17	102%	14	14	101%
18-19	42	42	100%	45	45	101%	49	49	101%	53	50	105%	47	47	102%
20-24	175	173	101%	176	173	102%	177	175	101%	183	173	106%	178	173	103%
25-29	189	188	101%	189	187	101%	187	185	101%	194	183	106%	190	186	102%
30-34	164	164	100%	164	163	100%	162	161	100%	168	160	105%	164	162	101%
35-39	154	154	100%	154	152	101%	152	150	101%	156	149	105%	154	151	102%
40-44	167	166	100%	166	165	100%	163	162	101%	166	160	104%	166	163	101%
45-49	163	162	100%	162	161	100%	160	158	101%	161	157	103%	162	160	101%
50-54	159	158	101%	159	157	101%	156	155	101%	157	154	102%	158	156	101%
55-59	147	147	100%	147	147	100%	145	145	100%	146	144	101%	146	146	100%
60-64	138	138	100%	130	131	100%	123	122	100%	117	115	101%	127	127	100%
Total	1,509	1,503	100%	1,506	1,495	101%	1,489	1,477	101%	1,518	1,461	104%	1,506	1,484	101%

J.4 Actual versus expected results by client starting segment

J.4.1 Number receiving benefits at some point in the quarter

Segment	Seg_ID	Q1			Q2			Q3			Q4			Average across quarters			
		Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	
Jobseeker	WR < 1	11	43,927	43,806	100%	34,545	34,152	101%	29,982	30,846	97%	27,127	27,660	98%	33,895	34,116	99%
	WR > 1	12	31,498	31,371	100%	29,149	28,060	104%	27,759	26,749	104%	26,206	25,074	105%	28,653	27,814	103%
	SB < 1	13	22,150	22,129	100%	19,551	19,663	99%	18,160	18,367	99%	16,841	17,146	98%	19,176	19,326	99%
	SB > 1	14	41,658	41,573	100%	40,195	39,989	101%	39,070	38,780	101%	37,818	37,485	101%	39,685	39,457	101%
Sole Parent	Ch 0-2	21	26,624	26,610	100%	25,831	25,951	100%	25,191	25,455	99%	24,487	24,681	99%	25,533	25,674	99%
	Ch 3-4	22	14,612	14,609	100%	14,070	14,235	99%	13,699	13,912	98%	13,162	13,494	98%	13,886	14,063	99%
	Ch 5-13 < 1	23	4,555	4,557	100%	4,125	4,230	98%	3,887	4,013	97%	3,610	3,789	95%	4,044	4,147	98%
	Ch 5-13 > 1	24	25,924	25,916	100%	25,153	25,296	99%	24,629	24,719	100%	23,859	24,023	99%	24,891	24,989	100%
Supp Living	Carer	31	8,753	8,744	100%	8,453	8,441	100%	8,223	8,223	100%	7,989	8,001	100%	8,355	8,352	100%
	Partner	32	8,013	7,988	100%	7,710	7,676	100%	7,426	7,412	100%	7,171	7,170	100%	7,580	7,562	100%
	Invalids	33	86,673	86,544	100%	84,597	84,459	100%	82,894	82,647	100%	81,241	80,994	100%	83,851	83,661	100%
Youth	Youth payt	41	1,955	1,942	101%	1,751	1,745	100%	1,521	1,634	93%	1,349	1,445	93%	1,644	1,692	97%
	Youth parental	42	1,101	1,102	100%	1,054	1,069	99%	1,025	1,054	97%	989	1,021	97%	1,042	1,062	98%
Non-ben	Sup <1yr	51	30,276	30,206	100%	27,142	26,652	102%	24,374	23,994	102%	22,022	21,063	105%	25,954	25,479	102%
	Sup >1yr	52	71,148	71,016	100%	67,258	65,459	103%	63,979	60,989	105%	60,618	56,596	107%	65,751	63,515	104%
	Orp only	53	5,173	5,172	100%	4,981	4,897	102%	4,668	4,601	101%	4,514	4,407	102%	4,834	4,769	101%
	Recent exits	54	20,470	19,453	105%	28,208	27,659	102%	30,019	31,591	95%	30,427	32,152	95%	27,281	27,714	98%
Total		444,510	442,738	100%	423,773	419,633	101%	406,506	404,986	100%	389,430	386,201	101%	416,055	413,390	101%	

J.4.2 Average benefits received per client

Segment	Seg_ID	Q1			Q2			Q3			Q4			Average across quarters			
		Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	
Jobseeker	WR < 1	11	2,696	2,726	99%	2,672	2,780	96%	2,706	2,736	99%	2,777	2,769	100%	2,713	2,753	99%
	WR > 1	12	3,571	3,409	105%	3,525	3,383	104%	3,462	3,297	105%	3,539	3,297	107%	3,524	3,346	105%
	SB < 1	13	3,250	3,287	99%	3,297	3,377	98%	3,276	3,330	98%	3,351	3,363	100%	3,293	3,339	99%
	SB > 1	14	3,843	3,757	102%	3,835	3,778	101%	3,785	3,689	103%	3,833	3,709	103%	3,824	3,733	102%
Sole Parent	Ch 0-2	21	5,557	5,468	102%	5,489	5,399	102%	5,345	5,236	102%	5,749	5,261	109%	5,535	5,341	104%
	Ch 3-4	22	5,490	5,494	100%	5,372	5,383	100%	5,183	5,187	100%	5,451	5,131	106%	5,374	5,299	101%
	Ch 5-13 < 1	23	4,807	4,945	97%	4,668	4,838	96%	4,546	4,686	97%	4,798	4,631	104%	4,705	4,775	99%
	Ch 5-13 > 1	24	5,409	5,390	100%	5,275	5,265	100%	5,126	5,080	101%	5,338	5,001	107%	5,287	5,184	102%
Supp Living	Carer	31	4,989	4,942	101%	4,938	4,893	101%	4,846	4,768	102%	4,955	4,741	104%	4,932	4,836	102%
	Partner	32	3,576	3,607	99%	3,571	3,599	99%	3,545	3,537	100%	3,623	3,534	103%	3,579	3,569	100%
	Invalids	33	4,392	4,412	100%	4,399	4,417	100%	4,356	4,347	100%	4,374	4,344	101%	4,380	4,380	100%
Youth	Youth payt	41	2,787	2,706	103%	2,771	2,705	102%	2,736	2,621	104%	2,833	2,647	107%	2,782	2,670	104%
	Youth parental	42	4,736	4,712	101%	4,812	4,786	101%	4,569	4,721	97%	5,302	4,874	109%	4,855	4,773	102%
Non-ben	Sup <1yr	51	898	874	103%	1,025	1,000	103%	1,112	1,112	100%	1,278	1,249	102%	1,078	1,059	102%
	Sup >1yr	52	1,011	994	102%	1,102	1,100	100%	1,156	1,172	99%	1,268	1,271	100%	1,134	1,134	100%
	Orp only	53	3,646	3,537	103%	3,710	3,614	103%	3,707	3,616	103%	3,776	3,683	103%	3,710	3,612	103%
	Recent exits	54	1,947	2,390	81%	2,350	2,460	96%	2,562	2,579	99%	2,762	2,688	103%	2,405	2,529	95%
Total		3,318	3,319	100%	3,353	3,369	100%	3,359	3,350	100%	3,499	3,412	103%	3,379	3,361	101%	

J.4.3 Total payments

Segment		Seg_ID	Q1			Q2			Q3			Q4			Average across quarters		
			Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
Jobseeker	WR < 1	11	118	119	99%	92	95	97%	81	84	96%	75	77	98%	92	94	98%
	WR > 1	12	112	107	105%	103	95	108%	96	88	109%	93	83	112%	101	93	108%
	SB < 1	13	72	73	99%	64	66	97%	59	61	97%	56	58	98%	63	64	98%
	SB > 1	14	160	156	102%	154	151	102%	148	143	103%	145	139	104%	152	147	103%
Sole Parent	Ch 0-2	21	148	146	102%	142	140	101%	135	133	101%	141	130	108%	141	137	103%
	Ch 3-4	22	80	80	100%	76	77	99%	71	72	98%	72	69	104%	75	75	100%
	Ch 5-13 < 1	23	22	23	97%	19	20	94%	18	19	94%	17	18	99%	19	20	96%
Supp Living	Ch 5-13 > 1	24	140	140	100%	133	133	100%	126	126	101%	127	120	106%	132	130	102%
	Carer	31	44	43	101%	42	41	101%	40	39	102%	40	38	104%	41	40	102%
	Partner	32	29	29	99%	28	28	100%	26	26	100%	26	25	103%	27	27	100%
Youth	Invalids	33	381	382	100%	372	373	100%	361	359	100%	355	352	101%	367	366	100%
	Youth payt	41	5	5	104%	5	5	103%	4	4	97%	4	4	100%	5	5	101%
Non-ben	Youth parental	42	5	5	100%	5	5	99%	5	5	94%	5	5	105%	5	5	100%
	Sup <1yr	51	27	26	103%	28	27	104%	27	27	102%	28	26	107%	28	27	104%
Non-ben	Sup >1yr	52	72	71	102%	74	72	103%	74	71	104%	77	72	107%	74	71	104%
	Orp only	53	19	18	103%	18	18	104%	17	17	104%	17	16	105%	18	17	104%
	Recent exits	54	40	46	86%	66	68	97%	77	81	94%	84	86	97%	67	71	95%
Total			1,475	1,469	100%	1,421	1,414	100%	1,366	1,357	101%	1,363	1,318	103%	1,406	1,389	101%

J.5 Actual versus expected results by duration at 30 June 2015⁹

J.5.1 Number receiving benefits at some point in the quarter

Duration	Q1			Q2			Q3			Q4			Average across quarters				
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio		
1-4	140,582	139,331	101%	131,444	130,354	101%	123,280	125,995	98%	116,030	118,128	98%	127,834	128,452	100%		
5-8	57,083	56,968	100%	53,140	52,335	102%	50,343	49,457	102%	47,495	46,372	102%	52,015	51,283	101%		
9-12	35,135	35,083	100%	33,433	32,939	101%	32,105	31,415	102%	30,673	29,837	103%	32,837	32,319	102%		
13-16	26,973	26,931	100%	25,909	25,518	102%	25,024	24,481	102%	24,011	23,384	103%	25,479	25,079	102%		
17-20	22,015	21,979	100%	21,217	20,995	101%	20,584	20,247	102%	19,832	19,436	102%	20,912	20,664	101%		
21-24	20,542	20,516	100%	19,883	19,773	101%	19,306	19,111	101%	18,658	18,375	102%	19,597	19,444	101%		
25-28	20,056	20,025	100%	19,431	19,265	101%	18,891	18,674	101%	18,345	18,005	102%	19,181	18,992	101%		
29-32	15,670	15,644	100%	15,268	15,106	101%	14,950	14,668	102%	14,535	14,250	102%	15,106	14,917	101%		
33-36	12,057	12,035	100%	11,752	11,651	101%	11,476	11,308	101%	11,190	10,937	102%	11,619	11,483	101%		
37-40	10,555	10,538	100%	10,285	10,201	101%	10,086	9,943	101%	9,848	9,641	102%	10,194	10,081	101%		
41-60	34,337	34,282	100%	33,548	33,328	101%	32,826	32,469	101%	32,105	31,632	101%	33,204	32,928	101%		
61-80	19,330	19,298	100%	18,890	18,747	101%	18,514	18,355	101%	18,128	17,904	101%	18,716	18,576	101%		
81-100	29,861	29,796	100%	29,268	29,124	100%	28,822	28,575	101%	28,293	28,018	101%	29,061	28,878	101%		
100+	314	312	101%	305	297	103%	299	288	104%	287	282	102%	301	295	102%		
Total			444,510	442,738	100%	423,773	419,633	101%	406,506	404,986	100%	389,430	386,201	101%	416,055	413,390	101%

⁹ Here we use MSD's definition of continuous duration, which resets when a client spends at least 14 days off benefits

J.5.3 Average benefits received per client

Duration	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
1-4	2,564	2,650	97%	2,629	2,710	97%	2,698	2,734	99%	2,858	2,823	101%	2,687	2,729	98%
5-8	2,970	2,948	101%	2,993	3,024	99%	2,975	3,022	98%	3,124	3,098	101%	3,015	3,023	100%
9-12	3,257	3,231	101%	3,257	3,277	99%	3,224	3,255	99%	3,356	3,310	101%	3,274	3,269	100%
13-16	3,432	3,412	101%	3,426	3,454	99%	3,389	3,416	99%	3,533	3,464	102%	3,445	3,436	100%
17-20	3,580	3,560	101%	3,581	3,588	100%	3,530	3,542	100%	3,675	3,572	103%	3,591	3,565	101%
21-24	3,693	3,656	101%	3,696	3,673	101%	3,654	3,624	101%	3,781	3,665	103%	3,706	3,654	101%
25-28	3,835	3,790	101%	3,825	3,815	100%	3,785	3,760	101%	3,913	3,794	103%	3,840	3,789	101%
29-32	3,892	3,837	101%	3,891	3,840	101%	3,839	3,787	101%	3,955	3,820	104%	3,894	3,821	102%
33-36	3,819	3,796	101%	3,816	3,806	100%	3,780	3,749	101%	3,895	3,766	103%	3,828	3,779	101%
37-40	3,919	3,845	102%	3,926	3,858	102%	3,885	3,799	102%	3,992	3,823	104%	3,930	3,831	103%
41-60	4,112	4,020	102%	4,117	4,032	102%	4,076	3,970	103%	4,173	3,982	105%	4,119	4,001	103%
61-80	4,331	4,252	102%	4,334	4,264	102%	4,291	4,194	102%	4,381	4,207	104%	4,334	4,229	102%
81-100	4,403	4,372	101%	4,404	4,375	101%	4,356	4,301	101%	4,403	4,302	102%	4,392	4,338	101%
100+	4,708	4,635	102%	4,731	4,702	101%	4,679	4,583	102%	4,734	4,543	104%	4,713	4,616	102%
Total	3,318	3,319	100%	3,353	3,369	100%	3,359	3,350	100%	3,499	3,412	103%	3,379	3,361	101%

J.5.4 Total payments

Duration	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
1-4	360	369	98%	346	353	98%	333	344	97%	332	333	99%	343	350	98%
5-8	170	168	101%	159	158	100%	150	149	100%	148	144	103%	157	155	101%
9-12	114	113	101%	109	108	101%	104	102	101%	103	99	104%	107	106	102%
13-16	93	92	101%	89	88	101%	85	84	101%	85	81	105%	88	86	102%
17-20	79	78	101%	76	75	101%	73	72	101%	73	69	105%	75	74	102%
21-24	76	75	101%	73	73	101%	71	69	102%	71	67	105%	73	71	102%
25-28	77	76	101%	74	73	101%	71	70	102%	72	68	105%	74	72	102%
29-32	61	60	102%	59	58	102%	57	56	103%	57	54	106%	59	57	103%
33-36	46	46	101%	45	44	101%	43	42	102%	44	41	106%	44	43	102%
37-40	41	41	102%	40	39	103%	39	38	104%	39	37	107%	40	39	104%
41-60	141	138	102%	138	134	103%	134	129	104%	134	126	106%	137	132	104%
61-80	84	82	102%	82	80	102%	79	77	103%	79	75	105%	81	79	103%
81-100	131	130	101%	129	127	101%	126	123	102%	125	121	103%	128	125	102%
100+	1	1	102%	1	1	103%	1	1	106%	1	1	106%	1	1	104%
Total	1,475	1,469	100%	1,421	1,414	100%	1,366	1,357	101%	1,363	1,318	103%	1,406	1,389	101%

J.6 Actual versus expected results by region at 30 June 2015

J.6.1 Number receiving benefits at some point in the quarter

Region	Q1			Q2			Q3			Q4			Average across quarters		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
Auck	148,000	147,980	100%	140,285	140,107	100%	135,030	134,850	100%	129,231	128,289	101%	138,137	137,807	100%
Cant	34,558	34,466	100%	32,997	32,106	103%	31,919	30,852	103%	30,882	29,296	105%	32,589	31,680	103%
Central	25,518	25,494	100%	24,371	24,031	101%	23,351	23,325	100%	22,496	22,301	101%	23,934	23,788	101%
East	26,405	26,043	101%	25,463	24,881	102%	24,145	24,043	100%	22,825	22,947	99%	24,710	24,479	101%
Nelson	16,808	16,770	100%	16,099	15,737	102%	15,415	15,222	101%	14,839	14,540	102%	15,790	15,567	101%
Northld	22,893	22,761	101%	21,957	21,764	101%	21,245	21,159	100%	20,365	20,290	100%	21,615	21,494	101%
Plenty	40,706	40,307	101%	39,042	38,838	101%	37,792	37,794	100%	35,633	36,133	99%	38,293	38,268	100%
South	28,799	28,388	101%	27,130	26,889	101%	24,848	25,321	98%	24,360	24,288	100%	26,284	26,222	100%
Taran	19,505	19,425	100%	18,559	18,704	99%	17,921	18,313	98%	17,319	17,650	98%	18,326	18,523	99%
Waik	37,879	37,742	100%	36,284	35,634	102%	34,871	34,476	101%	33,315	32,748	102%	35,587	35,150	101%
Wlgtn	39,120	39,047	100%	37,405	36,740	102%	35,913	35,539	101%	34,230	33,730	101%	36,667	36,264	101%
Aust	4,319	4,315	100%	4,181	4,202	100%	4,056	4,092	99%	3,935	3,989	99%	4,123	4,150	99%
Total	444,510	442,738	100%	423,773	419,633	101%	406,506	404,986	100%	389,430	386,201	101%	416,055	413,390	101%

J.6.2 Average benefits received per client

Region	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
Auck	3,288	3,301	100%	3,328	3,355	99%	3,331	3,336	100%	3,481	3,404	102%	3,357	3,349	100%
Cant	3,398	3,275	104%	3,440	3,342	103%	3,437	3,323	103%	3,565	3,379	106%	3,460	3,330	104%
Central	3,330	3,330	100%	3,388	3,379	100%	3,411	3,352	102%	3,541	3,407	104%	3,417	3,367	101%
East	3,479	3,425	102%	3,509	3,479	101%	3,486	3,454	101%	3,678	3,526	104%	3,538	3,471	102%
Nelson	3,213	3,173	101%	3,228	3,230	100%	3,224	3,215	100%	3,344	3,263	102%	3,252	3,220	101%
Northld	3,616	3,615	100%	3,648	3,648	100%	3,637	3,615	101%	3,786	3,671	103%	3,672	3,637	101%
Plenty	3,310	3,319	100%	3,332	3,347	100%	3,340	3,323	101%	3,445	3,387	102%	3,357	3,344	100%
South	3,190	3,179	100%	3,205	3,244	99%	3,254	3,248	100%	3,361	3,288	102%	3,253	3,240	100%
Taran	3,420	3,395	101%	3,483	3,434	101%	3,479	3,404	102%	3,608	3,445	105%	3,497	3,419	102%
Waik	3,383	3,352	101%	3,426	3,406	101%	3,447	3,399	101%	3,615	3,474	104%	3,468	3,408	102%
Wlghtn	3,285	3,285	100%	3,303	3,331	99%	3,309	3,306	100%	3,455	3,366	103%	3,338	3,322	100%
Aust	1,667	3,161	53%	1,679	3,193	53%	1,665	3,162	53%	1,689	3,177	53%	1,675	3,173	53%
Total	3,318	3,319	100%	3,353	3,369	100%	3,359	3,350	100%	3,499	3,412	103%	3,379	3,361	101%

J.6.3 Total payments

Region	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
Auck	487	488	100%	467	470	99%	450	450	100%	450	437	103%	463	461	100%
Cant	117	113	104%	114	107	106%	110	103	107%	110	99	111%	113	105	107%
Central	85	85	100%	83	81	102%	80	78	102%	80	76	105%	82	80	102%
East	92	89	103%	89	87	103%	84	83	101%	84	81	104%	87	85	103%
Nelson	54	53	102%	52	51	102%	50	49	102%	50	47	105%	51	50	102%
Northld	83	82	101%	80	79	101%	77	76	101%	77	74	103%	79	78	101%
Plenty	135	134	101%	130	130	100%	126	126	101%	123	122	100%	128	128	100%
South	92	90	102%	87	87	100%	81	82	98%	82	80	103%	85	85	101%
Taran	67	66	101%	65	64	101%	62	62	100%	62	61	103%	64	63	101%
Waik	128	127	101%	124	121	102%	120	117	103%	120	114	106%	123	120	103%
Wlghtn	129	128	100%	124	122	101%	119	117	101%	118	114	104%	122	120	102%
Aust	7	14	53%	7	13	52%	7	13	52%	7	13	52%	7	13	52%
Total	1,475	1,469	100%	1,421	1,414	100%	1,366	1,357	101%	1,363	1,318	103%	1,406	1,389	101%

J.7.3 Total payments

Benefit	Incapacity	Q1			Q2			Q3			Q4			Average across quarters		
		Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
SLP-HCD	Accident	20	20	100%	19	19	100%	19	19	100%	19	18	101%	19	19	100%
	Cancer	12	12	99%	11	11	98%	10	10	98%	9	9	99%	10	11	98%
	Cardio	30	30	100%	29	29	100%	27	27	100%	27	27	101%	28	28	100%
	Ill-defined	0	0	114%	0	0	141%	0	0	140%	0	0	127%	0	0	129%
	Immune	17	17	100%	16	16	100%	16	15	101%	15	15	102%	16	16	101%
	Infectious	4	4	101%	4	4	101%	4	4	102%	4	4	103%	4	4	102%
	Musc-skel	47	48	99%	46	46	99%	44	44	99%	43	43	100%	45	45	99%
	Nervous Sys	34	34	100%	33	33	100%	32	32	101%	32	31	102%	33	32	101%
	Pregnancy	0	0	82%	0	0	90%	0	0	96%	0	0	97%	0	0	91%
	Psych/hndcp	170	170	100%	168	168	100%	164	163	101%	163	161	101%	166	165	100%
	Respiratory	14	14	100%	13	13	100%	13	13	101%	13	12	102%	13	13	101%
	Sensory	12	12	100%	12	12	100%	12	12	100%	12	11	102%	12	12	100%
	Substance	8	8	100%	8	8	100%	8	8	101%	8	7	101%	8	8	100%
	Other dis	41	41	100%	40	40	100%	39	39	100%	38	38	101%	39	39	100%
Missing	0	0	83%	0	0	82%	0	0	84%	0	0	84%	0	0	83%	
JS-HCD	Accident	17	17	103%	16	16	102%	15	15	102%	14	14	102%	16	15	102%
	Cancer	4	4	101%	3	3	100%	3	3	99%	3	3	97%	3	3	99%
	Cardio	12	12	101%	11	11	101%	11	10	102%	10	10	103%	11	11	102%
	Ill-defined	0	0	109%	0	0	100%	0	0	107%	0	0	116%	0	0	107%
	Immune	12	12	101%	11	11	100%	11	11	102%	10	10	102%	11	11	101%
	Infectious	3	3	104%	3	3	104%	3	2	107%	2	2	109%	3	2	106%
	Musc-skel	40	39	101%	38	38	100%	36	35	101%	35	34	102%	37	37	101%
	Nervous Sys	7	7	102%	7	7	101%	6	6	101%	6	6	102%	7	6	101%
	Pregnancy	3	3	116%	4	3	114%	4	3	113%	4	3	121%	4	3	116%
	Psych/hndcp	100	99	101%	94	93	100%	89	88	101%	86	84	102%	92	91	101%
	Respiratory	7	7	100%	6	6	99%	6	6	100%	6	6	101%	6	6	100%
	Sensory	3	3	103%	3	3	101%	2	2	103%	2	2	104%	3	2	103%
	Substance	13	13	101%	12	12	101%	12	12	101%	11	11	101%	12	12	101%
	Other dis	12	12	101%	11	11	100%	10	10	101%	10	10	102%	11	11	101%
Missing	1	1	87%	1	1	88%	1	1	90%	1	1	96%	1	1	90%	
Total		641	640	100%	618	618	100%	595	590	101%	583	574	102%	609	605	101%

J.8 Actual versus expected results by benefit and partner status, for benefits that record partner status¹⁰

J.8.1 Number receiving benefits at the end of the quarter

Benefit	Partnered status	Q1			Q2			Q3			Q4			Average across quarters		
		Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
EB	Yes	959	953	101%	726	741	98%	620	644	96%	673	592	114%	745	733	102%
	No	1,546	1,527	101%	1,091	1,132	96%	994	1,019	98%	1,032	942	110%	1,166	1,155	101%
SLP-HCD	Yes	16,301	16,267	100%	15,646	15,610	100%	15,077	15,057	100%	14,570	14,589	100%	15,399	15,381	100%
	No	78,385	78,265	100%	76,661	76,525	100%	75,243	75,002	100%	73,842	73,575	100%	76,033	75,842	100%
JS-HCD	Yes	12,296	12,275	100%	11,430	11,472	100%	10,874	10,912	100%	10,350	10,430	99%	11,238	11,272	100%
	No	51,532	51,447	100%	48,335	48,196	100%	46,374	46,251	100%	44,324	44,217	100%	47,641	47,528	100%
JS-WR	Yes	14,725	14,681	100%	12,781	12,655	101%	11,653	11,795	99%	10,898	10,948	100%	12,514	12,520	100%
	No	60,130	59,938	100%	50,828	49,413	103%	45,977	45,755	100%	42,064	41,681	101%	49,750	49,197	101%
Total		235,874	235,353	100%	217,498	215,744	101%	206,812	206,435	100%	197,753	196,974	100%	214,484	213,627	100%

¹⁰ Here 'Yes' refers both to clients who are main beneficiaries with a registered partner, as well as that partner themselves.

J.8.2 Average benefits received per client

Benefit	Partner Status	Q1			Q2			Q3			Q4			Average across quarters		
		Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
EB	Yes	2,356	2,425	97%	2,570	2,607	99%	2,670	2,654	101%	2,650	2,738	97%	2,562	2,606	98%
	No	3,108	2,819	110%	3,797	3,238	117%	3,839	3,333	115%	3,785	3,385	112%	3,632	3,194	114%
SLP-HCD	Yes	3,583	3,608	99%	3,588	3,614	99%	3,567	3,564	100%	3,643	3,566	102%	3,595	3,588	100%
	No	4,477	4,497	100%	4,481	4,499	100%	4,434	4,424	100%	4,445	4,419	101%	4,459	4,460	100%
JS-HCD	Yes	2,975	2,999	99%	2,988	3,048	98%	2,969	2,995	99%	3,065	3,028	101%	2,999	3,018	99%
	No	3,795	3,735	102%	3,817	3,788	101%	3,777	3,710	102%	3,829	3,735	103%	3,804	3,742	102%
JS-WR	Yes	2,612	2,632	99%	2,562	2,611	98%	2,590	2,572	101%	2,724	2,608	104%	2,622	2,606	101%
	No	3,173	3,108	102%	3,170	3,155	100%	3,169	3,090	103%	3,244	3,112	104%	3,189	3,116	102%
Total		3,721	3,701	101%	3,762	3,767	100%	3,753	3,713	101%	3,816	3,741	102%	3,761	3,730	101%

J.8.3 Total payments

Benefit	Partner Status	Q1			Q2			Q3			Q4			Average across quarters		
		Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
EB	Yes	2	2	98%	2	2	97%	2	2	97%	2	2	110%	2	2	100%
	No	5	4	112%	4	4	113%	4	3	112%	4	3	123%	4	4	115%
SLP-HCD	Yes	58	59	100%	56	56	100%	54	54	100%	53	52	102%	55	55	100%
	No	351	352	100%	344	344	100%	334	332	101%	328	325	101%	339	338	100%
JS-HCD	Yes	37	37	99%	34	35	98%	32	33	99%	32	32	100%	34	34	99%
	No	196	192	102%	184	183	101%	175	172	102%	170	165	103%	181	178	102%
JS-WR	Yes	38	39	100%	33	33	99%	30	30	99%	30	29	104%	33	33	100%
	No	191	186	102%	161	156	103%	146	141	103%	136	130	105%	159	153	103%
Total		878	871	101%	818	813	101%	776	767	101%	755	737	102%	807	797	101%

J.9 Actual versus expected results by child age, for clients in SPS benefit¹¹

J.9.1 Number receiving benefits at some point in the quarter

Child age	Q1			Q2			Q3			Q4			Average across quarters			
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio	
1-2	27,563	27,550	100%	26,736	26,867	100%	26,077	26,365	99%	25,352	25,563	99%	26,432	26,586	99%	
3-4	14,714	14,711	100%	14,160	14,329	99%	13,779	13,999	98%	13,226	13,577	97%	13,970	14,154	99%	
5-6	10,088	10,087	100%	9,675	9,768	99%	9,402	9,510	99%	9,071	9,237	98%	9,559	9,651	99%	
7-8	7,283	7,282	100%	7,018	7,086	99%	6,841	6,903	99%	6,607	6,697	99%	6,937	6,992	99%	
9-10	5,788	5,788	100%	5,571	5,606	99%	5,436	5,472	99%	5,263	5,288	100%	5,515	5,539	100%	
11-12	4,994	4,992	100%	4,798	4,834	99%	4,691	4,711	100%	4,496	4,556	99%	4,745	4,773	99%	
13-14	2,328	2,326	100%	2,218	2,234	99%	2,148	2,138	100%	2,034	2,036	100%	2,182	2,184	100%	
Total		72,758	72,736	100%	70,176	70,724	99%	68,374	69,098	99%	66,049	66,954	99%	69,339	69,878	99%

¹¹ A small number of clients receiving SPS where the youngest reported child is aged > 14 have been excluded.

J.9.2 Average benefits received per client

Child age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio	Actual (\$)	Expected (\$)	Ratio
1-2	5,535	5,444	102%	5,472	5,379	102%	5,323	5,220	102%	5,738	5,249	109%	5,517	5,323	104%
3-4	5,473	5,484	100%	5,356	5,376	100%	5,168	5,182	100%	5,441	5,125	106%	5,360	5,292	101%
5-6	5,358	5,330	101%	5,235	5,229	100%	5,078	5,062	100%	5,318	5,023	106%	5,247	5,161	102%
7-8	5,369	5,361	100%	5,235	5,267	99%	5,094	5,104	100%	5,281	5,049	105%	5,245	5,195	101%
9-10	5,314	5,339	100%	5,169	5,242	99%	5,064	5,072	100%	5,308	5,014	106%	5,214	5,167	101%
11-12	5,248	5,253	100%	5,141	5,144	100%	4,994	4,994	100%	5,220	4,914	106%	5,151	5,076	101%
13-14	5,157	5,286	98%	5,000	4,929	101%	4,831	4,557	106%	4,995	4,223	118%	4,996	4,749	105%
Total	5,432	5,402	101%	5,331	5,305	100%	5,177	5,131	101%	5,483	5,100	108%	5,356	5,238	102%

J.9.3 Total payments

Child age	Q1			Q2			Q3			Q4			Average across quarters		
	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio	Actual (\$m)	Expected (\$m)	Ratio
1-2	153	150	102%	146	145	101%	139	138	101%	145	134	108%	146	142	103%
3-4	81	81	100%	76	77	98%	71	73	98%	72	70	103%	75	75	100%
5-6	54	54	101%	51	51	99%	48	48	99%	48	46	104%	50	50	101%
7-8	39	39	100%	37	37	98%	35	35	99%	35	34	103%	36	36	100%
9-10	31	31	100%	29	29	98%	28	28	99%	28	27	105%	29	29	100%
11-12	26	26	100%	25	25	99%	23	24	100%	23	22	105%	24	24	101%
13-14	12	12	98%	11	11	101%	10	10	107%	10	9	118%	11	10	105%
Total	395	393	101%	374	375	100%	354	355	100%	362	341	106%	371	366	101%

APPENDIX K CHANGE IN LIABILITY FROM THE PREVIOUS VALUATION

K.1 Attribution of change from 2015 to 2016 valuation

Table K.1 Attribution of change from 2015 to 2016 valuation by segment

Segment	2015 current client liability			Roll-forward to 2016					Change due to experience			
	Previous valuation	Methodology changes	Liability using updated economic	Expected Payments	Liability less payments	Remove clients leaving	Addition of future liability	Unroll 1 year discounting	Difference between actual and	Recognition of experience	Child material hardship	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	
	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	
Jobseekers	Work-ready, <1 year	4,189	4,357	4,946	371	4,575	2,607	3,900	4,015	5,036	4,858	4,983
	Work-ready, >1 year	3,672	3,670	4,066	369	3,697	4,000	4,181	4,305	4,261	4,242	4,365
	JS-HCD, <1 year	2,678	2,692	2,961	256	2,706	1,651	2,470	2,543	3,033	2,882	2,957
	JS-HCD, >1 year	5,866	5,853	6,365	583	5,781	6,526	6,706	6,905	6,318	6,063	6,164
Sole Parents	Youngest child 0-2	5,519	5,838	6,445	543	5,902	5,859	6,305	6,490	5,998	5,598	5,851
	Youngest child 3-4	2,840	2,927	3,242	295	2,947	2,919	3,037	3,126	2,963	2,774	2,874
	Child 5-13, <1 year	610	631	685	78	607	370	529	545	743	700	734
	Child 5-13, >1 year	4,441	4,596	4,999	513	4,486	4,898	4,946	5,092	4,861	4,659	4,839
Supported Living	Carer	1,360	1,361	1,458	160	1,298	1,347	1,424	1,466	1,477	1,498	1,543
	Partner	872	859	922	107	815	694	718	739	876	891	899
	SLP-HCD	15,398	15,416	16,718	1,451	15,268	16,116	16,581	17,072	16,694	16,768	16,861
Youth	Youth payment (<18)	294	330	375	18	357	84	348	358	340	313	315
	Young parent payt (<19)	232	251	279	20	259	126	270	278	259	235	253
Not On Main Benefits	Sup only, <1 year	1,405	1,458	1,642	105	1,536	817	1,435	1,477	1,444	1,447	1,467
	Sup only, >1 year	3,666	3,770	4,178	283	3,895	3,881	4,012	4,130	4,392	4,436	4,512
	Orphan only	510	485	514	68	446	431	486	501	555	600	597
Recent exits	Recent exits, <1 year	7,099	7,443	8,538	278	8,260	6,688	8,354	8,600	8,178	7,712	7,917
All segments		60,650	61,938	68,333	5,497	62,836	59,015	65,702	67,640	67,426	65,676	67,131
Net Rec Assist		112	120	131	10	121	112	126	129	129	181	181
Net Overpay/ fraud Expenses		230	234	259	21	238	238	238	256	255	211	211
		7,398	7,555	8,290	664	7,626	7,202	8,017	8,254	8,221	8,498	8,498
Grand Total		68,390	69,847	77,012	6,192	70,820	66,566	74,083	76,279	76,031	74,566	76,022
Change			1,456	7,165		-6,192	-4,253	7,517	2,196	-247	-1,466	1,456

Notes:

- (a) All net loans costs and expenses have been removed from the segment level liabilities and added as separate line items
- (b) Methodology changes include integration with the social housing system valuation
- (c) Increase in 2015 liability after updating economic assumptions driven by lower discount rates offset partially by lower forecast inflation. About \$1b of the increase is due to a higher long-term unemployment rate assumption
- (d) Expected payments in the 2015/16 year, actual dollars
- (e) Equals (c) - (d)
- (f) Clients exit the valuation if no benefits are received in the 2015/16 year - this is the residual of liability after the expected level of exits
- (g) Clients not in the 2015 current client liability but expected to receive payments in 2015/16, thus part of the 2016 current client liability
- (h) Can think of as adding on the "interest earned" on the notional \$74b. This column represents our expected 2016 current client liability
- (i) Difference between actual and expected number of clients in the 2016 current liability cohort and their risk characteristics
- (j) The transition and payment models have evolved with experience from those used in 2015
- (k) Increased benefit rates associated with the child material hardship package

K.2 Comparison of future years on benefit measures

Throughout this report we have reported future years on **main** benefits as an alternative measure to future cost. This is a slight change from previous reports in which we reported future years on any benefits, which include time on Supplementary only benefits. The reason for the change was that for the first time the two measures have provided mixed signals. Projected durations on Supplementary only benefits have increased considerably this year (see for instance Sections 3.8 and 3.9), whereas durations on main benefits have reduced. Benefit payments to those on main benefits is considerably higher than

Supplementary only, so the dollar value of lifetime costs have generally reduced. The switch to main benefit durations better captures this evolution of the benefit system and performance over time.

For comparison purposes, the table below shows both measures for the 2016 Valuation, the 2015 restatement and the original 2015 valuation.

Table K.2 Main results with additional future years on benefits measure

Segment		2016 Valuation				2015 Restatement				2015 Valuation			
		N	Total liability (\$m)	Future years on main benefits	Future years on benefits	N	Total liability (\$m)	Future years on main benefits	Future years on benefits	N	Total liability (\$m)	Future years on main benefits	Future years on benefits
Jobseekers	Work-ready, <1 year	44,538	4,983	8.6	10.3	44,174	4,357	8.8	10.2	44,456	4,189	8.4	9.7
	Work-ready, >1 year	32,419	4,365	9.4	11.1	31,802	3,670	9.2	10.4	32,371	3,672	9.1	10.3
	JS-HCD, <1 year	23,033	2,957	9.0	10.3	22,306	2,692	9.6	10.6	22,307	2,678	9.6	10.5
	JS-HCD, >1 year	41,435	6,164	9.9	10.8	41,961	5,853	10.3	11.1	42,515	5,866	10.4	11.0
Sole Parents	Youngest child 0-2	24,590	5,851	12.7	16.1	26,631	5,838	13.8	16.4	26,233	5,519	13.2	15.9
	Youngest child 3-4	13,403	2,874	11.4	14.7	14,620	2,927	12.5	14.9	14,680	2,840	12.1	14.6
	Child 5-13, <1 year	4,836	734	8.5	11.0	4,560	631	9.0	10.9	4,563	610	8.7	10.5
	Child 5-13, >1 year	24,903	4,839	10.5	13.3	25,939	4,596	11.0	13.1	25,960	4,441	10.8	12.7
Supported Living	Carer	8,811	1,543	9.9	11.0	8,791	1,361	9.7	10.7	8,815	1,360	9.9	10.7
	Partner	7,577	899	8.0	8.8	8,089	859	7.9	8.5	8,135	872	8.0	8.3
	SLP-HCD	86,482	16,861	12.4	12.8	87,650	15,416	12.3	12.6	87,182	15,398	12.6	12.7
Youth	Youth payment (<18)	1,762	315	13.8	16.7	1,957	330	15.3	17.6	1,923	294	14.4	16.7
	Young parent pay (<19)	990	253	14.3	18.0	1,103	251	15.3	18.0	1,086	232	14.0	16.9
Not On Main Benefits	Sup only, <1 year	26,356	1,467	2.9	7.8	30,352	1,458	3.1	6.7	30,151	1,405	3.0	6.5
	Sup only, >1 year	74,598	4,512	2.8	8.6	71,460	3,770	3.1	7.3	71,670	3,666	3.0	7.1
	Orphan only	5,519	597	2.0	7.8	5,195	485	2.1	7.2	5,291	510	2.1	7.3
Recent exits	Recent exits, <1 year	126,286	7,917	4.6	6.0	132,802	7,443	4.8	6.0	132,352	7,099	4.6	5.7
All segments		547,538	67,131	7.7	9.9	559,392	61,938	8.0	9.6	559,690	60,650	7.8	9.5

K.3 Percentage change in common measures

The table below shows the percentage changes from June 2015 to June 2016 in the measures commonly used through-out the report.

Table K.3 Percentage changes compared to 2015 restatement valuation

Segment		% Change since 2015 valuation			
		N	Total liability	Future years on main benefits	Future years on benefits
Jobseekers	Work-ready, <1 year	+1%	+14%	-3%	+1%
	Work-ready, >1 year	+2%	+19%	+2%	+6%
	JS-HCD, <1 year	+3%	+10%	-6%	-3%
	JS-HCD, >1 year	-1%	+5%	-4%	-2%
Sole Parents	Youngest child 0-2	-8%	+0%	-8%	-2%
	Youngest child 3-4	-8%	-2%	-9%	-2%
	Child 5-13, <1 year	+6%	+16%	-6%	+1%
	Child 5-13, >1 year	-4%	+5%	-5%	+1%
Supported Living	Carer	+0%	+13%	+1%	+3%
	Partner	-6%	+5%	+2%	+4%
	SLP-HCD	-1%	+9%	+1%	+2%
Youth	Youth payment (<18)	-10%	-4%	-10%	-6%
	Young parent pay (<19)	-10%	+1%	-6%	+0%
Not On Main Benefits	Sup only, <1 year	-13%	+1%	-7%	+17%
	Sup only, >1 year	+4%	+20%	-8%	+17%
	Orphan only	+6%	+23%	-3%	+9%
Recent exits	Recent exits, <1 year	-5%	+6%	-5%	+0%
All segments		-2%	+8%	-3%	+3%

APPENDIX L SENSITIVITY ANALYSIS

L.1 Unemployment sensitivity

L.1.1 Table of national unemployment rates used in scenarios

Quarter	National unemployment rate		
	Adopted (a)	Constant scenario (b)	Recession scenario (b)
Sep-16	4.95%	5.06%	5.31%
Dec-16	4.90%	5.06%	5.57%
Mar-17	4.85%	5.06%	5.82%
Jun-17	4.84%	5.06%	6.08%
Sep-17	4.84%	5.06%	6.33%
Dec-17	4.78%	5.06%	6.59%
Mar-18	4.68%	5.06%	6.84%
Jun-18	4.63%	5.06%	7.10%
Sep-18	4.47%	5.06%	6.93%
Dec-18	4.37%	5.06%	6.75%
Mar-19	4.32%	5.06%	6.58%
Jun-19	4.26%	5.06%	6.40%
Sep-19	4.26%	5.06%	6.23%
Dec-19	4.26%	5.06%	6.05%
Mar-20	4.30%	5.06%	5.88%
Jun-20	4.30%	5.06%	5.70%
Sep-20	4.30%	5.06%	5.53%
Dec-20	4.30%	5.06%	5.35%
Mar-21	4.30%	5.06%	5.18%
Jun-21	4.30%	5.06%	5.00%
Sep-21	4.30%	5.06%	4.83%
Dec-21	4.30%	5.06%	4.65%
Mar-22	4.30%	5.06%	4.48%
Jun-22	4.30%	5.06%	4.30%
Sep-22 and beyond	4.30%	5.06%	4.30%

To run scenarios, each of these national rate alternatives considered above is converted into regional level forecasts in a similar fashion to the main projection.

L.1.2 Current client liability excluding loans and expenses, adopted unemployment rate

Top tier segment	Segment	Total benefit payments (\$m)														Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS		
Jobseekers	Work-ready, <1 year	1,157	815	651	845	123	32	85	841	81	44	68	20	220	4,983	
	Work-ready, >1 year	1,028	752	479	773	123	30	107	696	83	39	42	12	199	4,365	
	JS-HCD, <1 year	232	828	251	811	47	8	35	469	81	20	27	6	140	2,957	
	JS-HCD, >1 year	360	2,042	290	1,758	95	13	88	952	194	36	28	8	301	6,164	
Sole Parents	Youngest child 0-2	285	347	2,718	501	186	11	133	983	87	108	220	12	260	5,851	
	Youngest child 3-4	149	191	1,246	283	101	6	72	500	48	55	86	6	129	2,874	
	Child 5-13, <1 year	61	71	260	90	29	3	20	125	13	12	15	2	34	734	
	Child 5-13, >1 year	373	468	1,680	619	206	13	142	837	102	82	80	9	228	4,839	
Supported Living	Carer	72	114	88	156	737	2	44	191	38	28	11	1	59	1,543	
	Partner	23	45	32	581	7	1	22	93	42	11	5	0	37	899	
	SLP-HCD	101	235	62	13,266	28	5	100	1,577	819	58	31	4	576	16,861	
Youth	Youth payment (<18)	59	35	83	44	6	1	5	54	4	3	8	1	13	315	
	Young parent pay (<19)	14	11	133	15	5	0	4	40	2	4	14	1	10	253	
Not On Main Benefits	Sup only, <1 year	122	169	199	206	45	8	35	421	34	88	68	3	69	1,467	
	Sup only, >1 year	307	507	538	632	148	23	129	1,360	123	340	182	7	213	4,512	
	Orphan only	18	28	23	39	10	1	407	29	5	17	11	0	9	597	
Recent exits	Recent exits, <1 year	1,192	1,322	1,178	1,535	224	46	187	1,389	153	98	198	27	368	7,917	
Total		5,553	7,981	9,911	22,154	2,122	206	1,615	10,558	1,909	1,043	1,094	120	2,866	67,131	

Notes:

(a) Adopted national unemployment rates are shown in column (a) of table L.1.1, with the regional rates adjusted accordingly as shown in Appendix C.

L.1.3 Current client liability excluding loans and expenses, constant unemployment rate forecast at current rate of 5.06%

Top tier segment	Segment	Total benefit payments (\$m)														Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS			
Jobseekers	Work-ready, <1 year	1,340	875	675	827	132	35	91	900	82	46	69	22	234	5,327	7%	
	Work-ready, >1 year	1,167	792	489	759	126	33	108	729	83	41	41	13	208	4,590	5%	
	JS-HCD, <1 year	282	869	262	788	48	8	38	488	81	21	27	7	145	3,065	4%	
	JS-HCD, >1 year	424	2,131	297	1,712	96	14	90	970	194	37	28	8	306	6,306	2%	
Sole Parents	Youngest child 0-2	355	390	2,779	501	202	13	141	1,022	89	113	220	13	270	6,108	4%	
	Youngest child 3-4	183	213	1,275	288	111	7	73	518	49	58	86	6	135	3,003	4%	
	Child 5-13, <1 year	72	76	266	85	31	3	21	127	13	12	16	2	35	756	3%	
	Child 5-13, >1 year	448	513	1,722	606	213	15	148	864	104	84	80	9	237	5,044	4%	
Supported Living	Carer	86	121	89	150	737	3	43	195	37	29	11	1	60	1,563	1%	
	Partner	28	48	34	582	7	1	23	94	42	11	5	0	37	913	2%	
	SLP-HCD	128	260	67	13,262	31	5	101	1,571	816	58	31	4	574	16,907	0%	
Youth	Youth payment (<18)	70	39	85	44	7	1	5	58	5	4	8	1	14	340	8%	
	Young parent pay (<19)	17	12	134	16	5	1	5	41	2	4	14	1	11	260	3%	
Not On Main Benefits	Sup only, <1 year	151	188	207	214	49	9	38	436	36	92	68	3	74	1,564	7%	
	Sup only, >1 year	375	559	563	632	156	26	135	1,384	126	349	183	8	223	4,718	5%	
	Orphan only	21	28	23	39	12	2	412	31	6	17	11	0	9	610	2%	
Recent exits	Recent exits, <1 year	1,451	1,454	1,248	1,545	247	52	200	1,500	159	104	201	30	396	8,588	8%	
Total		6,599	8,567	10,216	22,049	2,208	228	1,671	10,929	1,923	1,078	1,099	129	2,967	69,662	4%	

Notes:

(a) Adopted national unemployment rates are shown in column (b) of table L.1.1, with the regional rates adjusted accordingly as shown in Appendix C.

L.1.4 Current client liability excluding loans and expenses, mild recession type unemployment rate forecast

Top tier segment	Segment	Total benefit payments (\$m)														Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS			
Jobseekers	Work-ready, <1 year	1,347	841	664	834	128	34	88	882	81	46	68	22	229	5,265	6%	
	Work-ready, >1 year	1,195	779	481	764	124	33	109	724	83	41	41	13	207	4,594	5%	
	JS-HCD, <1 year	265	869	265	799	46	8	36	483	82	21	27	6	144	3,053	3%	
	JS-HCD, >1 year	408	2,132	300	1,707	95	13	89	968	194	37	27	8	305	6,284	2%	
Sole Parents	Youngest child 0-2	316	363	2,750	502	193	12	135	995	87	112	219	12	264	5,960	2%	
	Youngest child 3-4	164	197	1,281	290	105	7	71	510	49	58	86	6	133	2,956	3%	
	Child 5-13, <1 year	70	75	264	89	31	3	21	127	13	12	15	2	35	757	3%	
	Child 5-13, >1 year	430	491	1,730	614	214	14	145	854	103	85	79	9	235	5,003	3%	
Supported Living	Carer	81	114	90	153	744	3	44	193	37	28	11	1	60	1,559	1%	
	Partner	28	49	35	584	7	2	22	94	42	11	5	0	37	917	2%	
	SLP-HCD	115	255	67	13,226	30	5	100	1,552	811	58	31	4	569	16,824	0%	
Youth	Youth payment (<18)	67	36	84	42	6	1	6	56	4	4	8	1	14	328	4%	
	Young parent pay (<19)	15	10	137	15	5	0	4	41	2	4	14	1	11	258	2%	
Not On Main Benefits	Sup only, <1 year	142	181	210	210	46	8	35	428	35	91	68	3	72	1,530	4%	
	Sup only, >1 year	354	534	569	634	154	25	129	1,365	125	350	182	8	219	4,648	3%	
	Orphan only	20	28	24	40	11	2	413	30	6	17	11	0	9	610	2%	
Recent exits	Recent exits, <1 year	1,419	1,413	1,258	1,564	245	51	197	1,490	159	108	203	30	393	8,529	8%	
Total		6,438	8,368	10,208	22,066	2,184	221	1,644	10,792	1,913	1,082	1,096	128	2,935	69,075	3%	

Notes:

(a) Adopted national unemployment rates are shown in column (c) of table L.1.1, with the regional rates adjusted accordingly as shown in Appendix C.

L.2 Economic sensitivity

L.2.1 Current client liability excluding loans and expenses, discount rates 1% lower

Top tier segment	Segment	Total benefit payments (\$m)													Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS		
Jobseekers	Work-ready, <1 year	1,256	944	727	1,039	145	35	103	962	98	50	76	22	253	5,710	15%
	Work-ready, >1 year	1,097	850	530	920	141	33	123	779	96	44	46	13	223	4,894	12%
	JS-HCD, <1 year	258	896	277	947	55	9	42	526	93	23	30	7	157	3,319	12%
	JS-HCD, >1 year	397	2,177	318	2,007	107	14	99	1,045	217	40	30	8	330	6,791	10%
Sole Parents	Youngest child 0-2	332	424	2,908	631	222	14	164	1,100	104	122	237	13	292	6,563	12%
	Youngest child 3-4	172	229	1,324	349	119	7	87	555	57	62	93	6	145	3,205	12%
	Child 5-13, <1 year	68	82	273	107	33	3	23	137	15	13	17	2	38	810	10%
	Child 5-13, >1 year	415	539	1,767	730	234	15	164	916	116	89	86	9	252	5,333	10%
Supported Living	Carer	80	129	96	181	781	3	49	209	41	30	12	1	65	1,677	9%
	Partner	25	50	35	626	8	2	24	102	46	11	5	0	40	975	8%
	SLP-HCD	116	268	70	14,645	33	6	110	1,753	910	63	34	5	635	18,648	11%
Youth	Youth payment (<18)	65	43	94	57	7	1	6	64	6	4	9	1	16	374	19%
	Young parent payt (<19)	16	14	144	20	7	1	5	46	3	4	15	1	12	288	14%
Not On Main Benefits	Sup only, <1 year	137	195	217	248	53	9	41	463	39	95	72	3	78	1,652	13%
	Sup only, >1 year	345	581	586	751	172	27	151	1,481	140	363	192	8	239	5,035	12%
	Orphan only	20	31	25	45	11	2	430	33	6	18	11	0	10	641	7%
Recent exits	Recent exits, <1 year	1,332	1,526	1,300	1,860	263	52	223	1,594	183	112	215	30	424	9,114	15%
Total		6,130	8,979	10,690	25,165	2,393	232	1,843	11,761	2,171	1,146	1,179	131	3,208	75,028	12%

Notes:

(a) Assumes all forward rates are 1% lower than those given in Appendix C

L.2.2 Current client liability excluding loans and expenses, discount rates 1% higher

Top tier segment	Segment	Total benefit payments (\$m)													Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS		
Jobseekers	Work-ready, <1 year	1,075	712	587	697	106	29	71	744	68	38	62	19	194	4,402	-12%
	Work-ready, >1 year	970	671	436	658	109	28	94	628	72	35	38	11	179	3,929	-10%
	JS-HCD, <1 year	210	771	229	703	41	7	30	423	71	18	25	6	126	2,661	-10%
	JS-HCD, >1 year	329	1,924	266	1,553	84	11	79	873	175	33	25	7	276	5,636	-9%
Sole Parents	Youngest child 0-2	248	288	2,551	402	157	10	110	887	73	97	205	11	234	5,271	-10%
	Youngest child 3-4	131	161	1,177	232	87	5	61	454	41	50	81	5	117	2,601	-9%
	Child 5-13, <1 year	55	62	249	76	25	2	17	115	11	11	15	2	31	671	-9%
	Child 5-13, >1 year	338	410	1,603	528	183	12	124	769	90	75	75	8	208	4,424	-9%
Supported Living	Carer	66	102	81	135	699	2	40	176	34	26	10	1	54	1,427	-7%
	Partner	21	40	30	541	6	1	21	86	39	10	5	0	34	833	-7%
	SLP-HCD	89	208	55	12,109	25	4	91	1,431	743	53	29	4	526	15,365	-9%
Youth	Youth payment (<18)	54	29	73	34	5	1	4	46	3	3	7	1	11	270	-14%
	Young parent payt (<19)	12	9	123	11	4	0	3	35	2	3	13	1	9	225	-11%
Not On Main Benefits	Sup only, <1 year	109	148	183	172	39	7	30	387	30	82	64	3	62	1,316	-10%
	Sup only, >1 year	276	447	497	536	129	21	112	1,258	109	320	173	7	191	4,075	-10%
	Orphan only	16	25	21	34	9	1	386	27	5	16	10	0	8	558	-6%
Recent exits	Recent exits, <1 year	1,077	1,158	1,073	1,284	192	41	158	1,223	130	86	183	25	324	6,955	-12%
Total		5,074	7,165	9,233	19,706	1,899	185	1,431	9,561	1,696	956	1,019	111	2,585	60,621	-10%

Notes:

(a) Assumes all forward rates are 1% higher than those given in Appendix C

L.2.3 Current client liability excluding loans and expenses, inflation rates 1% lower

Top tier segment	Segment	Total benefit payments (\$m)													Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS		
Jobseekers	Work-ready, <1 year	1,078	712	588	696	106	29	71	744	68	38	62	19	194	4,406	-12%
	Work-ready, >1 year	972	672	437	657	109	29	94	629	72	35	38	11	180	3,935	-10%
	JS-HCD, <1 year	211	773	230	703	41	7	30	424	72	18	25	6	126	2,665	-10%
	JS-HCD, >1 year	330	1,929	266	1,555	85	11	79	875	175	33	25	7	276	5,647	-8%
Sole Parents	Youngest child 0-2	248	287	2,558	402	157	10	110	888	73	97	205	11	234	5,279	-10%
	Youngest child 3-4	131	161	1,180	232	87	5	61	455	41	50	81	5	117	2,606	-9%
	Child 5-13, <1 year	55	62	250	76	26	2	17	115	11	11	15	2	31	672	-8%
	Child 5-13, >1 year	338	410	1,607	528	183	12	125	771	90	75	75	8	209	4,432	-8%
Supported Living	Carer	66	102	81	135	701	2	40	177	34	27	10	1	55	1,431	-7%
	Partner	21	40	30	543	6	1	21	86	39	10	5	0	34	835	-7%
	SLP-HCD	89	208	56	12,131	25	4	91	1,433	744	53	29	4	527	15,393	-9%
Youth	Youth payment (<18)	54	29	73	34	5	1	4	46	3	3	7	1	11	270	-14%
	Young parent payt (<19)	12	9	123	11	4	0	3	35	2	3	13	1	9	225	-11%
Not On Main Benefits	Sup only, <1 year	109	148	183	172	39	7	30	387	30	82	64	3	62	1,317	-10%
	Sup only, >1 year	277	447	498	536	129	21	112	1,261	110	321	173	7	192	4,082	-10%
	Orphan only	16	25	21	34	9	1	387	27	5	16	10	0	8	559	-6%
Recent exits	Recent exits, <1 year	1,079	1,159	1,075	1,283	192	42	158	1,224	130	86	184	25	324	6,960	-12%
	Total	5,084	7,176	9,255	19,729	1,902	186	1,433	9,577	1,698	957	1,021	111	2,589	60,716	-10%

Notes:

(a) Assumes all April inflation increases are 1% lower than those given in Appendix C

L.2.4 Current client liability excluding loans and expenses, inflation rates 1% higher

Top tier segment	Segment	Total benefit payments (\$m)													Total	Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS		
Jobseekers	Work-ready, <1 year	1,252	941	724	1,036	145	35	103	959	97	50	76	22	252	5,693	14%
	Work-ready, >1 year	1,093	848	528	917	141	33	123	776	96	44	45	13	222	4,878	12%
	JS-HCD, <1 year	257	893	276	944	55	9	42	524	93	23	30	7	156	3,308	12%
	JS-HCD, >1 year	396	2,169	317	2,001	107	14	99	1,041	216	40	30	8	329	6,767	10%
Sole Parents	Youngest child 0-2	331	423	2,897	630	222	14	163	1,096	104	122	236	13	291	6,542	12%
	Youngest child 3-4	172	229	1,319	348	118	7	86	553	56	61	93	6	144	3,194	11%
	Child 5-13, <1 year	68	82	272	107	33	3	23	137	15	13	16	2	38	807	10%
	Child 5-13, >1 year	413	537	1,760	728	233	15	163	913	116	89	85	9	251	5,315	10%
Supported Living	Carer	79	128	96	180	778	3	48	208	41	30	12	1	65	1,671	8%
	Partner	25	50	35	624	8	2	24	101	45	11	5	0	40	971	8%
	SLP-HCD	115	267	70	14,595	33	6	110	1,747	907	63	33	4	633	18,584	10%
Youth	Youth payment (<18)	65	42	93	57	7	1	6	64	6	4	9	1	16	373	18%
	Young parent payt (<19)	16	14	144	20	7	1	5	46	3	4	15	1	12	287	13%
Not On Main Benefits	Sup only, <1 year	136	195	216	248	52	9	41	461	39	95	72	3	78	1,647	12%
	Sup only, >1 year	343	579	584	749	171	27	150	1,475	140	362	191	8	238	5,018	11%
	Orphan only	20	31	25	45	11	2	428	32	6	18	11	0	10	638	7%
Recent exits	Recent exits, <1 year	1,327	1,521	1,296	1,855	263	52	222	1,589	182	112	214	30	422	9,086	15%
	Total	6,109	8,949	10,651	25,085	2,385	231	1,838	11,722	2,164	1,142	1,174	131	3,198	74,778	11%

Notes:

(a) Assumes all April inflation increases are 1% higher than those given in Appendix C

L.3 Model sensitivity

L.3.1 Current client liability excluding loans and expenses, variable transition rates

In the table below the current client liability is recalculated with the standard economic parameters, but with the model transition rates individually increased or decreased by five percent.

L.3.1.1 Current client liability excluding loans and expenses, variable transition rates

Change	Total benefit payments (\$m)														Total	Change on base
	JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS			
Transition from SPS rate	-5%	5,537	7,974	9,510	22,078	2,121	206	1,616	10,333	1,890	1,067	1,093	119	2,818	66,362	-1.1%
	5%	5,567	7,992	10,324	22,072	2,121	205	1,615	10,652	1,909	1,049	1,093	121	2,888	67,608	0.7%
Transition from JS-WR rate	-5%	5,264	7,986	9,944	22,129	2,133	208	1,614	10,510	1,906	1,047	1,097	118	2,853	66,807	-0.5%
	5%	5,856	7,982	9,923	22,144	2,115	204	1,620	10,624	1,910	1,045	1,093	122	2,883	67,520	0.6%
Transition from JS-HCD rate	-5%	5,509	8,419	9,873	22,153	2,095	204	1,616	10,637	1,922	1,043	1,092	120	2,890	67,573	0.7%
	5%	5,594	7,591	9,937	22,129	2,106	207	1,607	10,484	1,895	1,041	1,094	120	2,844	66,648	-0.7%
Transition from SLH rate	-5%	5,565	8,000	9,884	21,777	2,127	205	1,615	10,530	1,886	1,045	1,093	120	2,851	66,699	-0.6%
	5%	5,542	7,950	9,922	22,455	2,125	205	1,622	10,472	1,919	1,076	1,093	120	2,858	67,359	0.3%
Transition from NOB rate	-5%	5,733	8,217	10,094	22,432	2,171	215	1,646	10,799	1,937	1,059	1,106	124	2,930	68,464	2.0%
	5%	5,363	7,749	9,707	21,812	2,074	199	1,579	10,175	1,868	1,056	1,080	116	2,778	65,555	-2.3%

Notes:

(a) For example, if 10% of clients transition out of a benefit state, a 5% increase would change this to 10.5%

APPENDIX M OTHER ONE-WAY TABLES

M.1 Current client liability by age at valuation date

Group	Number of clients	Benefit payment														Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS	Loa+Exp (a)	
		(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)	(\$m)
16-17	3,526	78	51	156	290	10	1	8	109	17	7	17	2	26	102	874
18-19	18,901	315	259	678	722	52	7	37	445	55	31	78	9	107	370	3,164
20-24	70,499	1,020	978	2,642	2,444	229	28	159	1,733	208	145	322	30	419	1,372	11,730
25-29	69,754	895	1,037	2,472	2,643	290	30	194	1,823	243	193	313	25	448	1,405	12,012
30-34	60,995	717	966	1,640	2,472	288	26	190	1,531	228	190	188	17	382	1,170	10,004
35-39	57,502	641	1,004	1,081	2,570	296	25	206	1,348	230	178	99	13	353	1,065	9,108
40-44	58,744	593	1,083	670	2,963	313	24	229	1,235	256	151	45	10	353	1,050	8,975
45-49	58,257	524	1,041	365	3,033	307	22	236	1,040	259	93	19	7	326	963	8,235
50-54	53,342	398	838	143	2,632	201	19	201	734	218	38	8	4	251	753	6,440
55-59	48,697	262	535	50	1,771	107	15	120	424	144	13	4	2	153	477	4,078
60-64	47,321	110	190	13	612	28	9	35	137	50	3	1	0	48	164	1,402
All	547,538	5,553	7,981	9,911	22,154	2,122	206	1,615	10,558	1,909	1,043	1,094	120	2,866	8,890	76,022

Notes:

(a) Loans and expenses allocated proportionally

M.2 Current client liability by continuous duration at valuation date

Group	Number of clients	Benefit payment														Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS	Loa+Exp (a)	
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
<1yr	116,911	1,731	2,047	2,226	2,860	372	56	292	2,304	277	203	265	37	584	1,755	15,009
1-2 yr	57,023	683	982	1,325	1,785	218	24	171	1,263	168	130	153	15	315	958	8,192
2-3 yr	38,554	387	633	930	1,371	161	16	127	881	127	95	104	9	219	670	5,729
3-4 yr	26,427	245	421	679	1,101	124	10	97	624	98	70	72	6	157	491	4,196
4-5 yr	21,354	182	330	546	1,001	106	8	86	511	88	59	55	4	131	411	3,518
5-6 yr	17,948	146	277	466	924	90	6	73	431	80	49	45	3	114	358	3,063
6-7 yr	17,177	136	261	435	932	97	6	71	410	81	49	41	3	111	349	2,981
7-8 yr	16,917	139	274	437	991	100	5	73	419	86	49	39	3	116	362	3,095
8-9 yr	13,518	104	207	336	910	83	4	60	338	78	42	29	2	95	303	2,592
9-10 yr	10,436	76	156	232	739	64	3	45	252	63	33	19	2	73	233	1,991
10-15 yr	35,108	257	514	682	2,831	224	10	155	841	237	99	50	5	258	816	6,978
15-20 yr	19,090	133	271	266	1,922	120	5	77	431	151	37	16	2	146	474	4,050
20-25 yr	20,104	122	249	160	1,994	119	5	86	352	156	26	8	1	138	453	3,871
25+ yr	10,685	19	37	13	1,257	20	1	14	111	67	4	1	0	39	210	1,793
Off benefits	126,286	1,192	1,322	1,178	1,535	224	46	187	1,389	153	98	198	27	368	1,048	8,966
All	547,538	5,553	7,981	9,911	22,154	2,122	206	1,615	10,558	1,909	1,043	1,094	120	2,866	8,890	76,022

Notes:

(a) Loans and expenses allocated proportionately

M.3 Current client liability by region at valuation date

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m		
Northland	27,531	413	515	654	1,121	136	10	123	576	95	42	52	7	182	520	4,448	
Auckland	180,655	1,395	2,696	3,100	5,746	845	64	412	3,810	493	324	317	31	930	2,670	22,832	
Waikato	47,250	544	706	959	1,971	181	18	147	933	173	84	109	13	278	810	6,924	
East Coast	32,557	350	432	711	1,617	150	20	145	580	119	85	101	11	176	595	5,091	
Bay of Plenty	50,487	603	835	1,053	1,671	215	25	205	1,033	143	90	128	13	243	829	7,085	
Taranaki	24,344	322	385	489	1,250	89	9	90	434	92	54	47	6	120	449	3,836	
Central	30,969	349	408	538	1,531	118	12	106	584	131	76	74	7	162	542	4,636	
Wellington	49,035	683	659	828	2,024	166	21	126	905	192	95	100	14	241	802	6,857	
Nelson	20,878	201	298	331	809	44	6	53	393	82	34	31	4	111	317	2,715	
Canterbury	43,417	284	587	691	2,323	109	10	111	718	206	93	79	7	252	725	6,195	
Southland	36,250	409	457	556	1,670	68	12	97	574	160	66	55	6	166	569	4,863	
Australia	4,165	1	2	0	423	0	0	1	20	23	0	0	0	5	63	540	
All	547,538	5,552	7,978	9,910	21,731	2,121	206	1,614	10,538	1,886	1,043	1,093	120	2,862	8,827	76,022	

Notes:

(a) Loans and expenses allocated proportionately

M.4 Current client liability by social housing state at valuation date

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m		
In social housing	55,630	752	1,151	1,664	3,197	473	28	297	618	299	119	118	15	273	1,193	10,197	
Acc. Supplement	278,463	3,145	4,838	6,221	12,372	1,193	110	689	7,693	1,159	487	654	68	1,981	5,378	45,988	
Neither	213,445	1,656	1,991	2,026	6,585	456	68	629	2,248	451	437	321	37	613	2,320	19,836	
All	547,538	5,553	7,981	9,911	22,154	2,122	206	1,615	10,558	1,909	1,043	1,094	120	2,866	8,890	76,022	

Notes:

(a) Loans and expenses allocated proportionately

M.5 Current client liability by cumulative time in social housing at valuation date

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m		
None	415,218	3,525	5,270	5,797	15,409	1,228	137	995	7,934	1,306	761	752	77	2,028	5,988	51,207	
<1yr	10,447	175	225	319	539	54	7	40	242	46	21	28	4	75	235	2,010	
1-2 yr	17,385	286	379	543	868	99	9	68	419	75	37	47	6	126	392	3,356	
2-3 yr	13,043	217	282	431	647	79	7	57	305	59	30	37	5	94	298	2,546	
3-4 yr	10,948	173	234	356	545	71	6	49	246	50	24	30	4	76	247	2,111	
4-5 yr	8,989	145	189	304	431	59	5	39	197	40	20	25	3	61	201	1,719	
5-6 yr	8,204	131	173	280	409	55	4	40	177	37	19	23	3	55	186	1,592	
6-7 yr	7,308	115	153	243	373	54	4	37	148	34	17	20	2	48	165	1,411	
7-8 yr	6,810	105	142	219	350	49	4	34	131	32	15	17	2	43	151	1,294	
8-9 yr	6,207	95	129	200	333	47	3	32	116	30	14	16	2	39	140	1,195	
9-10 yr	5,587	87	116	182	299	43	3	28	101	27	12	14	2	34	125	1,073	
10-15 yr	21,002	302	415	632	1,145	169	10	117	333	102	44	49	6	116	455	3,895	
15-20 yr	13,259	146	222	265	672	92	5	69	137	61	21	22	3	53	234	2,004	
20-25 yr	1,958	33	34	90	81	15	1	7	46	6	5	8	1	12	45	387	
>25 yr	1,173	18	18	49	53	9	1	4	25	4	3	4	0	7	26	221	
All	547,538	5,553	7,981	9,911	22,154	2,122	206	1,615	10,558	1,909	1,043	1,094	120	2,866	8,890	76,022	

Notes:

(a) Loans and expenses allocated proportionately

M.6 Current client liability by youngest child age, current SPS clients

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m			
0-2	26,725	309	369	2,873	531	197	12	141	1,047	91	115	243	13	275	823	7,040	
3-4	14,890	164	207	1,305	303	108	7	78	534	51	60	97	6	138	405	3,462	
5-6	10,855	125	162	849	239	88	5	59	376	40	41	52	4	98	283	2,422	
7-8	7,836	101	129	543	178	62	4	43	258	30	26	28	3	68	195	1,667	
9-10	6,102	88	112	349	144	48	3	33	183	23	17	14	2	51	142	1,210	
11-12	5,254	93	112	213	130	37	3	27	145	20	12	9	2	42	112	955	
13-14	2,615	60	66	55	64	16	1	12	62	9	4	3	1	19	49	422	
All	74,277	939	1,157	6,187	1,590	556	37	393	2,606	264	275	447	30	691	2,009	17,178	

Notes:

(a) Loans and expenses allocated proportionately

M.7 Current client liability by incapacity type, current SLP-HCD clients

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m			
Accident	4,583	7	16	5	626	2	0	8	76	43	3	2	0	32	109	930	
Cancer	3,126	4	9	4	220	1	0	4	31	17	2	1	0	15	41	349	
Cardio	7,125	7	17	5	586	2	0	13	70	41	3	2	0	33	103	884	
Immune	3,804	5	12	3	381	2	0	8	46	29	2	1	0	21	68	577	
Infectious	1,006	1	3	1	121	0	0	1	16	9	1	0	0	7	21	183	
Musc-skel	10,802	9	27	7	1,065	3	1	19	134	85	6	3	0	66	189	1,613	
Nervous Sys	8,065	10	21	9	1,222	3	1	9	145	87	6	4	0	55	208	1,780	
Other dis	9,744	15	28	14	1,793	5	1	12	217	125	9	6	1	74	305	2,605	
Pregnancy	20	0	0	0	3	0	0	0	0	0	0	0	0	0	1	5	
Psych/hndcp	39,529	60	134	42	6,892	15	3	38	825	360	31	16	2	265	1,150	9,833	
Respiratory	3,219	3	9	2	274	1	0	6	34	21	2	1	0	16	49	417	
Sensory	2,856	3	6	3	442	1	0	3	53	30	2	1	0	18	74	637	
Substance	1,726	3	8	2	224	1	0	2	30	16	1	1	0	13	40	340	
All	95,605	129	290	99	13,849	37	7	123	1,677	861	69	36	5	614	2,357	20,153	

Notes:

(a) Loans and expenses allocated proportionately

M.8 Current client liability by incapacity type, current JS-HCD clients

Group	Number of clients	Benefit payment														Loa+Exp (a)	Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS			
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m			
Accident	4,914	54	196	35	178	10	2	8	100	17	4	4	1	30	85	724	
Cancer	1,227	6	33	4	32	2	0	2	16	3	1	0	0	5	14	119	
Cardio	3,772	20	122	10	104	5	1	6	50	10	2	1	0	16	46	393	
Immune	3,542	24	144	13	114	7	1	7	57	11	2	1	0	18	53	455	
Infectious	746	6	32	4	29	1	0	1	15	3	0	0	0	5	13	110	
Musc-skel	12,075	77	474	41	363	21	4	20	198	40	7	4	2	63	174	1,486	
Nervous Sys	2,137	20	88	18	99	5	1	4	48	10	2	2	0	14	41	352	
Other dis	3,668	33	139	30	136	8	1	7	75	14	3	3	1	23	63	536	
Pregnancy	1,029	14	22	82	26	5	0	4	36	4	3	8	0	10	28	244	
Psych/hndcp	31,347	330	1,415	331	1,393	76	10	60	781	152	34	35	8	240	644	5,509	
Respiratory	1,970	14	77	8	67	3	1	4	31	7	1	1	0	10	30	253	
Sensory	879	7	33	5	29	2	0	1	16	3	1	1	0	5	14	116	
Substance	4,025	53	208	37	188	9	1	7	105	19	3	3	1	33	89	757	
All	71,331	657	2,982	618	2,759	156	23	133	1,528	293	62	63	15	472	1,293	11,054	

Notes:

(a) Loans and expenses allocated proportionately

M.9 Current client liability by partner, current JS-WR, JS-HCD, SLP-HCD and EB clients

Group	Number of clients	Benefit payment														Total
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	OB	AS	DA	CDA	CCS	EI	HS	Loa+Exp (a)	
		\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m	\$m
EB, no ptrnr	2,368	30	29	24	46	5	19	12	35	5	3	4	1	10	29	250
EB, ptrnr	1,331	11	11	11	15	2	9	3	14	2	1	2	0	4	11	95
SLP-HCD, no ptrnr	79,492	94	213	58	12,503	25	4	86	1,484	768	51	28	4	535	2,100	17,954
SLP-HCD, ptrnr	16,113	35	77	40	1,346	12	2	37	193	93	17	8	1	80	257	2,199
JS-HCD, no ptrnr	58,224	563	2,556	516	2,356	129	18	107	1,308	252	48	51	13	403	1,102	9,420
JS-HCD, ptrnr	13,107	94	426	102	403	27	5	26	220	41	15	12	2	68	191	1,634
JS-WR, no ptrnr	76,765	2,112	1,547	1,099	1,569	231	38	169	1,515	156	74	107	33	407	1,199	10,256
JS-WR, ptrnr	18,473	404	322	318	348	61	11	51	336	36	27	34	7	92	271	2,315
All	265,873	3,343	5,180	2,169	18,585	492	106	490	5,105	1,353	235	246	61	1,598	5,160	44,123

Notes:

(a) Loans and expenses allocated proportionately

APPENDIX N PROJECTED NUMBER OF CLIENTS AND PAYMENTS

Projected numbers and payments are included as an electronic Appendix N