Ministry of Social Development

Valuation of the Benefit System for working-age adults

As at 30 June 2015

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.

#	Title	Description
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	Computational details	Gives some background as to the way we performed the computation of the projection of the welfare population
J	Actual versus Expected comparison	Tables of actual versus expected experience for the year to 30 June 2015
K	Change in Liability from the previous valuation	A segment level reconciliation of the changes from the 2014 to 2015 current client liability numbers
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

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APPENDIX B   BACKGROUND

During the last few years the Government of NZ has reformed the benefit system significantly. Successive legislative changes have strengthened the system's 'return to work' focus. Operational changes are being made to provide active support to people receiving a benefit, in order to better help clients gain employment.

Underpinning these policy and operational changes is an investment approach to reducing long-term benefit receipt and its associated social and financial outcomes. This approach was a key recommendation of the Welfare Working Group, established by Cabinet in 2010 to develop options for reducing long-term dependency.

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 the 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 four prior valuations of the benefit system.[2] All five reports are publicly available on MSD's website.

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 have worked closely with MSD and the Treasury in previous years 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.

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[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
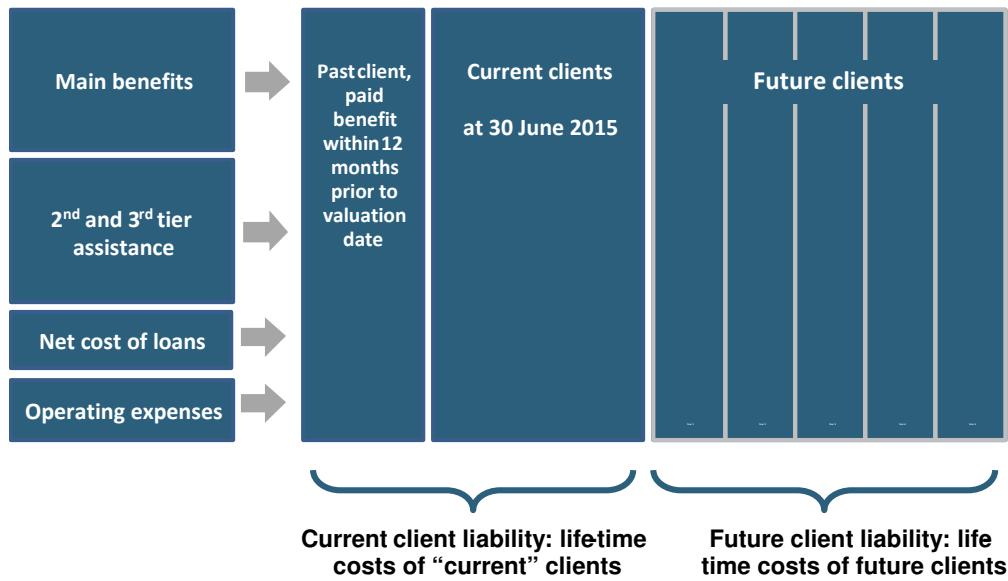2012 Valuation: https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2013/taylor-fry-welfare-valuation.html
2013 Valuation: https://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2014/taylor-fry-welfare-valuation.html
2014 Valuation: http://www.msd.govt.nz/about-msd-and-our-work/newsroom/media-releases/2015/reforms-succeed.html

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Figure B.1 Definition of liability

Current client liability: life-time costs of "current" clients

Future client liability: life time costs of future clients

B.2 Current client population

The 2015 current client liability values the lifetime cost of about 560,000 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. 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).

Figure B.2 Beneficiary segments
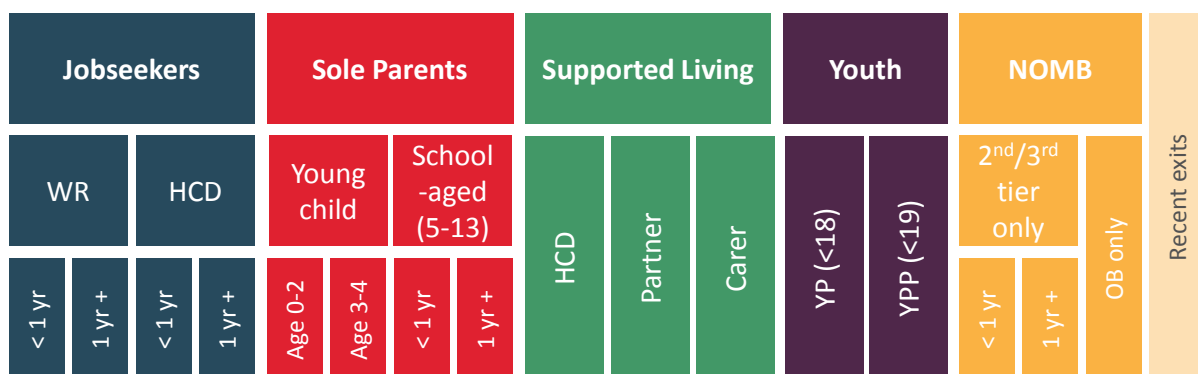
The top level of segmentation is based on a client's main benefit on the valuation date. Beneath the top level, segments are based on factors specific to each client group. Jobseekers (JS), for example, are either 'Work-ready (WR)' or have deferred work expectations due to 'health conditions, illnesses or disabilities

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(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. Further detail on the rationale for the segmentation is available in the 2012 valuation report.

The naming of the Not on main benefit (NOMB) and Recent exits has changed from the previous valuation, although their underlying allocation has not.

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.

Figure B.3 Work and income regions

B.3   Scope of valuation

The 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 sub-types. Further details on this and the scope of the valuation are provided in Appendix E.

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APPENDIX C   PROJECTION ASSUMPTIONS

C.1   Benefit rate inflation

We model payments in June 2015 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 2015
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

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.

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Table C.1.2 Projected benefit rate increases

Date	Yearly increase	Scale up factor
01-Apr-15		1.00
01-Apr-16	1.63%	1.02
01-Apr-17	1.63%	1.03
01-Apr-18	1.63%	1.05
01-Apr-19	1.63%	1.07
01-Apr-20	1.63%	1.08
01-Apr-21	1.63%	1.10
01-Apr-22	1.63%	1.12
01-Apr-23	1.63%	1.14
01-Apr-24	1.63%	1.16
01-Apr-25	1.63%	1.18
01-Apr-26	1.63%	1.19
01-Apr-27	1.63%	1.21
01-Apr-28	1.67%	1.23
01-Apr-29	1.72%	1.26
01-Apr-30	1.77%	1.28
01-Apr-31	1.81%	1.30
01-Apr-32	1.86%	1.33
01-Apr-33	1.91%	1.35
01-Apr-34	1.96%	1.38
01-Apr-35	2.00%	1.40
01-Apr-36	2.05%	1.43
01-Apr-37	2.10%	1.46
01-Apr-38	2.15%	1.49
01-Apr-39	2.19%	1.53
01-Apr-40	2.24%	1.56
01-Apr-41	2.29%	1.60
01-Apr-42	2.34%	1.63
01-Apr-43	2.38%	1.67
01-Apr-44	2.43%	1.71
01-Apr-45	2.48%	1.76
01-Apr-46	2.50%	1.80
01-Apr-47	2.50%	1.85
01-Apr-48	2.50%	1.89
01-Apr-49	2.50%	1.94
01-Apr-50	2.50%	1.99
01-Apr-51	2.50%	2.04
01-Apr-52	2.50%	2.09
01-Apr-53	2.50%	2.14
01-Apr-54	2.50%	2.19
01-Apr-55	2.50%	2.25
01-Apr-56	2.50%	2.31
Later	2.50%	

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-15, in provided spreadsheet *disc-rates-jun15.xls*

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Table C.1.3 Comparison with previous projected inflation rates

Date	Previous Valuation	Present Valuation	Difference
01-Apr-16	2.1%	1.6%	-0.5%
01-Apr-17	2.1%	1.6%	-0.5%
01-Apr-18	2.1%	1.6%	-0.5%
01-Apr-19	2.1%	1.6%	-0.5%
01-Apr-20	2.1%	1.6%	-0.5%
01-Apr-21	2.1%	1.6%	-0.5%
01-Apr-22	2.1%	1.6%	-0.5%
01-Apr-23	2.1%	1.6%	-0.5%
01-Apr-24	2.1%	1.6%	-0.5%
01-Apr-25	2.2%	1.6%	-0.6%
01-Apr-26	2.2%	1.6%	-0.6%
01-Apr-27	2.3%	1.6%	-0.6%
01-Apr-28	2.3%	1.7%	-0.6%
01-Apr-29	2.3%	1.7%	-0.6%
01-Apr-30	2.4%	1.8%	-0.6%
01-Apr-31	2.4%	1.8%	-0.6%
01-Apr-32	2.5%	1.9%	-0.6%
01-Apr-33	2.5%	1.9%	-0.6%
01-Apr-34	2.5%	2.0%	-0.5%
01-Apr-35	2.5%	2.0%	-0.5%
01-Apr-36	2.5%	2.1%	-0.4%
01-Apr-37	2.5%	2.1%	-0.4%
01-Apr-38	2.5%	2.2%	-0.3%
01-Apr-39	2.5%	2.2%	-0.3%
01-Apr-40	2.5%	2.2%	-0.3%
01-Apr-41	2.5%	2.3%	-0.2%
01-Apr-42	2.5%	2.3%	-0.2%
01-Apr-43	2.5%	2.4%	-0.1%
01-Apr-44	2.5%	2.4%	-0.1%
01-Apr-45	2.5%	2.5%	0.0%
01-Apr-46	2.5%	2.5%	0.0%
01-Apr-47 and beyond	2.5%	2.5%	0.0%

Notes:
(a) Previous valuation refers to 2014 actuarial valuation of the NZ Social Welfare system

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C.2 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.2.1 Discounting assumptions

Date	Treasury (monthly) forward rate	Discount factor applied to cashflows
30-Jun-16	2.76%	97.5%
30-Jun-17	2.88%	94.8%
30-Jun-18	3.08%	92.1%
30-Jun-19	3.30%	89.3%
30-Jun-20	3.54%	86.3%
30-Jun-21	3.81%	83.3%
30-Jun-22	4.04%	80.2%
30-Jun-23	4.24%	77.0%
30-Jun-24	4.39%	73.8%
30-Jun-25	4.50%	70.7%
30-Jun-26	4.56%	67.6%
30-Jun-27	4.60%	64.7%
30-Jun-28	4.65%	61.8%
30-Jun-29	4.70%	59.0%
30-Jun-30	4.75%	56.4%
30-Jun-31	4.80%	53.8%
30-Jun-32	4.85%	51.3%
30-Jun-33	4.90%	49.0%
30-Jun-34	4.95%	46.7%
30-Jun-35	5.00%	44.5%
30-Jun-36	5.05%	42.3%
30-Jun-37	5.10%	40.3%
30-Jun-38	5.15%	38.3%
30-Jun-39	5.20%	36.4%
30-Jun-40	5.25%	34.6%
30-Jun-41	5.30%	32.9%
30-Jun-42	5.35%	31.2%
30-Jun-43	5.40%	29.7%
30-Jun-44	5.45%	28.1%
30-Jun-45	5.50%	26.7%
30-Jun-46	5.50%	25.3%
30-Jun-47	5.50%	24.0%
30-Jun-48	5.50%	22.7%
30-Jun-49	5.50%	21.5%
30-Jun-50	5.50%	20.4%
30-Jun-51	5.50%	19.3%
30-Jun-52	5.50%	18.3%
30-Jun-53	5.50%	17.4%
30-Jun-54	5.50%	16.5%
30-Jun-55	5.50%	15.6%
30-Jun-56	5.50%	14.8%
Later	5.50%	

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-15, in spreadsheet titled *disc-rates-jun15.xls*. Forward rates are as provided Treasury.

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Table C.2.2 Comparison with previous projected discount rates

Year (monthly forward rate at 30th June)	Previous Valuation	Present Valuation	Difference
2016	4.0%	2.8%	-1.2%
2017	4.1%	2.9%	-1.2%
2018	4.3%	3.1%	-1.2%
2019	4.5%	3.3%	-1.2%
2020	4.6%	3.5%	-1.1%
2021	4.8%	3.8%	-1.0%
2022	5.0%	4.0%	-1.0%
2023	5.1%	4.2%	-0.9%
2024	5.2%	4.4%	-0.8%
2025	5.2%	4.5%	-0.7%
2026	5.2%	4.6%	-0.7%
2027	5.3%	4.6%	-0.7%
2028	5.3%	4.7%	-0.7%
2029	5.3%	4.7%	-0.6%
2030	5.4%	4.8%	-0.6%
2031	5.4%	4.8%	-0.6%
2032	5.4%	4.9%	-0.6%
2033	5.5%	4.9%	-0.6%
2034	5.5%	5.0%	-0.6%
2035	5.5%	5.0%	-0.5%
2036	5.5%	5.1%	-0.5%
2037	5.5%	5.1%	-0.4%
2038	5.5%	5.2%	-0.4%
2039	5.5%	5.2%	-0.3%
2040	5.5%	5.3%	-0.3%
2041	5.5%	5.3%	-0.2%
2042	5.5%	5.4%	-0.2%
2043	5.5%	5.4%	-0.1%
2044	5.5%	5.5%	-0.1%
2045	5.5%	5.5%	0.0%
Later	5.5%	5.5%	0.0%

Notes:
(a) Previous valuation refers to 2014 actuarial valuation of the NZ Social Welfare system.

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C.3   Unemployment rate

Table C.3.1 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%	10.5%	10.6%	10.6%
1993	10.1%	10.2%	9.6%	9.4%
1994	9.3%	8.6%	8.0%	7.6%
1995	6.8%	6.4%	6.3%	6.4%
1996	6.4%	6.2%	6.5%	6.2%
1997	6.7%	6.8%	7.0%	7.0%
1998	7.4%	7.8%	7.7%	8.0%
1999	7.5%	7.3%	7.0%	6.4%
2000	6.5%	6.3%	6.0%	5.7%
2001	5.5%	5.4%	5.4%	5.6%
2002	5.4%	5.3%	5.6%	5.0%
2003	5.0%	4.8%	4.5%	4.7%
2004	4.3%	4.2%	3.9%	3.8%
2005	3.9%	3.9%	3.8%	3.8%
2006	4.0%	3.7%	3.9%	3.8%
2007	3.9%	3.7%	3.6%	3.5%
2008	3.8%	4.0%	4.2%	4.6%
2009	5.2%	6.0%	6.4%	6.9%
2010	6.2%	6.9%	6.4%	6.7%
2011	6.6%	6.6%	6.5%	6.3%
2012	6.8%	6.8%	7.2%	6.8%
2013	6.3%	6.5%	6.2%	6.1%
2014	6.1%	5.7%	5.5%	5.8%
2015	5.8%	5.9%		

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

Table C.3.2 Projected national unemployment rate

	Unemployment rate			
Year	**31 Mar**	**30 Jun**	**30-Sep**	**31-Dec**
2015			5.8%	5.7%
2016	5.6%	5.4%	5.3%	5.3%
2017	5.2%	5.1%	5.0%	4.9%
2018	4.8%	4.8%	4.7%	4.6%
2019	4.6%	4.6%	4.5%	4.5%
2020 and beyond	4.5%	4.5%	4.5%	4.5%

Notes:
(a) Annual unemployment forecasts provided by Treasury in their BEFU 2015 economic forecasts to June 2019.
(b) The number of years until reversion to full employment has been extended from March 2018 to March 2020 in recognition of the difference between the actual unemployment rate in June 2015 quarter and Treasury forecast.

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Table C.3.3.1 Historical regional unemployment rates in Northland

	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	5.4%	3.5%	5.5%	2.7%
2008	4.7%	4.2%	7.1%	7.0%
2009	8.5%	8.1%	9.3%	9.2%
2010	9.4%	9.1%	8.1%	9.0%
2011	9.7%	7.4%	8.7%	8.3%
2012	8.6%	9.8%	10.0%	9.5%
2013	10.0%	7.7%	9.7%	9.1%
2014	8.1%	8.5%	8.7%	8.4%
2015	9.9%	8.6%		

Table C.3.3.2 Historical regional unemployment rates in Auckland

	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	4.7%	3.4%	3.7%	3.6%
2008	4.7%	4.3%	4.4%	5.2%
2009	6.5%	6.5%	6.4%	7.9%
2010	7.9%	8.6%	7.3%	7.7%
2011	7.8%	7.3%	6.8%	6.6%
2012	7.8%	7.3%	8.6%	7.2%
2013	7.3%	6.7%	6.6%	6.3%
2014	7.3%	6.3%	6.1%	5.8%
2015	6.9%	6.3%		

Table C.3.3.3 Historical regional unemployment rates in Waikato

	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%	3.4%
2008	4.2%	4.1%	4.5%	4.4%
2009	5.8%	6.7%	6.3%	5.8%
2010	5.3%	6.0%	7.0%	6.1%
2011	7.2%	6.4%	7.4%	6.3%
2012	8.5%	6.8%	5.9%	5.8%
2013	5.6%	5.7%	6.1%	6.7%
2014	7.0%	6.4%	6.2%	6.1%
2015	6.1%	5.0%		

Table C.3.3.4 Historical regional unemployment rates in Bay of Plenty

	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%	3.5%	3.7%
2008	5.1%	3.8%	4.2%	4.4%
2009	6.0%	5.8%	7.8%	7.4%
2010	7.9%	7.7%	8.6%	7.3%
2011	7.4%	6.9%	7.7%	8.2%
2012	8.5%	6.0%	7.0%	8.6%
2013	7.9%	6.1%	6.9%	9.3%
2014	7.1%	5.5%	6.5%	5.7%
2015	7.8%	6.7%		

Table C.3.3.5 Historical regional unemployment rates in East Coast

	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%	4.3%	4.9%
2008	5.9%	4.5%	6.7%	6.5%
2009	7.4%	7.2%	10.1%	8.5%
2010	6.5%	8.6%	7.1%	7.1%
2011	8.0%	7.1%	7.3%	7.0%
2012	8.6%	6.3%	9.0%	8.7%
2013	8.6%	7.8%	8.7%	7.4%
2014	8.5%	6.7%	7.1%	8.0%
2015	7.3%	7.7%		

Table C.3.3.6 Historical regional unemployment rates in Taranaki

	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	3.9%	3.1%	3.3%	3.4%
2009	2.7%	4.3%	3.8%	5.9%
2010	5.1%	4.8%	4.9%	5.0%
2011	5.3%	5.3%	5.2%	3.8%
2012	4.8%	3.8%	4.9%	5.2%
2013	5.6%	5.5%	5.5%	5.8%
2014	6.5%	5.2%	4.7%	4.8%
2015	6.0%	7.4%		

Table C.3.3.7 Historical regional unemployment rates in Central

	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	5.1%	5.3%	5.2%	5.7%
2008	5.0%	4.5%	3.8%	3.7%
2009	4.9%	4.6%	5.5%	8.1%
2010	7.0%	6.9%	6.6%	6.6%
2011	6.9%	6.8%	6.5%	6.1%
2012	8.8%	7.3%	8.5%	8.5%
2013	7.7%	8.9%	7.5%	5.8%
2014	7.9%	7.1%	7.1%	9.2%
2015	7.5%	7.1%		

Table C.3.3.8 Historical regional unemployment rates in Wellington

	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%	3.6%	3.3%	2.5%
2008	5.1%	3.3%	3.6%	3.6%
2009	5.4%	5.5%	5.8%	6.3%
2010	5.7%	5.4%	4.8%	5.4%
2011	6.9%	5.5%	6.0%	7.2%
2012	6.1%	6.3%	7.1%	8.0%
2013	6.8%	6.6%	6.1%	6.1%
2014	5.5%	5.4%	5.6%	5.7%
2015	5.9%	5.6%		

Table C.3.3.9 Historical regional unemployment rates in Nelson

	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%	2.6%	2.7%
2008	3.7%	2.9%	3.2%	3.4%
2009	3.0%	3.2%	4.1%	4.4%
2010	5.0%	3.3%	3.7%	4.5%
2011	5.1%	4.4%	3.9%	4.9%
2012	5.8%	4.8%	4.5%	5.8%
2013	4.8%	4.2%	4.0%	4.3%
2014	4.9%	4.3%	3.5%	6.1%
2015	4.4%	4.5%		

Table C.3.3.10 Historical regional unemployment rates in Canterbury

	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	3.4%	3.2%	2.7%	2.6%
2008	2.7%	3.2%	3.3%	3.5%
2009	4.7%	4.8%	5.9%	5.7%
2010	5.4%	4.7%	4.8%	6.0%
2011	5.5%	5.7%	5.4%	5.0%
2012	5.4%	6.5%	5.2%	5.0%
2013	4.3%	4.4%	4.2%	3.5%
2014	3.4%	2.9%	3.2%	3.5%
2015	3.1%	3.3%		

Table C.3.3.11 Historical regional unemployment rates in 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%	3.1%	3.0%	2.8%
2008	2.5%	3.6%	2.8%	3.0%
2009	3.7%	4.7%	5.0%	4.0%
2010	5.3%	4.6%	3.9%	5.2%
2011	4.2%	4.7%	4.9%	4.8%
2012	4.9%	4.5%	5.0%	4.5%
2013	4.8%	5.8%	5.0%	4.8%
2014	4.6%	3.2%	3.6%	4.0%
2015	3.9%	4.6%		

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 Stats NZ regions; Southland and Otago. Historical rates for Southern region are different to those presented last year due to a calculation error in 2014.

C.4 Methodology for projecting regional unemployment rates

C.4.1 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 Stats 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.4.2 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 2014/15.
- Assume the quarters from 2005Q3 through to 2008Q2 represent a period of 'full employment', and calculate the average unemployment in each region over this time 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 4.5% as the national long term unemployment rate. So for example a differential of +1.1% was calculated for Northland (over 2005-2008), so the Northland long term rate is 5.6%.
- 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 3.5% 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.

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Table C.4.1 Projected regional unemployment rates

Date	Unemployment rate					
	Northland	**Auckland**	**Waikato**	**Plenty**	**East coast**	**Taranaki**
30-Sep-15	9.0%	6.4%	5.4%	7.5%	7.6%	6.6%
31-Dec-15	8.8%	6.3%	5.3%	7.2%	7.5%	6.4%
31-Mar-16	8.3%	6.0%	5.2%	6.9%	7.2%	6.1%
30-Jun-16	8.0%	5.8%	5.1%	6.6%	7.0%	5.9%
30-Sep-16	7.7%	5.7%	5.1%	6.4%	6.9%	5.7%
31-Dec-16	7.6%	5.6%	5.0%	6.3%	6.8%	5.6%
31-Mar-17	7.4%	5.6%	5.0%	6.2%	6.7%	5.5%
30-Jun-17	7.2%	5.5%	4.9%	6.0%	6.6%	5.3%
30-Sep-17	7.0%	5.3%	4.9%	5.8%	6.4%	5.2%
31-Dec-17	6.7%	5.2%	4.8%	5.6%	6.3%	5.0%
31-Mar-18	6.5%	5.1%	4.7%	5.4%	6.1%	4.8%
30-Jun-18	6.3%	5.0%	4.7%	5.2%	6.0%	4.7%
30-Sep-18	6.1%	4.9%	4.6%	5.1%	5.9%	4.5%
31-Dec-18	5.9%	4.8%	4.6%	5.0%	5.8%	4.4%
31-Mar-19	5.8%	4.7%	4.6%	4.9%	5.7%	4.4%
30-Jun-19	5.8%	4.7%	4.6%	4.8%	5.7%	4.3%
30-Sep-19	5.7%	4.7%	4.5%	4.8%	5.7%	4.3%
31-Dec-19	5.7%	4.6%	4.5%	4.8%	5.6%	4.2%
31-Mar-20	5.6%	4.6%	4.5%	4.7%	5.6%	4.2%
30-Jun-20 and beyond	5.6%	4.6%	4.5%	4.7%	5.6%	4.2%

Date	Unemployment rate					
	Central	**Wellington**	**Nelson**	**Canterbury**	**Southern**	**Total**
30-Sep-15	7.1%	5.8%	4.6%	3.3%	4.3%	5.8%
31-Dec-15	7.0%	5.7%	4.6%	3.3%	4.3%	5.7%
31-Mar-16	6.8%	5.6%	4.4%	3.3%	4.2%	5.6%
30-Jun-16	6.6%	5.5%	4.3%	3.3%	4.2%	5.4%
30-Sep-16	6.5%	5.4%	4.3%	3.4%	4.2%	5.3%
31-Dec-16	6.4%	5.4%	4.2%	3.4%	4.1%	5.3%
31-Mar-17	6.4%	5.3%	4.2%	3.4%	4.1%	5.2%
30-Jun-17	6.3%	5.3%	4.1%	3.4%	4.1%	5.1%
30-Sep-17	6.2%	5.2%	4.1%	3.4%	4.1%	5.0%
31-Dec-17	6.0%	5.1%	4.0%	3.4%	4.0%	4.9%
31-Mar-18	5.9%	5.1%	4.0%	3.4%	4.0%	4.9%
30-Jun-18	5.8%	5.0%	3.9%	3.5%	4.0%	4.8%
30-Sep-18	5.7%	4.9%	3.8%	3.5%	4.0%	4.7%
31-Dec-18	5.7%	4.9%	3.8%	3.5%	3.9%	4.6%
31-Mar-19	5.6%	4.9%	3.8%	3.5%	3.9%	4.6%
30-Jun-19	5.6%	4.9%	3.8%	3.5%	3.9%	4.6%
30-Sep-19	5.6%	4.8%	3.7%	3.5%	3.9%	4.5%
31-Dec-19	5.5%	4.8%	3.7%	3.5%	3.9%	4.5%
31-Mar-20	5.5%	4.8%	3.7%	3.5%	3.9%	4.5%
30-Jun-20 and beyond	5.5%	4.8%	3.7%	3.5%	3.9%	4.5%

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

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C.5 Expense rates

Table C.5.1 Projected expense rates with comparison to previous rates

Year	Previous Valuation	Present Valuation	Difference
2016	11.5%	12.1%	0.6%
2017	11.6%	12.2%	0.6%
2018	11.7%	12.2%	0.5%
2019	11.7%	12.3%	0.6%
2020	11.8%	12.4%	0.6%
2021	11.8%	12.4%	0.5%
2022	11.9%	12.3%	0.4%
2023	11.9%	12.2%	0.3%
2024	12.0%	12.2%	0.2%
2025	12.0%	12.1%	0.1%
2026	12.0%	12.1%	0.1%

Notes:
(a) Previous valuation refers to 2014 actuarial valuation of the NZ Social Welfare system
(b) Expense rate is expressed as a percentage of total future payments excluding overpayments and recoverable assistance

C.6 Overpayments and Recoverable Assistance

There were significant changes to the proportions below due to exclusion of Superannuation related debts. This is discussed in Section 7.4 of the report.

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

	Previous Valuation	Present Valuation	Difference
Overpayment proportion	3.65%	3.20%	-0.45%
Recovery rate for recoverable assistance	94.5%	91.6%	-2.90%

Notes:
(a) Previous valuation refers to 2014 actuarial valuation of the NZ Social Welfare 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

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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)	Overpayts paid by MSD (g)	Overpayments recovered by MSD (h)	Overpayments outstanding (i)
0	0.757	46.8%	1.3%	35.4%	0.005	75.7%	34.9%	0.403
1	0.826	33.0%	4.3%	15.6%	0.007	6.9%	14.9%	0.317
2	0.863	19.9%	4.3%	7.0%	0.003	3.7%	6.7%	0.283
3	0.889	15.2%	4.3%	4.7%	0.002	2.6%	4.5%	0.262
4	0.908	11.1%	4.3%	3.1%	0.001	1.9%	3.0%	0.250
5	0.921	9.7%	4.3%	2.6%	0.001	1.3%	2.5%	0.238
6	0.930	7.9%	4.3%	2.0%	0.001	0.9%	1.9%	0.227
7	0.939	7.4%	4.3%	1.7%	0.001	0.9%	1.7%	0.218
8	0.946	6.9%	4.3%	1.5%	0.001	0.8%	1.5%	0.210
9	0.951	6.4%	4.3%	1.4%	0.001	0.5%	1.3%	0.202
10	0.956	5.9%	4.3%	1.2%	0.001	0.4%	1.2%	0.194
11	0.959	5.5%	4.3%	1.1%	0.000	0.3%	1.0%	0.186
12	0.962	5.1%	4.3%	1.0%	0.000	0.3%	0.9%	0.180
13	0.965	4.8%	4.3%	0.9%	0.000	0.3%	0.8%	0.174
14	0.967	4.4%	4.3%	0.8%	0.000	0.2%	0.7%	0.168
15	0.970	4.1%	4.3%	0.7%	0.000	0.3%	0.7%	0.164
16	0.972	3.8%	4.3%	0.6%	0.000	0.2%	0.6%	0.160
17	0.974	3.6%	4.3%	0.6%	0.000	0.2%	0.6%	0.156
18	0.976	3.3%	4.3%	0.5%	0.000	0.2%	0.5%	0.153
19	0.977	3.1%	4.3%	0.5%	0.000	0.1%	0.5%	0.149
20	0.978	2.9%	4.3%	0.4%	0.000	0.1%	0.4%	0.146
21	0.981	2.7%	4.3%	0.4%	0.000	0.3%	0.4%	0.144
22	0.982	2.5%	4.3%	0.4%	0.000	0.1%	0.3%	0.142
23	0.983	2.3%	4.3%	0.3%	0.000	0.1%	0.3%	0.139
24	0.984	2.1%	4.3%	0.3%	0.000	0.1%	0.3%	0.138
25	0.985	2.0%	4.3%	0.3%	0.000	0.1%	0.3%	0.136
26	0.987	1.9%	4.3%	0.3%	0.000	0.2%	0.2%	0.136
27	0.988	1.7%	4.3%	0.2%	0.000	0.1%	0.2%	0.134
28	0.989	1.6%	4.3%	0.2%	0.000	0.1%	0.2%	0.133
29	0.990	1.5%	4.3%	0.2%	0.000	0.1%	0.2%	0.132
30	0.990	1.4%	4.3%	0.2%	0.000	0.0%	0.2%	0.130
31	0.991	1.3%	4.3%	0.2%	0.000	0.1%	0.2%	0.129
32	0.992	1.2%	4.3%	0.2%	0.000	0.1%	0.1%	0.129
33	0.993	1.1%	4.3%	0.1%	0.000	0.1%	0.1%	0.128
34	0.994	1.0%	4.3%	0.1%	0.000	0.1%	0.1%	0.128
35	0.995	1.0%	4.3%	0.1%	0.000	0.1%	0.1%	0.127
36	0.996	0.9%	4.3%	0.1%	0.000	0.1%	0.1%	0.127
37	0.996	0.8%	4.3%	0.1%	0.000	0.1%	0.1%	0.127
38	0.997	0.8%	4.3%	0.1%	0.000	0.1%	0.1%	0.127
39	0.998	0.7%	4.3%	0.1%	0.000	0.1%	0.1%	0.126
40	0.998	10.0%	95.0%	1.3%	0.012	0.1%	0.1%	0.114

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)

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APPENDIX D   DATA SUPPLIED

D.1   SAS datasets

The following SAS datasets supplied by MSD were used to conduct the valuation. All data is up to 30 June 2015 but extracted as at 31 July 2015:

- **rate_period_30jun2015.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 2015, the valuation date.

- **ahpy_lumpsum1_30jun2015.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_30jun2015.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_30jun2015.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.

- **spel1506.sas7bdat:** File with one row per spell per client, containing a variety of fields related to the spell. In particular, the "oldcomdt" field contained the first payment date for the spell, which was used to overwrite spell commencement dates before the 1993 system change.

- **swn1506.sas7bdat:** File with one row per client, with a range of static variables. This dataset was used to determine date of birth, gender, education level and ethnicity for each client. We have used the equivalent files from previous valuations (swn1108.sas7bdat, swn1206.sas7bdat and swn1306.sas7bdat) to fill in some of the missing education data.

- **swns_with_dob_eth_30jun2015.sas7bdat:** File with one row per client, containing client ID and date of birth for all clients. This data set was used to fill in this information for those clients where it was not included in swn1506.sas7bdat.

- **chd1506.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 date of birth is also included.

- **dist1506.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.

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- **yp_ypp_regions_30jun2015.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.

- **ptnr1506.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.

- **incp1506.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.

- **chdadult_30jun2015.sas7bdat:** File containing a record of clients who have been matched as being registered as a child while a caregiver was on benefits. The matches in this file were used to calculate the fraction of quarters between ages 13-18 that a client's caregiver was on benefits. This formed the basis of the intergenerational indicator.

- **cyf_summary_30jun2015.sas7bdat:** File containing one record per client per child protection or youth justice spell. This allowed the calculation of CYF related variables for each client including the age of first entry into the CYF system and total number of CYF events.

- **mmc_period_30jun2015.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.

D.2   Loan data

Data on client loans in the form of recoverable assistance was provided in a SAS dataset, **dv_debt_summary_30jun2015.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 2015. Pre-1 July 2007 data is not split by breach type.

The file **prov9yr_jun15.sas7bdat** was also provided. It is a data table giving the outstanding provision for debts owed to MSD as at 30 June 2015. It contains one row per client, their aggregated debt plus a range of other static variables.

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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-2015.pdf**.

D.4   Historical and forecast economic variables

- **befu15-charts-data.xls**: Treasury fiscal strategy model, 2015 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-jun15.xls**: Excel spreadsheet containing Treasury assumptions for government accounts for future discount and inflation rates for a number of dates, including June 2015.

D.5   Miscellaneous files

A number of 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**: SAS dataset key containing identifiers for codes related to reasons why people leave benefit
- **benefit_codes.sas7bdat**: SAS dataset with identifiers for different benefit codes
- **district_codes.sas7bdat**: SAS dataset identifying district codes and corresponding regions

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

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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:
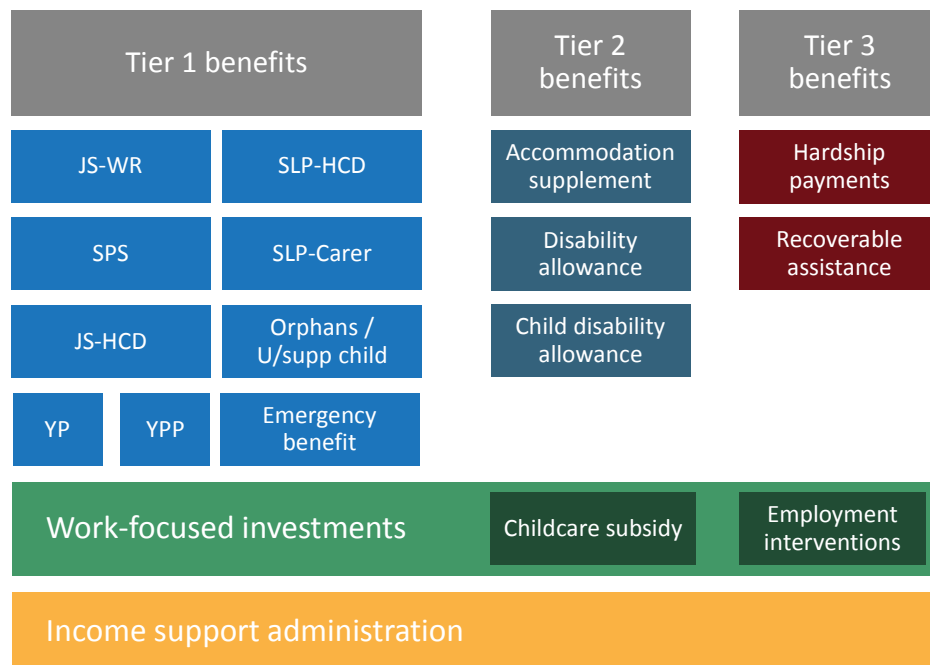
The table below gives further details on this categorisation. In particular, it identifies into which components some of the smaller payments have been allocated. Note that all payments to beneficiaries aged over 65 have been excluded from scope. In this table we have attempted consistency with Treasury appropriations for 2014/15[3].

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3   http://www.treasury.govt.nz/budget/2015/suppestimates/suppest15socdev.pdf

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Multi-Category Expenses and Capital Expenditure	Allocation
Administering Income Support	**Income support administration (Benefit processing)**
Improving Employment Outcomes – Service Provision 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 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 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	**Work-focused investment (training)**

Departmental Output Expenses	Allocation
Collection of Balances Owed by Former Clients and Non-beneficiaries (M63) 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.	**Income support administration (Collections)** NB: NZ Super and student costs excluded
Services to Protect the Integrity of the Benefit System (M63) Services to minimise errors, fraud and abuse of the benefit system.	**Income support administration (Integrity Services)**
Tailored Sets of Services (M63) 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)	**Income support administration (Benefit processing)** and **Work-focused investments** (work-focused case management, work brokerage, etc.)
Vocational Skills Training (M63) This appropriation is limited to vocationally based skills training for working-age people through the Training Opportunities Programme. (Closed in December 2013).	**Work-focused investment (training)**

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Non-Departmental Output Expenses	Allocation
Vocational Services for People with Disabilities Provision of vocational services for people with disabilities including community participation and employment services.	**Work-focused investment (training)**

Benefits and Other Unrequited Expenses	Allocation
Emergency Benefit 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.	**Other Tier 1 Benefits – Emergency benefit**
Jobseeker Support – Health Condition, Injury or Disability 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 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.	**Key Tier 1 Benefits – JS-HCD**
Jobseeker Support – Work Ready 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 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**

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Youth Payment (M63) Provision of income support for people aged 16 or 17 years who are currently unemployed but actively seeking work, training for work, at school, or sick, injured or disabled, where it is inappropriate for them to obtain financial support from their parents. Paid in accordance with criteria set out in the Social Security Act 1964.	**Key Tier 1 Benefits – YP**
Young Parent Payment (M63) Provision of income support for people aged 16 or 17 years who have a dependent child or children where it is inappropriate for them to obtain financial support from their parents. Paid in accordance with criteria set out in the Social Security Act 1964.	**Key Tier 1 Benefits – 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**
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.	**Tier 2 – Child disability allowance**
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.	**Tier 2 –Disability allowance**
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.	**Tier 3 Benefits – Hardship Payments**
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.	**Tier 3 Benefits – Hardship Payments**
Childcare Subsidy (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.	**Childcare subsidy**

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Assistance to transition into employment (M63)	Employment interventions
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.	

Non-Departmental Other Expenses	Allocation
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.	**Tier 3 Benefits – Loans**
Improving Employment Outcomes - Assistance 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.	**Work-focused investments (training)**
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.	**Work-focused investment (training)**
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.	**Work-focused investment (training)**
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.	*Work-focused investments (OSCAR)*

Non-Departmental Capital Expenditure	Allocation
Recoverable Assistance Payment Grant (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.	**Loans NB: net of recoveries on an annual basis**

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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 2014/15 only 19% of clients returning were in their second year off benefits and 11% in their third in that time period.

- **Reducing the potential for seasonal impacts:** The particular 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

Also note that benefits payable to youths (aged 16-17) such as the Youth Payment (YP) and Young Parents 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.

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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. Thus 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.

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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 2015
- Was not on benefits at the valuation date
- Received no benefits over the 2015/16 year
- Received further JS-WR benefits in 2016/17

In this example, cash flows relating to the client are now included in both the current liability and the future liability for 2016/17. 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) was treated somewhat differently as it was 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.

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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 being in the system for the purpose of liability.

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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 is able to deal with non-normally distributed response variables. Given a response variable y and a set of independent variables or predictors $x_1, x_2, …, x_n$, a GLM models the dependency as:

$$y = h^{-1}\left(\sum\nolimits_{i=1}^{n} \beta_i x_i\right) + \varepsilon_i \tag{F.1}$$

And

$$E(y) = \mu = h^{-1}\left(\sum\nolimits_{i=1}^{n} \beta_i x_i\right) \tag{F.2}$$

Where
   $h^{-1}()$ is the **link function**
   β_i (i=1, 2, …, n) is the **parameter** corresponding to the dependent variable x_i
   ε_i is an **error** term.

Note that

$$\eta = \sum\nolimits_{i=1}^{n} \beta_i x_i \tag{F.3}$$

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

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

Thus, a GLM consists of three components:

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

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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, …), 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.

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- As categorical groupings of the original variable: For example, age may be banded into a number of 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(age ≥ 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(age ≥ 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 similar to 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.

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- Mulquiney, P. and Taylor, G. (2007). Modeling 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

The modelling involves producing probability estimates for transitioning from any given benefit state to any other each quarter. 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. 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 a number of reasons:

- **Responsiveness:** Changes in movement behaviour observed in recent years can be correctly reflected in the models.
- **Long range accuracy:** We are able to 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 transition types are observed in a given quarter, it is worth noting that the most important 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 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.

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Figure G-1 Benefit states in the valuation quarterly transition model
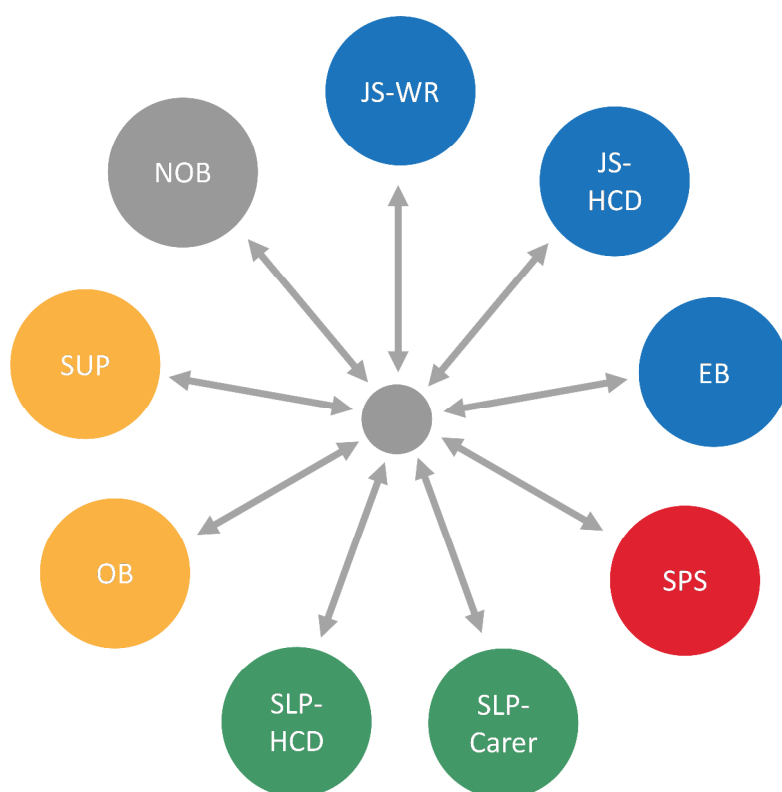
Table G-1 shows the models that have been fit to describe the transition behaviour in the welfare system. Detailed parameter values for these models are given in Appendix H, with a brief guide to these provided in Section G.8. All models were GLMs with the standard logistic link, with the exception of eight multinomial models. These multinomial models used the multinomial extension to logistic regression.

Table G-1 List of transition models used in Level II 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

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Benefit state	Type	Model ID	Description
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
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)

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Figure G-2 Transition diagram for a client starting in a key benefit – here JS-WR
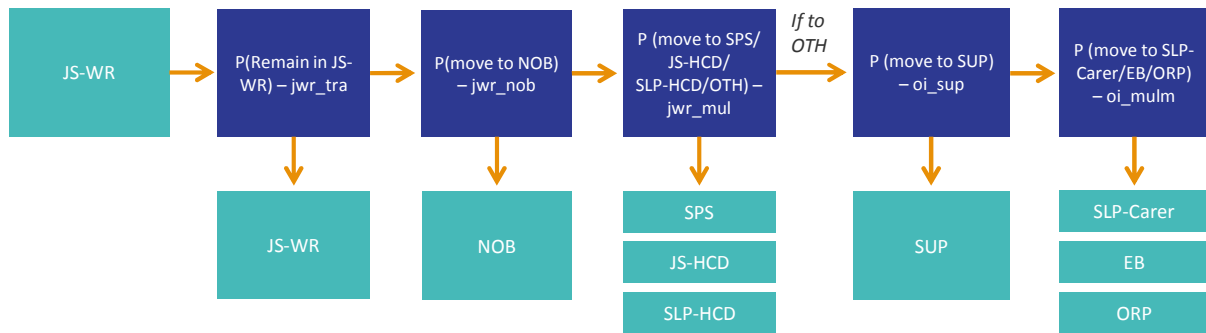
Figure G-3 Transition diagram for a client starting in NOB
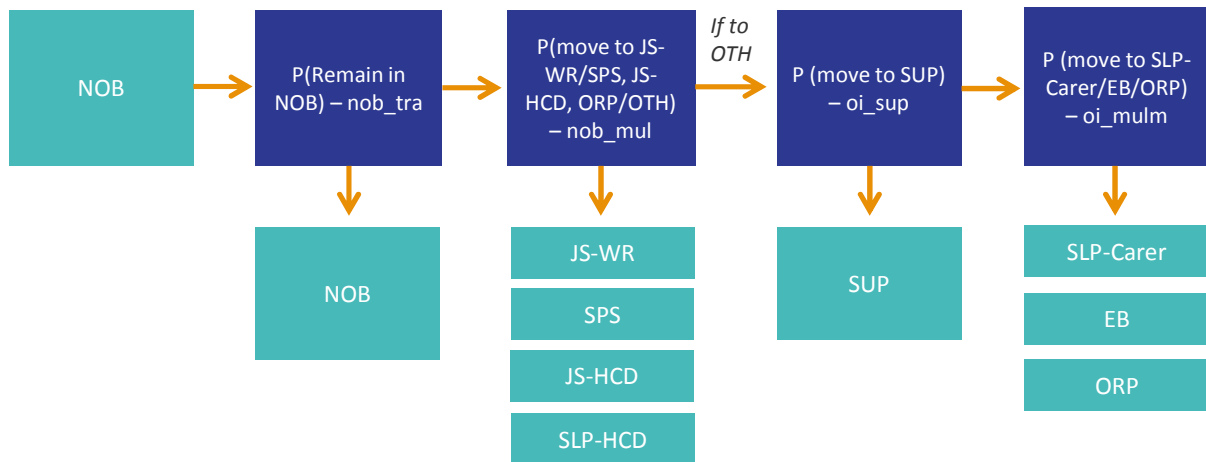
Figure G-4 Transition diagram for a client starting in a non-key benefit state– here SLP-Carer

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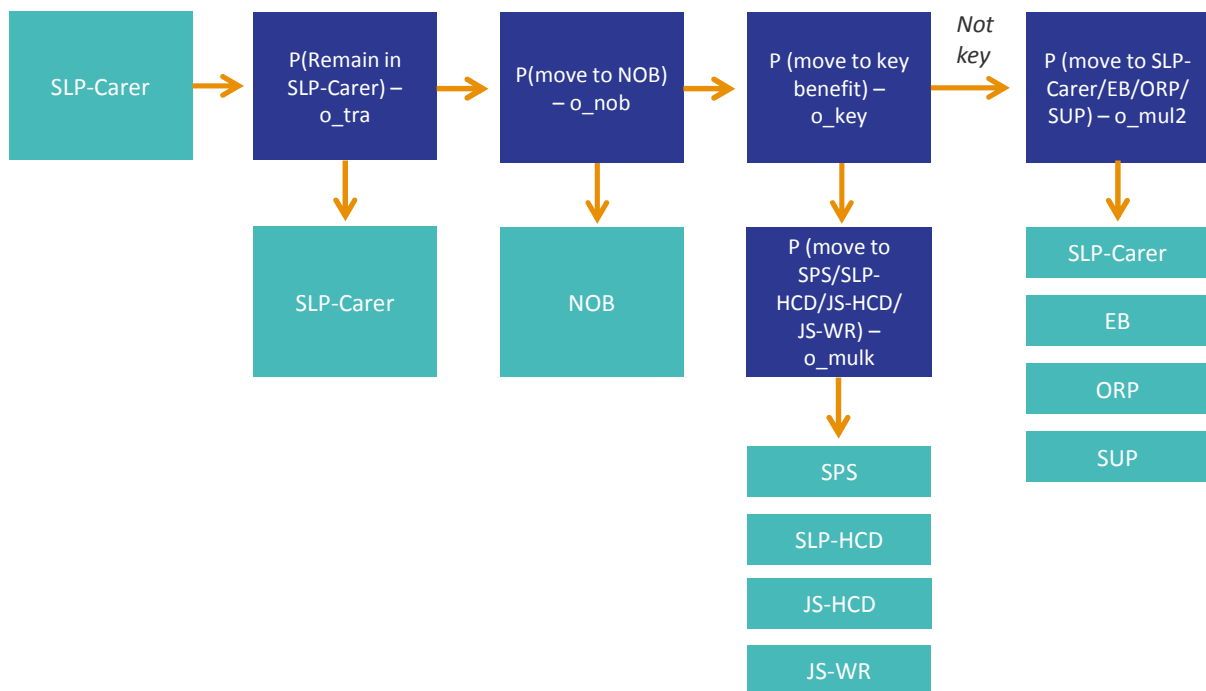
G.4   Payment models

Clients in each benefit state can receive a number of 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. 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-2, which shows the payment models required for each of the 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.

Table G-2 Payment models attributable to each state

Benefit state	Main T1 (excl OB)	Benefit type							
		OB	AS	DA	CDA	CCS	HS	EI	LOA
SPS	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
SLP-HCD	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
JSS-HCD	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
JSS-WR	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
SLP-Carer	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
EB	🔵	🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
OB		🟦	🟢	🟢	🟢	🟢	🟡	🟡	🔴
SUP			🟢	🟢	🟢	🟢	🟡	🟡	🔴
NOB						🟢	🟡	🟡	🔴

While there are a large number of 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-3. 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).

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Table G-3 Payment models attributable to each state

Benefit state	Payment type								
	Main T1 (excl. OB)	OB	AS	DA	CDA	CCS	HS	EI	LOA
JS-WR	jwr_abp	jwr_orp	jwr_as	a_da	a_cda	a_ccs	jwr_hs	x_ei	jwr_loa
JS-HCD	jhd_abp	jhd_orp	jhd_as	jhd_da	a_cda	a_ccs	jhd_hs	a_ei	jhd_loa
SPS	sps_abp	sps_orp	sps_as	sps_da	sps_cda	sps_ccs	sps_hs	x_ei	sps_loa
SLP-HCD	slh_abp	slh_orp	slh_as	slh_da	a_cda	a_ccs	slp_hs	a_ei	slh_loa
EB	emb_abp	a_orp	a_as	a_da	a_cda	a_ccs	a_hs	x_ei	a_loa
SLP-Carer	slc_abp	a_orp	a_as	a_da	z_cda	z_ccs	a_hs	a_ei	a_loa
OB	orp_abp		o_as	a_da	z_cda	z_ccs	a_hs	a_ei	a_loa
SUP			z_as	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 in the event that payment spells span multiple quarters. Further, all payments are scaled to June 2015 benefit levels, using the CPI index applied to benefit payments over the past 22 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 accommodation supplement for clients on EB and SLP-Carer all use the 'a_as' 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 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 the first in Table G-3). These payments represent an **average** value across people in a given benefit state; thus to take an example, the AS model for those in the JS-WR state estimates the average AS paid to clients receiving JS-WR, conditional on all their attributes like age, gender etc. However in reality some JS-WR clients receive AS and some do not, so at an individual level these payment models are misleading since the actual AS payments will usually be much higher (if the client receives AS) or much lower (if they do not). Thus 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.

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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 a number of benefits etc).

A number of variables were newly introduced into the 2015 valuation as discussed in Section 9.1.2:

- Child, Youth and Family history variables which measure a client's exposure to CYF services as a child
- Criminal conviction history variables which measure a client's convictions and related recent and longer-term exposure to correctional services

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, housing 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.

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.

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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

The client's region is stored for every client on benefit. Information on the district 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, Youth and Family variables

Variables specifying whether the client as a child was involved in child protection or youth justice services (or both), the number of CYF events, days in child protection and age at first entry into the CYF 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.

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 actually spread over 0, 0.25 and 0.5 years by the probabilities 0.2, 0.7 and 0.1 respectively.

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- 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

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.

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, if we sample that the region has changed and if so the new region is sampled from a table of probabilities.

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

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 – incapacity group, number of incapacities, incapacity relating to partner – 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.

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- In both cases 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.

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 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 were overhauled in this valuation, to include a full multinomial allocation of benefit type received by a client at the end of a benefit quarter. The process is now:

- 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 = SUP
- If not, then binomial GLM is used for the probability that the end of quarter benefit is NOB. If yes, set to NOB

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- If not and either ben_now or ben_next are ORP, then ben_end = ORP
- 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

A model for the number of new clients in each benefit type in each quarter of the next 5 years was constructed. This model explicitly depends on regional unemployment rates, by measuring the historical sensitivity and applying this to forecasts of new client entries using the assumed regional unemployment rate forecasts. The model also allows for other trends observed that are independent of the unemployment rate movement; for example, numbers may have been flat or increasing despite a decrease in the unemployment rate. This approach implicitly allows for demographic factors such as population growth and age distribution on a regional level.

For each new client in each benefit type we randomly sample client characteristics from the equivalent population of people entering the system in 2014/15. 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 2014/15 includes both returning and new clients). It assumes that the relative numbers of new entrants versus returns will be similar to that seen in 2014/15.

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.

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-3
- 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.

A number of 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.

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APPENDIX H   MODEL COEFFICIENTS

Please see the separate spreadsheet for model parameterisations.

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APPENDIX I   COMPUTATION DETAILS

I.1   Introduction

A large amount of data was provided to us by MSD. This presented a number of computational challenges that applied to all the main stages of the project:

- Processing the data to make it amenable 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 computationally. 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

I.2.1   Current client liability

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
- CYF variables
- Criminal conviction related variables

As discussed in Section 9.3.2 of the report, there are many possible combinations of these variables that make an exact projection – i.e. the calculation of the expected cash flows associated with all possible future states – computationally infeasible. Thus we have adopted a simulation approach for the valuation of the 2015 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,

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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 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.

- The next step is to update the dynamic variables to quarter *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 district from a table of probabilities for each new district.

- Once the dynamic variables have been updated, calculate the 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.

- The process then repeats until all members of the cohort 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.

- We use cluster computing to distribute the simulations across about 100 CPU cores. We use custom-built software developed in house to handle the distribution.

To illustrate the computational burden, 50 simulations of the current client liability projection use about 300 CPU hours in total.

I.2.2   Future client liability

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.

The computational details underpinning of the future liability projection are as follows, for each future quarter:

- Select the cohort of new entrants to the system in that quarter of the 2014/15 year (i.e. for the September 2015 future quarter, we select the corresponding set of new entrants in September 2014). These are assumed to be equivalent to the population entering in 2015/16, though the numbers of clients in each benefit will be different.
- Project this cohort until all members have retired and collate the results.
- Scale the results so that the number of actives in each benefit type matches those assumed for the future quarter.
- Repeat for the next future quarter.

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As with the current liability, this process is distributed over a number of computers to lead to an acceptable computational time.

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.

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J.1   Actual versus expected results by client benefit state

J.1.1   Number receiving benefits at some point in the quarter[4]

J.1.1.1 Of those in the 2014 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	80,360	80,230	100%	77,360	78,374	99%	75,344	77,111	98%	71,690	74,472	96%	76,189	77,546	98%
SLP-HCD	95,836	95,185	101%	95,056	94,380	101%	93,980	93,614	100%	93,206	92,991	100%	94,520	94,042	101%
JS-HCD	69,066	69,561	99%	65,804	65,729	100%	62,819	62,507	100%	59,626	59,166	101%	64,329	64,240	100%
JS-WR	88,991	88,405	101%	80,405	80,076	100%	74,268	75,383	99%	66,739	68,518	97%	77,601	78,095	99%
SLP-Carer	8,839	8,851	100%	8,610	8,675	99%	8,414	8,532	99%	8,310	8,382	99%	8,543	8,610	99%
EB	4,389	4,164	105%	3,949	3,981	99%	3,280	3,660	90%	3,002	3,235	93%	3,655	3,760	97%
OB	5,025	5,047	100%	4,878	4,829	101%	4,633	4,628	100%	4,507	4,486	100%	4,761	4,748	100%
SUP	95,013	95,704	99%	89,575	89,570	100%	85,088	83,819	102%	83,169	78,408	106%	88,211	86,875	102%
Total	447,519	447,145	100%	425,637	425,613	100%	407,826	409,253	100%	390,249	389,657	100%	417,808	417,917	100%

J.1.1.2 Of those in the 2014 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	1,793	1,732	104%	3,578	3,434	104%	5,444	5,176	105%	6,785	6,543	104%	4,400	4,221	104%
SLP-HCD	980	851	115%	1,935	1,717	113%	2,677	2,548	105%	3,376	3,391	100%	2,242	2,127	105%
JS-HCD	4,682	4,579	102%	8,534	8,216	104%	10,878	10,571	103%	12,217	12,198	100%	9,078	8,891	102%
JS-WR	10,985	10,178	108%	20,484	19,998	102%	26,601	26,694	100%	27,669	28,380	97%	21,435	21,312	101%
SLP-Carer	281	271	104%	490	518	95%	706	735	96%	836	914	91%	578	610	95%
EB	730	610	120%	1,244	1,091	114%	1,140	1,305	87%	1,153	1,397	83%	1,067	1,101	97%
OB	286	250	114%	526	455	116%	731	661	111%	871	823	106%	604	547	110%
SUP	5,795	5,749	101%	10,768	10,454	103%	15,496	16,161	96%	17,853	18,959	94%	12,478	12,831	97%
Total	25,532	24,220	105%	47,559	45,882	104%	63,673	63,852	100%	70,760	72,605	97%	51,881	51,640	100%

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	82,153	81,961	100%	80,938	81,807	99%	80,788	82,287	98%	78,475	81,015	97%	80,589	81,767	99%
SLP-HCD	96,816	96,035	101%	96,991	96,097	101%	96,657	96,162	101%	96,582	96,383	100%	96,762	96,169	101%
JS-HCD	73,748	74,139	99%	74,338	73,944	101%	73,697	73,078	101%	71,843	71,364	101%	73,407	73,131	100%
JS-WR	99,976	98,583	101%	100,889	100,073	101%	100,869	102,077	99%	94,408	96,897	97%	99,036	99,408	100%
SLP-Carer	9,120	9,123	100%	9,100	9,193	99%	9,120	9,267	98%	9,146	9,296	98%	9,122	9,220	99%
EB	5,119	4,774	107%	5,193	5,072	102%	4,420	4,965	89%	4,155	4,632	90%	4,722	4,861	97%
OB	5,311	5,297	100%	5,404	5,284	102%	5,364	5,289	101%	5,378	5,310	101%	5,364	5,295	101%
SUP	100,808	101,454	99%	100,343	100,024	100%	100,584	99,979	101%	101,022	97,366	104%	100,689	99,706	101%
Total	473,051	471,366	100%	473,196	471,495	100%	471,499	473,104	100%	461,009	462,263	100%	469,689	469,557	100%

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[4] 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

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J.1.2 Average benefits received per client[5]

J.1.2.1 Of those in the 2014 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	5,332	5,370	99%	5,342	5,361	100%	5,217	5,280	99%	5,339	5,407	99%	5,307	5,354	99%
SLP-HCD	4,274	4,294	100%	4,297	4,308	100%	4,226	4,249	99%	4,292	4,338	99%	4,272	4,297	99%
JS-HCD	3,489	3,467	101%	3,532	3,483	101%	3,464	3,422	101%	3,556	3,502	102%	3,510	3,469	101%
JS-WR	2,896	2,875	101%	2,922	2,895	101%	2,906	2,881	101%	2,971	2,982	100%	2,924	2,908	101%
SLP-Carer	4,874	4,855	100%	4,944	4,870	102%	4,870	4,797	102%	4,971	4,920	101%	4,915	4,860	101%
EB	2,372	2,467	96%	2,211	2,496	89%	2,337	2,495	94%	2,338	2,583	91%	2,314	2,510	92%
OB	3,488	3,415	102%	3,530	3,431	103%	3,459	3,387	102%	3,547	3,527	101%	3,506	3,440	102%
SUP	886	878	101%	895	876	102%	873	856	102%	913	892	102%	892	876	102%
Total	3,334	3,331	100%	3,378	3,371	100%	3,341	3,356	100%	3,417	3,472	98%	3,366	3,380	100%

J.1.2.2 Of those in the 2014 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	2,629	2,754	95%	3,744	3,883	96%	3,970	4,159	95%	4,320	4,504	96%	3,665	3,825	96%
SLP-HCD	1,643	1,565	105%	2,310	2,419	95%	2,641	2,724	97%	2,939	2,922	101%	2,383	2,408	99%
JS-HCD	1,619	1,595	102%	2,201	2,250	98%	2,350	2,437	96%	2,572	2,583	100%	2,185	2,216	99%
JS-WR	1,565	1,480	106%	1,857	1,850	100%	2,029	2,038	100%	2,167	2,173	100%	1,905	1,885	101%
SLP-Carer	2,037	2,126	96%	3,107	2,948	105%	3,114	3,192	98%	3,523	3,433	103%	2,946	2,925	101%
EB	1,181	1,217	97%	1,259	1,509	83%	1,460	1,667	88%	1,620	1,810	90%	1,380	1,551	89%
OB	1,722	1,712	101%	2,486	2,387	104%	2,589	2,464	105%	2,814	2,722	103%	2,403	2,321	104%
SUP	453	505	90%	579	608	95%	588	601	98%	686	671	102%	577	596	97%
Total	1,396	1,367	102%	1,794	1,822	98%	1,933	1,950	99%	2,122	2,110	101%	1,899	1,909	99%

J.1.2.3 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	5,273	5,315	99%	5,272	5,299	99%	5,133	5,209	99%	5,251	5,334	98%	5,232	5,289	99%
SLP-HCD	4,247	4,269	99%	4,257	4,274	100%	4,182	4,209	99%	4,244	4,289	99%	4,233	4,260	99%
JS-HCD	3,370	3,352	101%	3,379	3,346	101%	3,300	3,279	101%	3,389	3,345	101%	3,359	3,331	101%
JS-WR	2,750	2,731	101%	2,706	2,686	101%	2,675	2,661	101%	2,735	2,745	100%	2,717	2,706	100%
SLP-Carer	4,787	4,774	100%	4,846	4,762	102%	4,734	4,669	101%	4,839	4,774	101%	4,801	4,745	101%
EB	2,202	2,308	95%	1,983	2,283	87%	2,110	2,277	93%	2,139	2,350	91%	2,109	2,304	91%
OB	3,393	3,335	102%	3,429	3,341	103%	3,340	3,271	102%	3,428	3,402	101%	3,397	3,337	102%
SUP	861	857	100%	861	848	102%	829	815	102%	873	849	103%	856	842	102%
Total	3,229	3,230	100%	3,219	3,220	100%	3,151	3,166	100%	3,218	3,258	99%	3,204	3,218	100%

J.1.3 Total payments[6]

J.1.3.1 Of those in the 2014 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	428	431	99%	413	420	98%	393	407	97%	383	403	95%	404	415	97%
SLP-HCD	410	409	100%	408	407	100%	397	398	100%	400	403	99%	404	404	100%
JS-HCD	241	241	100%	232	229	102%	218	214	102%	212	207	102%	226	223	101%
JS-WR	258	254	101%	235	232	101%	216	217	99%	198	204	97%	227	227	100%
SLP-Carer	43	43	100%	43	42	101%	41	41	100%	41	41	100%	42	42	100%
EB	10	10	101%	9	10	88%	8	9	84%	7	8	84%	8	9	90%
OB	18	17	102%	17	17	104%	16	16	102%	16	16	101%	17	16	102%
SUP	84	84	100%	80	78	102%	74	72	103%	76	70	109%	79	76	103%
Total	1,492	1,489	100%	1,438	1,435	100%	1,363	1,374	99%	1,333	1,353	99%	1,406	1,413	100%

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

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

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J.1.3.2 Of those in the 2014 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	99%	13	13	100%	22	22	100%	29	29	99%	17	17	100%
SLP-HCD	2	1	121%	4	4	108%	7	7	102%	10	10	100%	6	6	103%
JS-HCD	8	7	104%	19	18	102%	26	26	99%	31	32	100%	21	21	100%
JS-WR	17	15	114%	38	37	103%	54	54	99%	60	62	97%	42	42	101%
SLP-Carer	1	1	99%	2	2	100%	2	2	94%	3	3	94%	2	2	95%
EB	1	1	116%	2	2	95%	2	2	77%	2	3	74%	1	2	84%
OB	0	0	115%	1	1	121%	2	2	116%	2	2	109%	2	1	114%
SUP	3	3	90%	6	6	98%	9	10	94%	12	13	96%	8	8	95%
Total	36	33	102%	85	84	98%	123	124	99%	150	153	101%	99	99	99%

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	433	436	99%	427	433	98%	415	429	97%	412	432	95%	422	432	97%
SLP-HCD	411	410	100%	413	411	101%	404	405	100%	410	413	99%	410	410	100%
JS-HCD	249	248	100%	251	247	102%	243	240	101%	243	239	102%	247	244	101%
JS-WR	275	269	102%	273	269	102%	270	272	99%	258	266	97%	269	269	100%
SLP-Carer	44	44	100%	44	44	101%	43	43	100%	44	44	100%	44	44	100%
EB	11	11	102%	10	12	89%	9	11	83%	9	11	82%	10	11	89%
OB	18	18	102%	19	18	105%	18	17	104%	18	18	102%	18	18	103%
SUP	87	87	100%	86	85	102%	83	81	102%	88	83	107%	86	84	103%
Total	1,528	1,523	100%	1,523	1,518	100%	1,486	1,498	99%	1,483	1,506	98%	1,505	1,511	100%

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J.2 Actual versus expected results by benefit type[7]

J.2.1 Of those in the 2014 current client liability

Benefit	Q1 Actual ($m)	Q1 Expected ($m)	Q1 Ratio	Q2 Actual ($m)	Q2 Expected ($m)	Q2 Ratio	Q3 Actual ($m)	Q3 Expected ($m)	Q3 Ratio	Q4 Actual ($m)	Q4 Expected ($m)	Q4 Ratio	Avg Actual ($m)	Avg Expected ($m)	Avg Ratio
SPS	318	321	99%	307	313	98%	293	302	97%	283	299	95%	300	309	97%
SLP-HCD	341	340	100%	339	338	100%	330	330	100%	332	335	99%	336	336	100%
JS-HCD	182	184	99%	175	174	101%	164	163	101%	160	157	102%	170	170	100%
JS-WR	203	201	101%	184	183	101%	169	171	99%	155	160	96%	178	179	99%
SLP-Carer	35	35	100%	34	34	100%	33	33	99%	33	33	99%	34	34	100%
EB	7	7	99%	6	7	87%	5	6	81%	5	6	81%	6	7	88%
OB	26	26	104%	26	25	105%	25	24	103%	25	24	103%	25	25	104%
WID	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
Total T1	**1,112**	**1,114**	**100%**	**1,072**	**1,074**	**100%**	**1,018**	**1,030**	**99%**	**992**	**1,015**	**98%**	**1,049**	**1,058**	**99%**
AS	242	240	101%	233	231	101%	220	220	100%	214	213	101%	227	226	101%
DA	30	30	99%	29	30	98%	28	29	98%	28	28	98%	29	29	98%
CDA	21	20	103%	20	20	103%	19	19	102%	19	19	102%	20	19	102%
CCS	31	31	98%	29	29	102%	25	26	99%	30	30	99%	29	29	99%
Total T2	**322**	**321**	**101%**	**312**	**309**	**101%**	**292**	**293**	**100%**	**292**	**291**	**100%**	**305**	**303**	**100%**
EI	5	6	82%	3	5	71%	3	4	77%	4	5	77%	4	5	77%
HS	59	56	106%	58	54	108%	55	53	105%	55	51	107%	57	53	106%
Total T3	**64**	**62**	**104%**	**61**	**58**	**105%**	**59**	**57**	**103%**	**58**	**56**	**104%**	**61**	**58**	**104%**
Grand total	**1,499**	**1,496**	**100%**	**1,445**	**1,442**	**100%**	**1,369**	**1,380**	**99%**	**1,342**	**1,361**	**99%**	**1,414**	**1,420**	**100%**

J.2.2 Of those in the 2014 future client liability

Benefit	Q1 Actual ($m)	Q1 Expected ($m)	Q1 Ratio	Q2 Actual ($m)	Q2 Expected ($m)	Q2 Ratio	Q3 Actual ($m)	Q3 Expected ($m)	Q3 Ratio	Q4 Actual ($m)	Q4 Expected ($m)	Q4 Ratio	Avg Actual ($m)	Avg Expected ($m)	Avg Ratio
SPS	4	4	104%	10	10	103%	17	16	103%	23	22	101%	13	13	102%
SLP-HCD	1	1	124%	4	4	110%	6	6	104%	9	9	102%	5	5	105%
JS-HCD	6	6	103%	15	14	102%	20	20	99%	25	25	101%	16	16	101%
JS-WR	14	12	115%	31	30	104%	44	44	100%	49	50	98%	34	34	101%
SLP-Carer	1	0	105%	1	1	101%	2	2	95%	3	3	95%	2	2	97%
EB	1	1	119%	1	1	99%	1	2	78%	1	2	76%	1	1	87%
OB	0	0	114%	1	1	114%	2	2	112%	3	2	106%	2	1	110%
WID	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
Total T1	**27**	**24**	**111%**	**64**	**62**	**104%**	**92**	**92**	**100%**	**111**	**112**	**99%**	**73**	**72**	**101%**
AS	6	6	98%	15	15	97%	22	23	95%	27	29	94%	17	18	95%
DA	0	0	103%	1	1	93%	1	1	85%	1	1	88%	1	1	89%
CDA	0	0	145%	1	0	147%	1	1	138%	1	1	132%	1	1	138%
CCS	1	1	91%	1	1	87%	2	2	80%	2	3	77%	1	2	81%
Total T2	**7**	**7**	**98%**	**17**	**18**	**97%**	**25**	**27**	**94%**	**32**	**34**	**93%**	**20**	**21**	**95%**
EI	0	0	83%	1	1	63%	1	1	77%	1	1	73%	1	1	73%
HS	2	2	104%	4	4	105%	5	5	99%	6	6	100%	4	4	101%
Total T3	**2**	**2**	**101%**	**4**	**4**	**97%**	**6**	**6**	**94%**	**7**	**7**	**95%**	**5**	**5**	**96%**
Grand total	**36**	**33**	**108%**	**85**	**84**	**102%**	**123**	**125**	**99%**	**150**	**154**	**98%**	**99**	**99**	**100%**

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

Taylor Fry

J.2.3 All clients

Benefit	Q1 Actual ($m)	Q1 Expected ($m)	Q1 Ratio	Q2 Actual ($m)	Q2 Expected ($m)	Q2 Ratio	Q3 Actual ($m)	Q3 Expected ($m)	Q3 Ratio	Q4 Actual ($m)	Q4 Expected ($m)	Q4 Ratio	Average Actual ($m)	Average Expected ($m)	Average Ratio
SPS	322	324	99%	317	323	98%	310	319	97%	305	321	95%	313	322	97%
SLP-HCD	342	341	100%	343	341	101%	336	336	100%	341	344	99%	341	341	100%
JS-HCD	188	190	99%	190	189	101%	184	183	101%	185	182	101%	187	186	100%
JS-WR	216	213	101%	215	213	101%	212	215	99%	203	210	97%	212	213	100%
SLP-Carer	35	35	100%	36	36	100%	35	35	99%	36	36	99%	35	36	100%
EB	8	8	101%	7	8	88%	6	8	80%	6	8	80%	7	8	87%
OB	27	26	104%	27	26	106%	27	26	103%	27	26	103%	27	26	104%
WID	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-
Total T1	**1,139**	**1,138**	**100%**	**1,136**	**1,136**	**100%**	**1,110**	**1,121**	**99%**	**1,103**	**1,127**	**98%**	**1,122**	**1,131**	**99%**
AS	248	246	101%	248	246	101%	241	243	99%	241	241	100%	244	244	100%
DA	30	30	99%	30	30	98%	29	30	97%	29	30	97%	29	30	98%
CDA	21	20	103%	21	20	104%	20	20	103%	21	20	103%	21	20	103%
CCS	31	32	98%	31	30	101%	27	28	97%	33	34	97%	30	31	98%
Total T2	**329**	**328**	**100%**	**329**	**327**	**101%**	**317**	**320**	**99%**	**324**	**325**	**100%**	**325**	**325**	**100%**
EI	5	6	82%	4	5	70%	4	6	77%	5	6	76%	4	6	76%
HS	61	58	106%	61	57	107%	60	58	104%	61	57	106%	61	58	106%
Total T3	**66**	**64**	**104%**	**65**	**63**	**104%**	**65**	**64**	**102%**	**65**	**63**	**103%**	**65**	**63**	**103%**
Grand total	**1,534**	**1,529**	**100%**	**1,530**	**1,525**	**100%**	**1,492**	**1,505**	**99%**	**1,492**	**1,515**	**98%**	**1,512**	**1,519**	**100%**

J.3 Actual versus expected results by client age at 30 June 2014

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

J.3.1.1 Of those in the 2014 current client liability

Age	Q1 Actual	Q1 Expected	Q1 Ratio	Q2 Actual	Q2 Expected	Q2 Ratio	Q3 Actual	Q3 Expected	Q3 Ratio	Q4 Actual	Q4 Expected	Q4 Ratio	Avg Actual	Avg Expected	Avg Ratio
16-17	3,252	3,226	101%	3,085	3,027	102%	2,886	2,903	99%	2,666	2,739	97%	2,972	2,974	100%
18-19	14,965	14,896	100%	13,715	13,471	102%	12,965	12,803	101%	11,997	11,597	103%	13,411	13,192	102%
20-24	53,907	54,033	100%	50,604	50,659	100%	48,359	48,901	99%	45,282	45,296	100%	49,538	49,722	100%
25-29	52,021	51,908	100%	49,393	49,193	100%	47,368	47,401	100%	45,091	44,815	101%	48,468	48,329	100%
30-34	49,125	49,096	100%	46,769	46,799	100%	44,955	44,998	100%	43,032	42,855	100%	45,970	45,937	100%
35-39	48,246	48,283	100%	46,002	46,173	100%	44,408	44,387	100%	42,846	42,536	101%	45,376	45,345	100%
40-44	53,560	53,522	100%	51,496	51,392	100%	49,680	49,520	100%	48,035	47,664	101%	50,693	50,525	100%
45-49	49,232	49,146	100%	47,379	47,327	100%	45,626	45,693	100%	44,263	44,105	100%	46,625	46,568	100%
50-54	45,585	45,513	100%	43,994	44,157	100%	42,440	42,892	99%	41,188	41,713	99%	43,302	43,569	99%
55-59	39,875	39,911	100%	38,540	38,830	99%	37,343	37,861	99%	36,532	36,997	99%	38,073	38,400	99%
60-64	37,751	37,612	100%	34,660	34,585	100%	31,796	31,893	100%	29,317	29,340	100%	33,381	33,358	100%
Total	**447,519**	**447,146**	**100%**	**425,637**	**425,613**	**100%**	**407,826**	**409,252**	**100%**	**390,249**	**389,657**	**100%**	**417,808**	**417,917**	**100%**

J.3.1.2 Of those in the 2014 future client liability

Age	Q1 Actual	Q1 Expected	Q1 Ratio	Q2 Actual	Q2 Expected	Q2 Ratio	Q3 Actual	Q3 Expected	Q3 Ratio	Q4 Actual	Q4 Expected	Q4 Ratio	Avg Actual	Avg Expected	Avg Ratio
16-17	1,323	1,288	103%	3,311	3,385	98%	5,706	5,815	98%	7,157	7,462	96%	4,374	4,488	97%
18-19	2,654	2,565	103%	5,179	5,162	100%	6,758	7,013	96%	6,631	6,847	97%	5,306	5,397	98%
20-24	4,571	4,308	106%	8,808	8,682	101%	11,474	12,084	95%	11,404	12,044	95%	9,064	9,280	98%
25-29	3,229	3,097	104%	5,907	5,619	105%	7,792	7,717	101%	8,627	8,682	99%	6,389	6,279	102%
30-34	2,786	2,597	107%	4,991	4,586	109%	6,578	6,343	104%	7,495	7,556	99%	5,463	5,271	104%
35-39	2,172	2,124	102%	4,022	3,783	106%	5,341	5,121	104%	6,187	6,240	99%	4,431	4,317	103%
40-44	2,088	2,009	104%	3,728	3,538	105%	4,924	4,867	101%	5,777	5,891	98%	4,129	4,076	101%
45-49	1,862	1,763	106%	3,273	3,115	105%	4,244	4,189	101%	4,932	4,980	99%	3,578	3,511	102%
50-54	1,759	1,647	107%	3,081	2,979	103%	4,085	3,979	103%	4,709	4,804	98%	3,409	3,352	102%
55-59	1,606	1,558	103%	2,844	2,782	102%	3,757	3,760	100%	4,439	4,603	96%	3,162	3,176	100%
60-64	1,482	1,263	117%	2,415	2,253	107%	3,014	2,963	102%	3,402	3,497	97%	2,578	2,494	103%
Total	**25,532**	**24,220**	**105%**	**47,559**	**45,882**	**104%**	**63,673**	**63,851**	**100%**	**70,760**	**72,605**	**97%**	**51,881**	**51,640**	**100%**

Taylor Fry

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	4,575	4,514	101%	6,396	6,412	100%	8,592	8,718	99%	9,823	10,201	96%	7,347	7,461	98%
18-19	17,619	17,461	101%	18,894	18,633	101%	19,723	19,816	100%	18,628	18,444	101%	18,716	18,588	101%
20-24	58,478	58,341	100%	59,412	59,341	100%	59,833	60,985	98%	56,686	57,340	99%	58,602	59,002	99%
25-29	55,250	55,005	100%	55,300	54,812	101%	55,160	55,118	100%	53,718	53,497	100%	54,857	54,608	100%
30-34	51,911	51,693	100%	51,760	51,385	101%	51,533	51,341	100%	50,527	50,411	100%	51,433	51,208	100%
35-39	50,418	50,407	100%	50,024	49,956	100%	49,749	49,508	100%	49,033	48,776	101%	49,806	49,662	100%
40-44	55,648	55,531	100%	55,224	54,930	101%	54,604	54,387	100%	53,812	53,555	100%	54,822	54,601	100%
45-49	51,094	50,909	100%	50,652	50,442	100%	49,870	49,882	100%	49,195	49,085	100%	50,203	50,079	100%
50-54	47,344	47,160	100%	47,075	47,136	100%	46,525	46,871	99%	45,897	46,517	99%	46,710	46,921	100%
55-59	41,481	41,469	100%	41,384	41,612	99%	41,100	41,621	99%	40,971	41,600	98%	41,234	41,575	99%
60-64	39,233	38,875	101%	37,075	36,838	101%	34,810	34,856	100%	32,719	32,837	100%	35,959	35,852	100%
Total	473,051	471,366	100%	473,196	471,495	100%	471,499	473,103	100%	461,009	462,262	100%	469,689	469,557	100%

J.3.2 Average benefits received per client

J.3.2.1 Of those in the 2014 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	2,906	104%	3,097	2,990	104%	3,064	3,001	102%	3,340	3,182	105%	3,130	3,020	104%
18-19	2,729	2,726	100%	2,841	2,841	100%	2,882	2,890	100%	3,080	3,121	99%	2,883	2,895	100%
20-24	3,268	3,284	100%	3,351	3,361	100%	3,340	3,372	99%	3,514	3,584	98%	3,368	3,400	99%
25-29	3,513	3,539	99%	3,573	3,586	100%	3,524	3,568	99%	3,635	3,716	98%	3,561	3,602	99%
30-34	3,306	3,331	99%	3,354	3,370	100%	3,305	3,356	99%	3,381	3,477	97%	3,337	3,384	99%
35-39	3,252	3,228	101%	3,283	3,255	101%	3,227	3,244	99%	3,275	3,345	98%	3,259	3,268	100%
40-44	3,248	3,241	100%	3,270	3,263	100%	3,225	3,242	99%	3,261	3,326	98%	3,251	3,268	99%
45-49	3,320	3,307	100%	3,343	3,332	100%	3,305	3,312	100%	3,350	3,400	99%	3,329	3,338	100%
50-54	3,448	3,433	100%	3,482	3,462	101%	3,448	3,438	100%	3,507	3,530	99%	3,471	3,466	100%
55-59	3,537	3,515	101%	3,582	3,548	101%	3,545	3,521	101%	3,605	3,620	100%	3,567	3,551	100%
60-64	3,552	3,538	100%	3,588	3,571	100%	3,554	3,536	101%	3,622	3,634	100%	3,579	3,570	100%
Total	3,349	3,346	100%	3,394	3,387	100%	3,357	3,372	100%	3,438	3,494	98%	3,383	3,397	100%

J.3.2.2 Of those in the 2014 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	1,355	1,377	98%	1,770	1,732	102%	1,954	1,900	103%	2,185	2,105	104%	1,816	1,778	102%
18-19	1,324	1,210	109%	1,531	1,505	102%	1,730	1,645	105%	1,999	1,915	104%	1,646	1,569	105%
20-24	1,370	1,256	109%	1,652	1,586	104%	1,772	1,699	104%	2,004	1,934	104%	1,700	1,619	105%
25-29	1,391	1,319	105%	1,815	1,821	100%	1,915	1,953	98%	2,088	2,075	101%	1,802	1,792	101%
30-34	1,316	1,386	95%	1,766	1,898	93%	1,872	1,979	95%	2,004	2,059	97%	1,740	1,830	95%
35-39	1,390	1,440	96%	1,816	1,959	93%	1,979	2,088	95%	2,099	2,160	97%	1,821	1,912	95%
40-44	1,442	1,498	96%	1,906	2,067	92%	2,040	2,184	93%	2,159	2,273	95%	1,887	2,006	94%
45-49	1,540	1,475	104%	1,999	2,052	97%	2,114	2,206	96%	2,215	2,311	96%	1,967	2,011	98%
50-54	1,477	1,507	98%	2,006	2,074	97%	2,141	2,241	96%	2,274	2,346	97%	1,974	2,042	97%
55-59	1,415	1,434	99%	1,939	2,014	96%	2,111	2,165	98%	2,292	2,287	100%	1,939	1,975	98%
60-64	1,450	1,391	104%	1,988	1,969	101%	2,127	2,151	99%	2,374	2,283	104%	1,985	1,949	102%
Total	1,396	1,367	102%	1,794	1,824	98%	1,933	1,953	99%	2,122	2,119	100%	1,899	1,914	99%

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	2,538	2,470	103%	2,410	2,326	104%	2,327	2,266	103%	2,498	2,394	104%	2,443	2,364	103%
18-19	2,517	2,504	101%	2,482	2,471	100%	2,487	2,449	102%	2,695	2,673	101%	2,545	2,524	101%
20-24	3,119	3,134	100%	3,099	3,102	100%	3,039	3,041	100%	3,210	3,237	99%	3,117	3,128	100%
25-29	3,389	3,414	99%	3,385	3,405	99%	3,297	3,342	99%	3,386	3,449	98%	3,364	3,403	99%
30-34	3,199	3,233	99%	3,201	3,239	99%	3,122	3,186	98%	3,177	3,265	97%	3,175	3,231	98%
35-39	3,172	3,152	101%	3,165	3,157	100%	3,093	3,124	99%	3,126	3,193	98%	3,139	3,157	99%
40-44	3,180	3,178	100%	3,178	3,186	100%	3,118	3,147	99%	3,142	3,210	98%	3,155	3,180	99%
45-49	3,256	3,243	100%	3,256	3,253	100%	3,204	3,219	100%	3,236	3,290	98%	3,238	3,251	100%
50-54	3,375	3,366	100%	3,385	3,374	100%	3,333	3,336	100%	3,380	3,408	99%	3,368	3,371	100%
55-59	3,455	3,436	101%	3,469	3,445	101%	3,414	3,398	100%	3,462	3,472	100%	3,450	3,438	100%
60-64	3,473	3,468	100%	3,484	3,473	100%	3,431	3,418	100%	3,492	3,491	100%	3,470	3,462	100%
Total	3,243	3,244	100%	3,234	3,235	100%	3,165	3,181	100%	3,236	3,278	99%	3,220	3,234	100%

Taylor Fry

J.3.3   Total payments

J.3.3.1 Of those in the 2014 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	9	105%	10	9	106%	9	9	102%	9	9	102%	9	9	104%
18-19	41	41	101%	39	38	102%	37	37	101%	37	36	102%	39	38	101%
20-24	176	177	99%	170	170	100%	162	165	98%	159	162	98%	167	169	99%
25-29	183	184	99%	176	176	100%	167	169	99%	164	167	98%	173	174	99%
30-34	162	164	99%	157	158	99%	149	151	98%	146	149	98%	153	155	99%
35-39	157	156	101%	151	150	100%	143	144	100%	140	142	99%	148	148	100%
40-44	174	173	100%	168	168	100%	160	161	100%	157	159	99%	165	165	100%
45-49	163	163	101%	158	158	100%	151	151	100%	148	150	99%	155	155	100%
50-54	157	156	101%	153	153	100%	146	147	99%	144	147	98%	150	151	100%
55-59	141	140	101%	138	138	100%	132	133	99%	132	134	98%	136	136	100%
60-64	134	133	101%	124	124	101%	113	113	100%	106	107	100%	119	119	100%
Total	1,499	1,496	100%	1,445	1,442	100%	1,369	1,380	99%	1,342	1,361	99%	1,414	1,420	100%

J.3.3.2 Of those in the 2014 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	2	2	101%	6	6	100%	11	11	101%	16	16	100%	9	9	100%
18-19	4	3	113%	8	8	102%	12	12	101%	13	13	101%	9	9	102%
20-24	6	5	116%	15	14	106%	20	21	99%	23	23	98%	16	16	102%
25-29	4	4	110%	11	10	105%	15	15	99%	18	18	100%	12	12	102%
30-34	4	4	102%	9	9	101%	12	13	98%	15	16	97%	10	10	99%
35-39	3	3	99%	7	7	99%	11	11	99%	13	13	96%	8	9	98%
40-44	3	3	100%	7	7	97%	10	11	95%	12	13	93%	8	9	95%
45-49	3	3	110%	7	6	102%	9	9	97%	11	12	95%	7	7	99%
50-54	3	2	105%	6	6	100%	9	9	98%	11	11	95%	7	7	98%
55-59	2	2	102%	6	6	98%	8	8	97%	10	11	97%	6	7	98%
60-64	2	2	122%	5	4	108%	6	6	101%	8	8	101%	5	5	104%
Total	36	33	108%	85	84	102%	123	125	99%	150	154	98%	99	99	100%

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	12	11	104%	15	15	103%	20	20	101%	25	24	100%	18	18	102%
18-19	44	44	101%	47	46	102%	49	49	101%	50	49	102%	48	47	102%
20-24	182	183	100%	184	184	100%	182	185	98%	182	186	98%	183	184	99%
25-29	187	188	100%	187	187	100%	182	184	99%	182	185	99%	185	186	99%
30-34	166	167	99%	166	166	100%	161	164	98%	161	165	98%	163	165	99%
35-39	160	159	101%	158	158	100%	154	155	99%	153	156	98%	156	157	100%
40-44	177	176	100%	176	175	100%	170	171	99%	169	172	98%	173	174	100%
45-49	166	165	101%	165	164	101%	160	161	100%	159	161	99%	163	163	100%
50-54	160	159	101%	159	159	100%	155	156	99%	155	159	98%	157	158	99%
55-59	143	143	101%	144	143	100%	140	141	99%	142	144	98%	142	143	100%
60-64	136	135	101%	129	128	101%	119	119	100%	114	115	100%	125	124	101%
Total	1,534	1,529	100%	1,530	1,525	100%	1,492	1,505	99%	1,492	1,515	98%	1,512	1,519	100%

Taylor Fry

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	43,958	44,047	100%	34,389	35,282	97%	29,778	31,346	95%	26,653	27,920	95%	33,695	34,649	97%
	WR > 1	12	33,966	33,913	100%	31,244	30,938	101%	29,531	29,209	101%	27,669	27,395	101%	30,603	30,364	101%
	SB < 1	13	21,858	21,965	100%	19,199	19,426	99%	17,652	18,024	98%	16,336	16,780	97%	18,761	19,049	98%
	SB > 1	14	43,642	43,647	100%	42,033	41,774	101%	40,785	40,301	101%	39,429	38,831	102%	41,472	41,138	101%
Sole Parent	Ch 0-2	21	27,176	27,186	100%	26,405	26,429	100%	25,823	25,855	100%	25,150	25,121	100%	26,139	26,148	100%
	Ch 3-4	22	16,311	16,312	100%	15,795	15,844	100%	15,377	15,480	99%	14,843	15,018	99%	15,582	15,664	99%
	Ch 5-13 < 1	23	4,134	4,137	100%	3,756	3,840	98%	3,544	3,645	97%	3,296	3,435	96%	3,683	3,764	98%
	Ch 5-13 > 1	24	28,845	28,848	100%	27,969	28,073	100%	27,341	27,432	100%	26,369	26,613	99%	27,631	27,742	100%
Supp Living	Carer	31	8,612	8,628	100%	8,313	8,333	100%	8,074	8,116	99%	7,827	7,856	100%	8,207	8,233	100%
	Partner	32	8,000	8,014	100%	7,677	7,688	100%	7,398	7,409	100%	7,137	7,159	100%	7,553	7,568	100%
	Invalids	33	85,748	85,815	100%	83,745	83,794	100%	81,953	82,034	100%	80,267	80,368	100%	82,928	83,003	100%
Youth	Youth payt	41	1,827	1,819	100%	1,612	1,590	101%	1,389	1,451	96%	1,203	1,306	92%	1,508	1,542	98%
	Youth parental	42	1,192	1,191	100%	1,157	1,157	100%	1,121	1,132	99%	1,089	1,095	99%	1,140	1,144	100%
Non-ben	Sup <1yr	51	32,383	32,444	100%	28,707	28,523	101%	25,603	25,312	101%	23,199	21,815	106%	27,473	27,024	102%
	Sup >1yr	52	63,686	63,649	100%	58,622	58,529	100%	55,273	54,358	102%	52,551	50,302	104%	57,533	56,710	101%
	Orp only	53	5,077	5,082	100%	4,844	4,815	101%	4,531	4,559	99%	4,349	4,342	100%	4,700	4,700	100%
	Recent exits	54	21,104	20,449	103%	30,170	29,578	102%	32,653	33,589	97%	32,882	34,300	96%	29,202	29,479	99%
Total			447,519	447,146	100%	425,637	425,613	100%	407,826	409,252	100%	390,249	389,656	100%	417,808	417,917	100%

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	2,693	2,713	99%	2,692	2,756	98%	2,649	2,714	98%	2,695	2,806	96%	2,682	2,747	98%
	WR > 1	12	3,553	3,372	105%	3,497	3,363	104%	3,384	3,292	103%	3,417	3,374	101%	3,463	3,350	103%
	SB < 1	13	3,235	3,313	98%	3,283	3,380	97%	3,225	3,340	97%	3,313	3,423	97%	3,264	3,364	97%
	SB > 1	14	3,786	3,688	103%	3,798	3,689	103%	3,710	3,612	103%	3,768	3,691	102%	3,765	3,670	103%
Sole Parent	Ch 0-2	21	5,535	5,513	100%	5,466	5,434	101%	5,253	5,284	99%	5,351	5,377	100%	5,401	5,402	100%
	Ch 3-4	22	5,446	5,459	100%	5,318	5,367	99%	5,091	5,202	98%	5,091	5,231	97%	5,237	5,315	99%
	Ch 5-13 < 1	23	4,808	5,082	95%	4,662	4,944	94%	4,411	4,763	93%	4,384	4,734	93%	4,566	4,881	94%
	Ch 5-13 > 1	24	5,372	5,354	100%	5,240	5,222	100%	5,028	5,056	99%	4,970	5,048	98%	5,153	5,170	100%
Supp Living	Carer	31	4,899	4,864	101%	4,859	4,805	101%	4,717	4,674	101%	4,763	4,734	101%	4,809	4,769	101%
	Partner	32	3,574	3,576	100%	3,596	3,577	101%	3,534	3,519	100%	3,596	3,590	100%	3,575	3,566	100%
	Invalids	33	4,353	4,363	100%	4,358	4,369	100%	4,276	4,299	99%	4,329	4,379	99%	4,329	4,353	99%
Youth	Youth payt	41	2,735	2,473	111%	2,695	2,496	108%	2,557	2,434	105%	2,711	2,520	108%	2,675	2,481	108%
	Youth parental	42	4,696	4,662	101%	4,718	4,723	100%	4,574	4,662	98%	4,940	4,885	101%	4,732	4,733	100%
Non-ben	Sup <1yr	51	893	879	102%	1,016	1,010	101%	1,102	1,110	99%	1,222	1,271	96%	1,058	1,067	99%
	Sup >1yr	52	1,019	1,017	100%	1,131	1,124	101%	1,187	1,191	100%	1,262	1,307	97%	1,150	1,160	99%
	Orp only	53	3,583	3,490	103%	3,665	3,569	103%	3,612	3,563	101%	3,710	3,716	100%	3,642	3,585	102%
	Recent exits	54	2,029	2,351	86%	2,382	2,414	99%	2,500	2,541	98%	2,654	2,696	98%	2,391	2,501	96%
Total			3,349	3,346	100%	3,394	3,387	100%	3,357	3,372	100%	3,438	3,494	98%	3,383	3,397	100%

Taylor Fry

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%	93	97	95%	79	85	93%	72	78	92%	90	95	95%
	WR > 1	12	121	114	106%	109	104	105%	100	96	104%	95	92	102%	106	102	104%
	SB < 1	13	71	73	97%	63	66	96%	57	60	95%	54	57	94%	61	64	96%
	SB > 1	14	165	161	103%	160	154	104%	151	146	104%	149	143	104%	156	151	103%
Sole Parent	Ch 0-2	21	150	150	100%	144	144	101%	136	137	99%	135	135	100%	141	141	100%
	Ch 3-4	22	89	89	100%	84	85	99%	78	81	97%	76	79	96%	82	83	98%
	Ch 5-13 < 1	23	20	21	95%	18	19	92%	16	17	90%	14	16	89%	17	18	92%
	Ch 5-13 > 1	24	155	154	100%	147	147	100%	137	139	99%	131	134	98%	143	144	99%
Supp Living	Carer	31	42	42	101%	40	40	101%	38	38	100%	37	37	100%	39	39	101%
	Partner	32	29	29	100%	28	28	100%	26	26	100%	26	26	100%	27	27	100%
	Invalids	33	373	374	100%	365	366	100%	350	353	99%	348	352	99%	359	361	99%
Youth	Youth payt	41	5	4	111%	4	4	109%	4	4	101%	3	3	99%	4	4	106%
	Youth parental	42	6	6	101%	5	5	100%	5	5	97%	5	5	101%	5	5	100%
Non-ben	Sup <1yr	51	29	29	101%	29	29	101%	28	28	100%	28	28	102%	29	28	101%
	Sup >1yr	52	65	65	100%	66	66	101%	66	65	101%	66	66	101%	66	65	101%
	Orp only	53	18	18	103%	18	17	103%	16	16	101%	16	16	100%	17	17	102%
	Recent exits	54	43	48	89%	72	71	101%	82	85	96%	87	92	94%	71	74	95%
Total			1,499	1,496	100%	1,445	1,442	100%	1,369	1,380	99%	1,342	1,361	99%	1,414	1,420	100%

Taylor Fry

J.5 Actual versus expected results by duration at 30 June 2014[8]

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	142,336	141,978	100%	133,804	134,424	100%	125,802	128,862	98%	118,077	120,363	98%	130,005	131,407	99%
5-8	54,050	54,062	100%	49,441	49,625	100%	46,527	46,624	100%	43,762	43,535	101%	48,445	48,462	100%
9-12	36,275	36,290	100%	34,257	34,117	100%	32,790	32,491	101%	31,361	30,799	102%	33,671	33,424	101%
13-16	28,103	28,098	100%	26,714	26,693	100%	25,744	25,592	101%	24,752	24,435	101%	26,328	26,205	100%
17-20	25,541	25,534	100%	24,475	24,394	100%	23,666	23,497	101%	22,761	22,536	101%	24,111	23,990	101%
21-24	24,285	24,279	100%	23,367	23,293	100%	22,696	22,485	101%	21,944	21,657	101%	23,073	22,929	101%
25-28	18,488	18,485	100%	17,936	17,836	101%	17,477	17,286	101%	16,964	16,715	101%	17,716	17,581	101%
29-32	13,973	13,977	100%	13,576	13,494	101%	13,232	13,083	101%	12,862	12,661	102%	13,411	13,304	101%
33-36	12,107	12,105	100%	11,786	11,711	101%	11,471	11,355	101%	11,192	11,013	102%	11,639	11,546	101%
37-40	10,684	10,680	100%	10,389	10,335	101%	10,159	10,048	101%	9,924	9,752	102%	10,289	10,204	101%
41-60	33,061	33,049	100%	32,231	32,099	100%	31,535	31,268	101%	30,824	30,442	101%	31,913	31,715	101%
61-80	19,435	19,426	100%	19,014	18,973	100%	18,581	18,544	100%	18,162	18,134	100%	18,798	18,769	100%
81-100	29,181	29,182	100%	28,647	28,618	100%	28,146	28,117	100%	27,664	27,615	100%	28,410	28,383	100%
Total	447,519	447,145	100%	425,637	425,612	100%	407,826	409,252	100%	390,249	389,657	100%	417,808	417,917	100%

J.5.2 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	2,532	2,613	97%	2,601	2,667	98%	2,617	2,698	97%	2,729	2,840	96%	2,620	2,704	97%
5-8	3,014	3,000	100%	3,085	3,071	100%	3,046	3,068	99%	3,141	3,196	98%	3,071	3,084	100%
9-12	3,338	3,322	101%	3,362	3,362	100%	3,297	3,335	99%	3,353	3,445	97%	3,337	3,366	99%
13-16	3,515	3,501	100%	3,536	3,529	100%	3,465	3,495	99%	3,520	3,599	98%	3,509	3,531	99%
17-20	3,653	3,636	100%	3,660	3,655	100%	3,572	3,611	99%	3,618	3,705	98%	3,626	3,652	99%
21-24	3,828	3,781	101%	3,834	3,795	101%	3,740	3,745	100%	3,793	3,837	99%	3,799	3,790	100%
25-28	3,870	3,833	101%	3,869	3,842	101%	3,795	3,791	100%	3,835	3,880	99%	3,843	3,837	100%
29-32	3,822	3,817	100%	3,828	3,824	100%	3,746	3,771	99%	3,788	3,856	98%	3,796	3,817	99%
33-36	3,932	3,840	102%	3,923	3,847	102%	3,839	3,795	101%	3,880	3,878	100%	3,893	3,840	101%
37-40	3,926	3,848	102%	3,940	3,857	102%	3,863	3,804	102%	3,888	3,889	100%	3,904	3,849	101%
41-60	4,221	4,099	103%	4,218	4,102	103%	4,131	4,043	102%	4,155	4,126	101%	4,181	4,092	102%
61-80	4,396	4,319	102%	4,397	4,319	102%	4,293	4,252	101%	4,336	4,335	100%	4,355	4,306	101%
81-100	4,440	4,393	101%	4,443	4,388	101%	4,348	4,311	101%	4,398	4,389	100%	4,407	4,370	101%
Total	3,349	3,346	100%	3,394	3,387	100%	3,357	3,372	100%	3,438	3,494	98%	3,383	3,397	100%

J.5.3 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	371	97%	348	358	97%	329	348	95%	322	342	94%	340	355	96%
5-8	163	162	100%	153	152	100%	142	143	99%	137	139	99%	149	149	100%
9-12	121	121	100%	115	115	100%	108	108	100%	105	106	99%	112	112	100%
13-16	99	98	100%	94	94	100%	89	89	100%	87	88	99%	92	92	100%
17-20	93	93	100%	90	89	100%	85	85	100%	82	83	99%	87	88	100%
21-24	93	92	101%	90	88	101%	85	84	101%	83	83	100%	88	87	101%
25-28	72	71	101%	69	69	101%	66	66	101%	65	65	100%	68	67	101%
29-32	53	53	100%	52	52	101%	50	49	100%	49	49	100%	51	51	100%
33-36	48	46	102%	46	45	103%	44	43	102%	43	43	102%	45	44	102%
37-40	42	41	102%	41	40	103%	39	38	103%	39	38	102%	40	39	102%
41-60	140	135	103%	136	132	103%	130	126	103%	128	126	102%	133	130	103%
61-80	85	84	102%	84	82	102%	80	79	101%	79	79	100%	82	81	101%
81-100	130	128	101%	127	126	101%	122	121	101%	122	121	100%	125	124	101%
Total	1,499	1,496	100%	1,445	1,442	100%	1,369	1,380	99%	1,342	1,361	99%	1,414	1,420	100%

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

Taylor Fry

J.6 Actual versus expected results by region at 30 June 2014

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	143,820	143,945	100%	136,146	136,859	99%	130,925	131,717	99%	125,140	125,342	100%	134,008	134,466	100%
Cant	37,835	37,822	100%	35,733	35,553	101%	34,422	34,003	101%	33,100	32,210	103%	35,273	34,897	101%
Central	37,812	37,910	100%	35,921	35,973	100%	34,305	34,503	99%	32,524	32,492	100%	35,141	35,220	100%
East	25,924	25,702	101%	25,044	24,874	101%	23,677	23,978	99%	22,670	22,920	99%	24,329	24,369	100%
Nelson	15,842	15,766	100%	15,157	15,118	100%	14,568	14,568	100%	13,997	13,893	101%	14,891	14,836	100%
Northld	23,626	23,581	100%	22,680	22,612	100%	21,890	21,916	100%	20,883	21,040	99%	22,270	22,287	100%
Plenty	40,132	39,943	100%	38,546	38,136	101%	37,311	36,898	101%	35,416	35,242	100%	37,851	37,555	101%
South	29,794	29,786	100%	28,172	28,485	99%	25,926	26,750	97%	25,252	25,523	99%	27,286	27,636	99%
Taran	20,545	20,534	100%	19,580	19,637	100%	18,719	19,019	98%	18,111	18,222	99%	19,239	19,353	99%
Waik	39,279	39,251	100%	37,390	37,267	100%	35,997	35,899	100%	34,591	34,221	101%	36,814	36,660	100%
Wlgtn	32,910	32,908	100%	31,268	31,101	101%	30,086	30,002	100%	28,565	28,553	100%	30,707	30,641	100%
Total	447,519	447,148	100%	425,637	425,615	100%	407,826	409,253	100%	390,249	389,658	100%	417,808	417,919	100%

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	3,461	3,471	100%	3,512	3,512	100%	3,470	3,494	99%	3,551	3,615	98%	3,499	3,523	99%
Cant	3,207	3,220	100%	3,264	3,275	100%	3,209	3,263	98%	3,302	3,382	98%	3,245	3,285	99%
Central	2,862	2,839	101%	2,928	2,912	101%	2,924	2,935	100%	3,054	3,097	99%	2,942	2,946	100%
East	3,558	3,535	101%	3,578	3,563	100%	3,516	3,542	99%	3,598	3,672	98%	3,562	3,578	100%
Nelson	3,364	3,356	100%	3,387	3,385	100%	3,334	3,372	99%	3,411	3,480	98%	3,374	3,398	99%
Northld	3,575	3,568	100%	3,601	3,596	100%	3,557	3,567	100%	3,636	3,683	99%	3,593	3,604	100%
Plenty	3,392	3,373	101%	3,425	3,399	101%	3,388	3,376	100%	3,424	3,497	98%	3,407	3,411	100%
South	3,166	3,134	101%	3,209	3,184	101%	3,190	3,193	100%	3,244	3,287	99%	3,202	3,199	100%
Taran	3,337	3,348	100%	3,392	3,380	100%	3,369	3,351	101%	3,443	3,460	100%	3,385	3,385	100%
Waik	3,310	3,328	99%	3,359	3,361	100%	3,335	3,340	100%	3,415	3,456	99%	3,355	3,371	100%
Wlgtn	3,410	3,395	100%	3,448	3,425	101%	3,399	3,396	100%	3,499	3,512	100%	3,439	3,432	100%
Total	3,349	3,346	100%	3,394	3,387	100%	3,357	3,372	100%	3,438	3,494	98%	3,383	3,397	100%

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	498	500	100%	478	481	99%	454	460	99%	444	453	98%	469	473	99%
Cant	121	122	100%	117	116	100%	110	111	100%	109	109	100%	114	115	100%
Central	108	108	101%	105	105	100%	100	101	99%	99	101	99%	103	104	100%
East	92	91	101%	90	89	101%	83	85	98%	82	84	97%	87	87	99%
Nelson	53	53	101%	51	51	100%	49	49	99%	48	48	99%	50	50	100%
Northld	84	84	100%	82	81	100%	78	78	100%	76	77	98%	80	80	100%
Plenty	136	135	101%	132	130	102%	126	125	101%	121	123	98%	129	128	101%
South	94	93	101%	90	91	100%	83	85	97%	82	84	98%	87	88	99%
Taran	69	69	100%	66	66	100%	63	64	99%	62	63	99%	65	65	99%
Waik	130	131	100%	126	125	100%	120	120	100%	118	118	100%	123	124	100%
Wlgtn	112	112	100%	108	107	101%	102	102	100%	100	100	100%	106	105	100%
Total	1,499	1,496	100%	1,445	1,442	100%	1,369	1,380	99%	1,342	1,361	99%	1,414	1,420	100%

Taylor Fry

J.7 Actual versus expected results by benefit type and incapacity

J.7.1 Number receiving benefits at end of the quarter

Benefit	Incapacity	Q1 Actual	Q1 Expected	Q1 Ratio	Q2 Actual	Q2 Expected	Q2 Ratio	Q3 Actual	Q3 Expected	Q3 Ratio	Q4 Actual	Q4 Expected	Q4 Ratio	Avg Actual	Avg Expected	Avg Ratio
SLP-HCS	Accident	4,332	4,358	99%	4,229	4,249	100%	4,126	4,138	100%	4,032	4,047	100%	4,180	4,198	100%
	Cancer	2,710	2,720	100%	2,505	2,503	100%	2,294	2,333	98%	2,129	2,195	97%	2,410	2,438	99%
	Cardio	7,127	7,138	100%	6,807	6,850	99%	6,544	6,572	100%	6,274	6,318	99%	6,688	6,720	100%
	Ill-defined	3	3	100%	3	2	150%	3	2	150%	3	1	300%	3	2	150%
	Immune	3,813	3,813	100%	3,647	3,654	100%	3,546	3,540	100%	3,434	3,418	100%	3,610	3,606	100%
	Infectious	969	970	100%	931	935	100%	906	918	99%	887	897	99%	923	930	99%
	Musc-skel	10,776	10,798	100%	10,413	10,439	100%	10,088	10,120	100%	9,766	9,795	100%	10,261	10,288	100%
	Nervous Sys	7,526	7,528	100%	7,344	7,342	100%	7,186	7,198	100%	7,038	7,049	100%	7,274	7,279	100%
	Pregnancy	23	23	100%	22	21	105%	21	20	105%	20	19	105%	22	21	104%
	Psych/hndcp	40,085	40,088	100%	39,588	39,523	100%	39,079	39,006	100%	38,617	38,532	100%	39,342	39,287	100%
	Respiratory	3,079	3,078	100%	2,933	2,956	99%	2,824	2,833	100%	2,712	2,727	99%	2,887	2,899	100%
	Sensory	2,848	2,850	100%	2,793	2,783	100%	2,736	2,728	100%	2,680	2,670	100%	2,764	2,758	100%
	Substance	1,678	1,678	100%	1,645	1,642	100%	1,618	1,612	100%	1,594	1,588	100%	1,634	1,630	100%
	Other dis	8,702	8,708	100%	8,487	8,508	100%	8,307	8,349	99%	8,146	8,200	99%	8,411	8,441	100%
	Missing	77	77	100%	75	75	100%	73	72	101%	72	70	103%	74	74	101%
JS-HCD	Accident	5,463	5,495	99%	4,996	5,035	99%	4,676	4,760	98%	4,426	4,510	98%	4,890	4,950	99%
	Cancer	1,050	1,059	99%	937	945	99%	860	875	98%	801	820	98%	912	925	99%
	Cardio	3,471	3,476	100%	3,246	3,241	100%	3,074	3,072	100%	2,916	2,930	100%	3,177	3,180	100%
	Ill-defined	29	29	100%	25	26	96%	24	24	100%	21	22	95%	25	25	98%
	Immune	3,476	3,479	100%	3,315	3,308	100%	3,177	3,166	100%	3,045	3,039	100%	3,253	3,248	100%
	Infectious	858	861	100%	811	797	102%	771	759	102%	740	725	102%	795	786	101%
	Musc-skel	11,064	11,091	100%	10,403	10,413	100%	9,923	9,919	100%	9,510	9,495	100%	10,225	10,230	100%
	Nervous Sys	1,970	1,974	100%	1,847	1,856	100%	1,786	1,772	101%	1,704	1,689	101%	1,827	1,823	100%
	Pregnancy	1,065	1,064	100%	984	955	103%	937	916	102%	897	864	104%	971	950	102%
	Psych/hndcp	27,101	27,124	100%	25,367	25,327	100%	24,325	24,189	101%	23,237	23,053	101%	25,008	24,923	100%
	Respiratory	1,674	1,676	100%	1,590	1,581	101%	1,528	1,514	101%	1,462	1,444	101%	1,564	1,554	101%
	Sensory	836	837	100%	788	778	101%	735	739	99%	684	701	98%	761	764	100%
	Substance	3,832	3,833	100%	3,590	3,590	100%	3,439	3,439	100%	3,304	3,293	100%	3,541	3,539	100%
	Other dis	3,430	3,435	100%	3,163	3,174	100%	3,022	3,016	100%	2,867	2,870	100%	3,121	3,124	100%
	Missing	206	207	100%	192	196	98%	179	184	97%	174	174	100%	188	190	99%
Total		159,273	159,470	100%	152,676	152,704	100%	147,807	147,785	100%	143,192	143,155	100%	150,737	150,779	100%

J.7.2 Average benefits received per client

Benefit	Incapacity	Q1 Actual (S)	Q1 Expected (S)	Q1 Ratio	Q2 Actual (S)	Q2 Expected (S)	Q2 Ratio	Q3 Actual (S)	Q3 Expected (S)	Q3 Ratio	Q4 Actual (S)	Q4 Expected (S)	Q4 Ratio	Avg Actual (S)	Avg Expected (S)	Avg Ratio
SLP-HCD	Accident	4,259	4,298	99%	4,273	4,306	99%	4,205	4,239	99%	4,273	4,320	99%	4,253	4,291	99%
	Cancer	3,989	3,973	100%	3,984	4,009	99%	3,928	3,963	99%	3,988	4,046	99%	3,972	3,998	99%
	Cardio	4,124	4,146	99%	4,145	4,160	100%	4,066	4,101	99%	4,129	4,184	99%	4,116	4,148	99%
	Ill-defined	6,157	5,603	110%	6,179	6,260	99%	6,297	4,193	150%	6,293	7,162	88%	6,232	5,804	107%
	Immune	4,337	4,319	100%	4,370	4,331	101%	4,281	4,266	100%	4,339	4,350	100%	4,331	4,316	100%
	Infectious	4,377	4,475	98%	4,382	4,485	98%	4,324	4,410	98%	4,375	4,484	98%	4,365	4,463	98%
	Musc-skel	4,274	4,336	99%	4,290	4,344	99%	4,214	4,279	98%	4,270	4,361	98%	4,262	4,330	98%
	Nervous Sys	4,201	4,193	100%	4,210	4,204	100%	4,146	4,142	100%	4,200	4,225	99%	4,189	4,191	100%
	Pregnancy	3,812	4,113	93%	3,457	4,038	86%	3,400	3,996	85%	3,606	4,032	89%	3,569	4,045	88%
	Psych/hndcp	4,344	4,341	100%	4,345	4,340	100%	4,259	4,266	100%	4,308	4,343	99%	4,314	4,323	100%
	Respiratory	4,417	4,428	100%	4,446	4,438	100%	4,343	4,373	99%	4,396	4,451	99%	4,401	4,423	100%
	Sensory	4,197	4,159	101%	4,197	4,168	101%	4,109	4,108	100%	4,147	4,188	99%	4,162	4,156	100%
	Substance	4,604	4,641	99%	4,576	4,639	99%	4,464	4,558	98%	4,526	4,629	98%	4,542	4,617	98%
	Other dis	4,245	4,249	100%	4,246	4,257	100%	4,172	4,192	100%	4,238	4,274	99%	4,225	4,243	100%
	Missing	3,879	4,308	90%	3,955	4,301	92%	3,888	4,243	92%	3,978	4,344	92%	3,925	4,299	91%
JS-HCD	Accident	3,464	3,428	101%	3,513	3,459	102%	3,460	3,398	102%	3,506	3,475	101%	3,486	3,440	101%
	Cancer	3,495	3,440	102%	3,541	3,499	101%	3,501	3,450	101%	3,601	3,533	102%	3,535	3,481	102%
	Cardio	3,550	3,457	103%	3,594	3,492	103%	3,528	3,439	103%	3,584	3,526	102%	3,564	3,478	102%
	Ill-defined	3,825	3,354	114%	3,910	3,471	113%	3,581	3,366	106%	3,917	3,457	113%	3,808	3,412	112%
	Immune	3,580	3,508	102%	3,569	3,519	101%	3,492	3,457	101%	3,581	3,536	101%	3,555	3,505	101%
	Infectious	3,596	3,543	101%	3,564	3,586	99%	3,513	3,527	100%	3,550	3,605	98%	3,556	3,565	100%
	Musc-skel	3,595	3,535	102%	3,616	3,549	102%	3,537	3,482	102%	3,609	3,561	101%	3,589	3,532	102%
	Nervous Sys	3,536	3,468	102%	3,574	3,514	102%	3,506	3,466	101%	3,575	3,564	100%	3,547	3,503	101%
	Pregnancy	3,636	3,363	108%	4,052	3,771	107%	4,082	3,953	103%	4,312	4,175	103%	4,021	3,816	105%
	Psych/hndcp	3,637	3,628	100%	3,668	3,648	101%	3,585	3,577	100%	3,653	3,656	100%	3,636	3,627	100%
	Respiratory	3,679	3,610	102%	3,720	3,632	102%	3,659	3,566	103%	3,747	3,656	102%	3,701	3,616	102%
	Sensory	3,459	3,417	101%	3,456	3,446	100%	3,461	3,395	102%	3,464	3,480	100%	3,460	3,434	101%
	Substance	3,755	3,757	100%	3,784	3,757	101%	3,690	3,668	101%	3,757	3,735	101%	3,747	3,729	100%
	Other dis	3,554	3,479	102%	3,577	3,509	102%	3,499	3,450	101%	3,593	3,530	102%	3,556	3,492	102%
	Missing	3,073	3,266	94%	3,097	3,464	89%	3,071	3,481	88%	3,147	3,587	88%	3,097	3,449	90%
Total		4,005	3,994	100%	4,030	4,017	100%	3,957	3,956	100%	4,022	4,041	100%	4,004	4,001	100%

Taylor Fry

J.7.3 Total payments

Benefit	Incapacity	Q1 Actual ($m)	Q1 Expected ($m)	Q1 Ratio	Q2 Actual ($m)	Q2 Expected ($m)	Q2 Ratio	Q3 Actual ($m)	Q3 Expected ($m)	Q3 Ratio	Q4 Actual ($m)	Q4 Expected ($m)	Q4 Ratio	Avg Actual ($m)	Avg Expected ($m)	Avg Ratio
SLP-HCD	Accident	18	19	98%	18	18	99%	17	18	99%	17	17	99%	18	18	99%
	Cancer	11	11	100%	10	10	99%	9	9	97%	8	9	96%	10	10	98%
	Cardio	29	30	99%	28	28	99%	27	27	99%	26	26	98%	28	28	99%
	Ill-defined	0	0	110%	0	0	148%	0	0	225%	0	0	264%	0	0	167%
	Immune	17	16	100%	16	16	101%	15	15	101%	15	15	100%	16	16	100%
	Infectious	4	4	98%	4	4	97%	4	4	97%	4	4	96%	4	4	97%
	Musc-skel	46	47	98%	45	45	99%	43	43	98%	42	43	98%	44	45	98%
	Nervous Sys	32	32	100%	31	31	100%	30	30	100%	30	30	99%	30	31	100%
	Pregnancy	0	0	93%	0	0	90%	0	0	89%	0	0	94%	0	0	91%
	Psych/hndcp	174	174	100%	172	172	100%	166	166	100%	166	167	99%	170	170	100%
	Respiratory	14	14	100%	13	13	99%	12	12	99%	12	12	98%	13	13	99%
	Sensory	12	12	101%	12	12	101%	11	11	100%	11	11	99%	12	11	100%
	Substance	8	8	99%	8	8	99%	7	7	98%	7	7	98%	7	8	99%
	Other dis	37	37	100%	36	36	100%	35	35	99%	35	35	98%	36	36	99%
	Missing	0	0	90%	0	0	92%	0	0	93%	0	0	94%	0	0	92%
JS-HCD	Accident	19	19	100%	18	17	101%	16	16	100%	16	16	99%	17	17	100%
	Cancer	4	4	101%	3	3	100%	3	3	100%	3	3	100%	3	3	100%
	Cardio	12	12	103%	12	11	103%	11	11	103%	10	10	101%	11	11	102%
	Ill-defined	0	0	114%	0	0	108%	0	0	106%	0	0	108%	0	0	109%
	Immune	12	12	102%	12	12	102%	11	11	101%	11	11	101%	12	11	102%
	Infectious	3	3	101%	3	3	101%	3	3	101%	3	3	101%	3	3	101%
	Musc-skel	40	39	101%	38	37	102%	35	35	102%	34	34	102%	37	36	102%
	Nervous Sys	7	7	102%	7	7	101%	6	6	102%	6	6	101%	6	6	102%
	Pregnancy	4	4	108%	4	4	111%	4	4	106%	4	4	107%	4	4	108%
	Psych/hndcp	99	98	100%	93	92	101%	87	87	101%	85	84	101%	91	90	101%
	Respiratory	6	6	102%	6	6	103%	6	5	104%	5	5	104%	6	6	103%
	Sensory	3	3	101%	3	3	102%	3	3	101%	2	2	97%	3	3	100%
	Substance	14	14	100%	14	13	101%	13	13	101%	12	12	101%	13	13	101%
	Other dis	12	12	102%	11	11	102%	11	10	102%	10	10	102%	11	11	102%
	Missing	1	1	94%	1	1	88%	1	1	86%	1	1	88%	1	1	89%
Total		638	637	100%	615	613	100%	585	585	100%	576	578	100%	603	603	100%

J.8 Actual versus expected results by benefit and partner status, for benefits that record partner status[9]

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

Benefit	Partnered status	Q1 Actual	Q1 Expected	Q1 Ratio	Q2 Actual	Q2 Expected	Q2 Ratio	Q3 Actual	Q3 Expected	Q3 Ratio	Q4 Actual	Q4 Expected	Q4 Ratio	Avg Actual	Avg Expected	Avg Ratio
EB	Yes	759	762	100%	633	636	100%	571	561	102%	554	499	111%	629	615	102%
	No	1,897	1,906	100%	1,451	1,530	95%	1,326	1,380	96%	1,352	1,264	107%	1,507	1,520	99%
SLP-HCD	Yes	16,428	16,459	100%	15,755	15,780	100%	15,174	15,215	100%	14,599	14,709	99%	15,489	15,541	100%
	No	77,320	77,371	100%	75,667	75,702	100%	74,177	74,228	100%	72,805	72,818	100%	74,992	75,030	100%
JS-HCD	Yes	12,308	12,337	100%	11,517	11,543	100%	10,980	10,971	100%	10,448	10,450	100%	11,313	11,325	100%
	No	53,217	53,300	100%	49,737	49,679	100%	47,476	47,375	100%	45,340	45,180	100%	48,943	48,884	100%
JS-WR	Yes	12,603	12,617	100%	11,015	10,812	102%	10,071	9,926	101%	9,259	9,099	102%	10,737	10,614	101%
	No	64,467	64,468	100%	54,124	54,811	99%	48,711	50,120	97%	44,337	45,739	97%	52,910	53,785	98%
Total		238,999	239,220	100%	219,899	220,493	100%	208,486	209,776	99%	198,694	199,758	99%	216,520	217,312	100%

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

Taylor Fry

J.8.2 Average benefits received per client

Benefit	Partner Status	Q1 Actual (S)	Q1 Expected (S)	Q1 Ratio	Q2 Actual (S)	Q2 Expected (S)	Q2 Ratio	Q3 Actual (S)	Q3 Expected (S)	Q3 Ratio	Q4 Actual (S)	Q4 Expected (S)	Q4 Ratio	Avg Actual (S)	Avg Expected (S)	Avg Ratio
EB	Yes	2,715	2,588	105%	2,859	2,697	106%	2,905	2,693	108%	2,903	2,803	104%	2,845	2,695	106%
	No	3,321	3,086	108%	3,860	3,418	113%	3,896	3,476	112%	3,771	3,589	105%	3,712	3,392	109%
SLP-HCD	Yes	3,581	3,582	100%	3,602	3,597	100%	3,549	3,549	100%	3,614	3,627	100%	3,586	3,588	100%
	No	4,437	4,448	100%	4,439	4,449	100%	4,351	4,375	99%	4,401	4,454	99%	4,407	4,431	99%
JS-HCD	Yes	2,964	2,993	99%	2,982	3,047	98%	2,933	3,020	97%	3,008	3,116	97%	2,972	3,044	98%
	No	3,749	3,694	101%	3,787	3,717	102%	3,709	3,645	102%	3,779	3,724	101%	3,756	3,695	102%
JS-WR	Yes	2,618	2,635	99%	2,567	2,602	99%	2,515	2,555	98%	2,565	2,637	97%	2,566	2,607	98%
	No	3,143	3,058	103%	3,149	3,104	101%	3,083	3,053	101%	3,138	3,150	100%	3,128	3,091	101%
Total		3,690	3,658	101%	3,736	3,713	101%	3,680	3,667	100%	3,752	3,767	100%	3,713	3,699	100%

J.8.3 Total payments

Benefit	Partner Status	Q1 Actual (Sm)	Q1 Expected (Sm)	Q1 Ratio	Q2 Actual (Sm)	Q2 Expected (Sm)	Q2 Ratio	Q3 Actual (Sm)	Q3 Expected (Sm)	Q3 Ratio	Q4 Actual (Sm)	Q4 Expected (Sm)	Q4 Ratio	Avg Actual (Sm)	Avg Expected (Sm)	Avg Ratio
EB	Yes	2	2	104%	2	2	106%	2	2	110%	2	1	115%	2	2	108%
	No	6	6	107%	6	5	107%	5	5	108%	5	5	112%	6	5	108%
SLP-HCD	Yes	59	59	100%	57	57	100%	54	54	100%	53	53	99%	56	56	100%
	No	343	344	100%	336	337	100%	323	325	99%	320	324	99%	331	333	99%
JS-HCD	Yes	36	37	99%	34	35	98%	32	33	97%	31	33	97%	34	34	98%
	No	200	197	101%	188	185	102%	176	173	102%	171	168	102%	184	181	102%
JS-WR	Yes	33	33	99%	28	28	100%	25	25	100%	24	24	99%	28	28	100%
	No	203	197	103%	170	170	100%	150	153	98%	139	144	97%	166	166	100%
Total		882	875	101%	821	819	100%	767	769	100%	745	752	99%	804	804	100%

J.9 Actual versus expected results by child age, for clients in SPS benefit[10]

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

Child age	Q1 Actual	Q1 Expected	Q1 Ratio	Q2 Actual	Q2 Expected	Q2 Ratio	Q3 Actual	Q3 Expected	Q3 Ratio	Q4 Actual	Q4 Expected	Q4 Ratio	Avg Actual	Avg Expected	Avg Ratio
1-2	28,798	28,808	100%	27,987	28,012	100%	27,368	27,406	100%	26,661	26,622	100%	27,704	27,712	100%
3-4	15,697	15,697	100%	15,192	15,239	100%	14,776	14,889	99%	14,251	14,448	99%	14,979	15,068	99%
5-6	10,815	10,815	100%	10,397	10,471	99%	10,104	10,210	99%	9,720	9,888	98%	10,259	10,346	99%
7-8	7,732	7,733	100%	7,433	7,490	99%	7,247	7,298	99%	6,948	7,066	98%	7,340	7,397	99%
9-10	6,402	6,404	100%	6,178	6,202	100%	6,009	6,046	99%	5,789	5,854	99%	6,095	6,127	99%
11-12	5,546	5,546	100%	5,345	5,369	100%	5,213	5,227	100%	5,013	5,058	99%	5,279	5,300	100%
13-14	2,583	2,586	100%	2,470	2,478	100%	2,410	2,387	101%	2,290	2,268	101%	2,438	2,430	100%
Total	77,573	77,589	100%	75,002	75,261	100%	73,127	73,463	100%	70,672	71,204	99%	74,094	74,379	100%

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[10] A small number of clients receiving SPS where the youngest recorded child is aged > 14 have been excluded.

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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	5,502	5,467	101%	5,437	5,402	101%	5,228	5,256	99%	5,335	5,355	100%	5,376	5,370	100%
3-4	5,443	5,487	99%	5,312	5,376	99%	5,082	5,209	98%	5,084	5,237	97%	5,230	5,327	98%
5-6	5,338	5,370	99%	5,185	5,270	98%	4,978	5,118	97%	4,937	5,138	96%	5,109	5,224	98%
7-8	5,320	5,350	99%	5,211	5,241	99%	4,998	5,085	98%	4,964	5,095	97%	5,123	5,193	99%
9-10	5,338	5,306	101%	5,223	5,199	100%	4,994	5,046	99%	4,920	5,046	97%	5,119	5,149	99%
11-12	5,225	5,242	100%	5,100	5,139	99%	4,922	4,993	99%	4,872	4,980	98%	5,030	5,088	99%
13-14	5,163	5,164	100%	5,022	4,738	106%	4,747	4,385	108%	4,639	4,156	112%	4,893	4,611	106%
Total	5,404	5,407	100%	5,299	5,305	100%	5,084	5,146	99%	5,103	5,185	98%	5,227	5,263	99%

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	158	158	101%	152	151	101%	143	144	99%	142	143	100%	149	149	100%
3-4	85	86	99%	81	82	99%	75	78	97%	72	76	96%	78	80	98%
5-6	58	58	99%	54	55	98%	50	52	96%	48	51	94%	52	54	97%
7-8	41	41	99%	39	39	99%	36	37	98%	34	36	96%	38	38	98%
9-10	34	34	101%	32	32	100%	30	31	98%	28	30	96%	31	32	99%
11-12	29	29	100%	27	28	99%	26	26	98%	24	25	97%	27	27	98%
13-14	13	13	100%	12	12	106%	11	10	109%	11	9	113%	12	11	106%
Total	419	419	100%	397	399	100%	372	378	98%	361	369	98%	387	392	99%

Taylor Fry

APPENDIX K   CHANGE IN LIABILITY FROM THE PREVIOUS VALUATION

K.1   Attribution of change from 2014 to 2015 valuation by segment

Group	2014 current client liability		Roll-forward to 2015					Change due to experience		
	Previous valuation	Liability using updated economic assumptions	Expected Payments	Liability less payments	Remove clients leaving the valn	Addition of future liability clients	Unroll 1 year discounting	Difference between actual and expected cohort	Recognition of experience	Other methodology changes
	(a) $m	(b) $m	(c) $m	(d) $m	(e) $m	(f) $m	(g) $m	(h) $m	(i) $m	(j) $m
Jobseekers										
Work-ready, <1 year	4,058	4,246	376	3,870	3,538	5,403	5,603	4,256	4,147	4,189
Work-ready, >1 year	3,911	4,066	402	3,664	4,157	4,157	4,311	3,853	3,677	3,672
JS-HCD, <1 year	2,523	2,617	252	2,365	2,090	3,142	3,258	2,585	2,672	2,678
JS-HCD, >1year	5,959	6,149	593	5,555	5,667	5,667	5,877	5,879	5,892	5,866
Sole Parents										
Youngest child 0-2	5,767	5,949	554	5,395	5,397	5,829	6,045	5,743	5,518	5,519
Youngest child 3-4	3,227	3,326	327	2,999	3,032	3,151	3,268	3,008	2,851	2,840
Child 5-13, <1 year	563	583	72	510	634	850	882	653	609	610
Child 5-13, >1 year	5,072	5,237	563	4,674	5,043	5,043	5,230	4,758	4,458	4,441
Supported Living										
Carer	1,297	1,334	154	1,180	1,259	1,340	1,389	1,369	1,361	1,360
Partner	853	876	106	770	727	731	758	873	880	872
SLP-HCD	14,842	15,260	1,415	13,845	14,640	15,057	15,614	15,235	15,387	15,398
Youth										
Youth payment (<18)	251	263	15	248	56	254	264	273	271	294
Young parent payt (<19)	254	262	21	241	108	238	247	233	229	232
Not On Main Benefits										
Sup only, <1 year	1,488	1,549	111	1,438	1,106	1,787	1,853	1,443	1,399	1,405
Sup only, >1 year	3,414	3,540	256	3,284	2,853	2,853	2,958	3,837	3,660	3,666
Orphan only	486	497	66	431	424	484	502	519	512	510
Recent exits										
Recent exits, <1 year	7,461	7,843	293	7,551	3,756	4,495	4,661	7,202	7,020	7,099
All segments	61,427	63,595	5,576	58,019	54,488	60,483	62,720	61,720	60,544	60,650
Net Rec Assist	74	76	6	70	65	72	75	74	112	112
Net Overpayt/ fraud	255	255	22	233	233	233	242	255	230	230
Expenses	7,258	7,502	640	6,862	6,445	7,147	7,411	7,310	7,398	7,398
Grand Total	69,014	71,429	6,244	65,184	61,231	67,935	70,449	69,360	68,284	68,390
Change		2,415		-6,244	-3,953	6,704	2,514	-1,088	-1,076	106

Notes:

(a) All net loans costs and expenses have been removed from the segment level liabilities and added as separate line items

(b) Increase in 2014 liability after updating economic assumptions driven by lower discount rates offset partially by lower forecast inflation. Smaller portion of the increase explained by the unemployment rate being higher than forecast with a slower reversion to full unemployment.

(c) Expected payments in the 2014/15 year, actual dollars

(d) Equals (b) - (c)

(e) Clients exit the valuation if no benefits received in the 2014/15 year - this is the residual of liability after the expected level of exits

(f) Clients not in the 2014 current client liability but expected to receive payments in 2014/15, thus part of the 2015 current client liability

(g) Can think of as adding on the "interest earned" on the notional $67.9b. This column represents our expected 2015 current client liability

(h) Difference between actual and expected number of clients in the 2015 current liability cohort and their risk characteristics

(i) The transition and payment models have evolved with experience from those used in 2014

(j) The 2015 valuation used CYF and Dept Corrections related variables for the first time

Taylor Fry

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-15	5.83%	5.90%	6.10%
Dec-15	5.73%	5.90%	6.30%
Mar-16	5.55%	5.90%	6.50%
Jun-16	5.42%	5.90%	6.70%
Sep-16	5.32%	5.90%	6.90%
Dec-16	5.26%	5.90%	7.10%
Mar-17	5.21%	5.90%	7.30%
Jun-17	5.12%	5.90%	7.50%
Sep-17	5.03%	5.90%	7.31%
Dec-17	4.94%	5.90%	7.13%
Mar-18	4.85%	5.90%	6.94%
Jun-18	4.75%	5.90%	6.75%
Sep-18	4.68%	5.90%	6.56%
Dec-18	4.62%	5.90%	6.38%
Mar-19	4.59%	5.90%	6.19%
Jun-19	4.56%	5.90%	6.00%
Sep-19	4.54%	5.90%	5.81%
Dec-19	4.52%	5.90%	5.63%
Mar-20	4.50%	5.90%	5.44%
Jun-20	4.50%	5.90%	5.25%
Sep-20	4.50%	5.90%	5.06%
Dec-20	4.50%	5.90%	4.88%
Mar-21	4.50%	5.90%	4.69%
Jun-21	4.50%	5.90%	4.50%
Sep-21 and beyond	4.50%	5.90%	4.50%

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.

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

Top tier segment	Segment	Total benefit payments ($m)													
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS	Total
Jobseekers	Work-ready, <1 year	999	694	543	788	95	26	65	621	69	28	60	21	179	4,189
	Work-ready, >1 year	950	619	379	700	95	25	82	516	70	25	35	12	165	3,672
	JS-HCD, <1 year	187	793	224	783	37	6	27	380	75	13	25	6	123	2,678
	JS-HCD, >1year	308	2,043	259	1,776	75	10	70	807	189	23	25	8	273	5,866
Sole Parents	Youngest child 0-2	247	280	2,660	474	168	10	104	921	84	91	216	13	252	5,519
	Youngest child 3-4	140	163	1,298	276	97	6	60	481	49	49	85	6	132	2,840
	Child 5-13, <1 year	48	54	228	78	22	2	15	100	11	8	13	2	29	610
	Child 5-13, >1 year	357	384	1,645	585	176	11	114	713	96	67	72	9	213	4,441
Supported Living	Carer	73	101	76	154	647	2	37	149	35	24	11	1	51	1,360
	Partner	22	43	30	581	7	1	21	82	39	6	5	0	35	872
	SLP-HCD	90	221	54	12,410	22	3	90	1,238	735	27	25	4	479	15,398
Youth	Youth payment (<18)	59	33	76	43	5	1	3	45	4	3	8	1	12	294
	Young parent payt (<19)	11	8	127	13	5	0	3	36	2	3	14	1	9	232
Not On Main Benefits	Sup only, <1 year	126	172	211	224	40	7	30	364	31	58	70	4	69	1,405
	Sup only, >1 year	287	431	499	592	117	18	93	944	96	243	162	7	178	3,666
	Orphan only	17	22	20	35	10	1	344	24	5	13	9	0	8	510
Recent exits	Recent exits, <1 year	1,009	1,210	1,093	1,541	193	40	151	1,102	143	70	192	29	328	7,099
Total		4,930	7,269	9,420	21,055	1,810	168	1,309	8,521	1,734	752	1,026	124	2,532	60,650

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 5.9%

Top tier segment	Segment	Total benefit payments ($m)														Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS	Total	
Jobseekers	Work-ready, <1 year	1,244	778	572	799	106	30	70	697	73	29	61	24	196	4,680	12%
	Work-ready, >1 year	1,133	675	390	681	102	27	85	562	72	26	35	13	175	3,975	8%
	JS-HCD, <1 year	249	859	241	772	41	7	28	408	78	14	25	7	130	2,858	7%
	JS-HCD, >1year	409	2,167	276	1,749	78	11	74	848	192	24	26	9	283	6,145	5%
Sole Parents	Youngest child 0-2	357	332	2,731	483	188	12	115	969	88	94	216	14	266	5,865	6%
	Youngest child 3-4	199	192	1,337	281	105	7	65	506	51	50	85	7	140	3,025	7%
	Child 5-13, <1 year	67	62	234	77	25	2	15	107	11	9	13	2	31	656	8%
	Child 5-13, >1 year	476	430	1,681	577	191	13	120	750	98	69	72	10	224	4,711	6%
Supported Living	Carer	96	111	80	147	655	2	38	155	35	24	11	2	52	1,409	4%
	Partner	29	50	33	586	8	1	21	85	40	6	5	1	36	901	3%
	SLP-HCD	130	260	61	12,443	24	4	92	1,257	738	28	25	4	485	15,552	1%
Youth	Youth payment (<18)	75	38	79	44	6	1	4	51	5	3	8	2	13	327	11%
	Young parent payt (<19)	16	9	133	13	6	0	3	38	2	3	14	1	10	249	7%
Not On Main Benefits	Sup only, <1 year	175	203	230	244	46	9	34	396	34	59	71	4	77	1,583	
	Sup only, >1 year	396	504	532	610	135	22	102	1,009	101	246	163	8	194	4,023	13%
	Orphan only	22	26	21	36	11	1	346	27	6	13	9	0	9	528	
Recent exits	Recent exits, <1 year	1,377	1,398	1,204	1,613	228	48	173	1,269	156	76	199	33	369	8,145	15%
Total		6,452	8,096	9,836	21,156	1,957	199	1,386	9,136	1,780	771	1,038	140	2,689	64,632	7%

Notes:

(a) The national unemployment rates for this scenario are shown in column (b) of table L.1.1, with the regional rates adjusted accordingly

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

Top tier segment	Segment	Total benefit payments ($m)														Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS	Total	
Jobseekers	Work-ready, <1 year	1,168	716	544	781	99	28	68	662	70	28	60	23	186	4,432	6%
	Work-ready, >1 year	1,097	633	374	683	94	26	81	545	70	25	34	13	170	3,844	5%
	JS-HCD, <1 year	217	832	235	777	37	6	28	394	76	13	25	6	127	2,775	4%
	JS-HCD, >1year	358	2,127	270	1,744	75	10	71	828	190	23	25	8	277	6,007	2%
Sole Parents	Youngest child 0-2	274	293	2,679	480	173	10	104	931	85	92	215	13	255	5,603	2%
	Youngest child 3-4	157	169	1,316	280	101	6	60	489	49	50	85	7	134	2,901	2%
	Child 5-13, <1 year	56	55	236	78	23	2	15	103	11	9	13	2	30	634	4%
	Child 5-13, >1 year	407	400	1,674	581	185	11	116	730	97	68	71	9	218	4,568	3%
Supported Living	Carer	84	103	78	150	653	2	37	152	35	24	10	1	51	1,381	2%
	Partner	27	47	32	583	7	1	21	84	40	6	5	0	36	888	2%
	SLP-HCD	103	238	59	12,416	22	3	91	1,245	737	27	25	4	482	15,454	0%
Youth	Youth payment (<18)	66	33	75	43	6	1	3	46	4	3	7	1	12	300	2%
	Young parent payt (<19)	12	8	127	13	5	0	3	36	2	3	14	1	9	234	1%
Not On Main Benefits	Sup only, <1 year	149	182	220	231	42	8	30	378	32	59	71	4	72	1,477	
	Sup only, >1 year	333	453	512	593	121	19	94	970	97	243	162	8	184	3,789	5%
	Orphan only	20	24	20	36	11	1	345	26	5	13	9	0	8	518	
Recent exits	Recent exits, <1 year	1,211	1,291	1,161	1,578	209	44	159	1,196	149	73	197	32	349	7,650	8%
Total		5,738	7,604	9,612	21,048	1,862	180	1,327	8,816	1,750	758	1,029	133	2,599	62,455	3%

Notes:

(a) The national unemployment rates for this scenario are shown in column (c) of table L.1.1, with the regional rates adjusted accordingly

Taylor Fry

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	1,065	792	602	961	110	29	77	695	83	32	67	23	203	4,738	13%
	Work-ready, >1 year	1,001	692	417	825	107	26	93	567	81	28	38	13	182	4,070	11%
	JS-HCD, <1 year	204	850	245	908	43	7	31	418	86	15	27	6	137	2,976	11%
	JS-HCD, >1year	336	2,167	283	2,018	84	11	79	876	209	25	28	8	298	6,421	9%
Sole Parents	Youngest child 0-2	286	338	2,839	594	198	11	127	1,014	100	102	231	14	281	6,134	11%
	Youngest child 3-4	160	193	1,378	339	112	6	71	525	57	54	91	7	146	3,141	11%
	Child 5-13, <1 year	53	62	239	92	25	2	17	108	13	9	14	2	32	668	9%
	Child 5-13, >1 year	394	439	1,727	688	198	12	131	772	108	73	76	10	233	4,860	9%
Supported Living	Carer	80	112	83	178	681	2	40	161	39	25	11	1	55	1,470	8%
	Partner	24	47	33	624	8	1	23	88	43	6	5	0	38	941	8%
	SLP-HCD	102	249	60	13,633	25	4	99	1,355	808	30	27	4	522	16,919	10%
Youth	Youth payment (<18)	64	39	86	57	6	1	4	52	6	3	9	2	14	343	17%
	Young parent payt (<19)	13	10	137	17	6	0	3	40	3	3	15	1	11	260	12%
Not On Main Benefits	Sup only, <1 year	139	195	230	269	46	8	35	394	36	62	75	4	77	1,571	
	Sup only, >1 year	317	488	541	701	134	20	108	1,016	109	256	170	8	198	4,065	12%
	Orphan only	18	25	22	41	11	1	362	27	6	14	9	0	9	544	
Recent exits	Recent exits, <1 year	1,109	1,377	1,201	1,856	224	44	179	1,240	170	79	207	31	373	8,090	14%
	Total	5,366	8,076	10,122	23,801	2,021	187	1,480	9,347	1,954	816	1,100	134	2,807	67,211	11%

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	943	615	492	655	83	25	55	560	59	25	55	20	159	3,744	-11%
	Work-ready, >1 year	906	558	346	600	85	24	73	473	62	23	32	11	150	3,341	-9%
	JS-HCD, <1 year	172	744	205	683	33	5	23	348	67	11	23	6	112	2,432	-9%
	JS-HCD, >1year	284	1,934	238	1,576	67	9	63	748	171	21	24	7	251	5,394	-8%
Sole Parents	Youngest child 0-2	216	235	2,501	382	143	8	87	844	71	83	202	12	228	5,012	-9%
	Youngest child 3-4	123	138	1,227	227	84	5	51	443	42	45	80	6	120	2,590	-9%
	Child 5-13, <1 year	44	48	218	66	20	2	13	93	10	8	12	1	27	561	-8%
	Child 5-13, >1 year	325	339	1,571	501	157	10	101	663	85	63	67	8	195	4,085	-8%
Supported Living	Carer	67	91	70	134	617	2	33	138	32	22	10	1	47	1,264	-7%
	Partner	20	39	28	543	7	1	20	76	37	5	5	0	32	813	-7%
	SLP-HCD	80	197	48	11,378	19	3	83	1,138	674	25	24	4	442	14,115	-8%
Youth	Youth payment (<18)	55	28	67	34	4	1	3	40	3	2	7	1	10	255	-13%
	Young parent payt (<19)	10	6	119	10	4	0	2	32	2	2	13	1	8	210	-10%
Not On Main Benefits	Sup only, <1 year	115	152	195	189	34	7	26	338	27	55	67	4	62	1,268	
	Sup only, >1 year	261	383	462	505	103	16	81	881	85	231	154	7	161	3,330	-10%
	Orphan only	16	20	18	31	9	1	328	23	5	12	8	0	7	479	
Recent exits	Recent exits, <1 year	927	1,073	999	1,295	168	36	129	988	122	62	179	26	291	6,295	-11%
	Total	4,562	6,600	8,805	18,810	1,635	153	1,170	7,824	1,554	696	960	116	2,302	55,188	-9%

Notes:

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

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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	945	615	492	654	83	25	55	560	59	25	55	20	159	3,745	-11%
	Work-ready, >1 year	908	558	347	599	85	24	73	473	62	23	32	11	150	3,344	-9%
	JS-HCD, <1 year	172	746	205	683	33	5	23	348	67	12	23	6	112	2,434	-9%
	JS-HCD, >1year	285	1,938	239	1,576	67	9	63	749	171	21	24	7	252	5,401	-8%
Sole Parents	Youngest child 0-2	216	234	2,506	381	143	8	87	845	71	83	202	12	228	5,016	-9%
	Youngest child 3-4	123	138	1,230	227	84	5	51	443	42	45	80	6	120	2,592	-9%
	Child 5-13, <1 year	44	48	218	66	20	2	13	93	10	8	12	1	27	562	-8%
	Child 5-13, >1 year	325	339	1,575	500	157	10	101	664	85	63	67	8	196	4,090	-8%
Supported Living	Carer	67	91	70	134	618	2	34	138	32	23	10	1	47	1,267	-7%
	Partner	20	39	28	544	7	1	20	76	37	6	5	0	32	814	-7%
	SLP-HCD	80	197	48	11,392	19	3	83	1,139	674	25	24	4	443	14,132	-8%
Youth	Youth payment (<18)	55	28	67	34	4	1	3	40	3	2	7	1	10	255	-13%
	Young parent payt (<19)	10	6	119	10	4	0	2	32	2	2	13	1	8	210	-10%
Not On Main Benefits	Sup only, <1 year	115	152	195	188	34	7	26	338	27	55	67	4	62	1,269	
	Sup only, >1 year	262	383	463	504	103	16	81	883	85	232	155	7	161	3,333	-10%
	Orphan only	16	20	18	31	9	1	329	23	5	12	8	0	7	480	
Recent exits	Recent exits, <1 year	928	1,074	1,000	1,293	168	36	129	988	122	62	179	26	291	6,295	-11%
	Total	4,569	6,606	8,821	18,815	1,636	153	1,171	7,833	1,555	697	962	116	2,304	55,239	-9%

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	1,062	790	601	960	110	29	77	693	83	32	66	23	202	4,729	13%
	Work-ready, >1 year	998	690	416	824	107	26	93	566	81	28	38	13	182	4,060	11%
	JS-HCD, <1 year	204	847	244	907	43	7	31	417	85	14	27	6	136	2,969	11%
	JS-HCD, >1year	335	2,160	282	2,014	83	11	78	873	209	25	28	8	297	6,404	9%
Sole Parents	Youngest child 0-2	285	338	2,830	594	198	11	126	1,011	99	102	230	14	280	6,120	11%
	Youngest child 3-4	160	193	1,373	339	112	6	71	524	57	54	91	7	145	3,133	10%
	Child 5-13, <1 year	53	62	238	92	25	2	17	108	13	9	14	2	32	666	9%
	Child 5-13, >1 year	393	438	1,721	687	198	12	130	770	108	73	76	10	232	4,848	9%
Supported Living	Carer	80	112	83	178	679	2	40	160	39	25	11	1	55	1,465	8%
	Partner	24	47	33	622	8	1	23	88	43	6	5	0	38	938	8%
	SLP-HCD	101	248	60	13,598	25	4	99	1,351	806	30	27	4	521	16,875	10%
Youth	Youth payment (<18)	64	39	85	57	6	1	4	52	6	3	9	2	14	343	17%
	Young parent payt (<19)	13	10	137	17	6	0	4	40	3	3	15	1	10	259	12%
Not On Main Benefits	Sup only, <1 year	139	195	229	269	46	8	35	393	36	62	74	4	77	1,567	
	Sup only, >1 year	316	487	539	700	133	20	108	1,013	108	256	169	8	198	4,055	12%
	Orphan only	18	25	21	40	11	1	360	27	6	14	9	0	9	543	
Recent exits	Recent exits, <1 year	1,106	1,374	1,198	1,854	224	44	178	1,237	170	78	207	31	372	8,074	14%
	Total	5,352	8,057	10,092	23,753	2,016	186	1,477	9,323	1,950	813	1,097	134	2,801	67,049	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.

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

Change		Total benefit payments ($m)														Change on base
		JS-WR	JS-HCD	SPS	SLP-HCD	SLP-Carer	EB	ORP	AS	DA	CDA	CCS	EI	HS	Total	
Transition from SPS rate	-5%	4,920	7,255	9,844	21,042	1,813	169	1,317	8,600	1,739	756	1,026	125	2,553	61,159	0.8%
	5%	4,879	7,249	9,044	21,003	1,809	170	1,438	8,431	1,724	751	1,034	123	2,502	60,156	-0.8%
Transition from JS-WR rate	-5%	5,207	7,268	9,424	21,053	1,808	168	1,314	8,568	1,736	752	1,025	127	2,546	60,995	0.6%
	5%	4,669	7,270	9,430	21,068	1,812	169	1,306	8,480	1,734	751	1,027	122	2,521	60,360	-0.5%
Transition from JS-HCD rate	-5%	4,889	7,651	9,401	21,027	1,809	168	1,311	8,581	1,746	752	1,026	124	2,549	61,034	0.6%
	5%	4,968	6,931	9,449	21,048	1,811	171	1,306	8,474	1,722	753	1,029	124	2,516	60,304	-0.6%
Transition from SLH rate	-5%	4,919	7,254	9,423	21,373	1,810	169	1,321	8,550	1,753	753	1,027	124	2,544	61,019	0.6%
	5%	4,944	7,297	9,447	20,707	1,804	169	1,306	8,500	1,712	752	1,026	125	2,520	60,308	-0.6%
Transition from NOB rate	-5%	4,779	7,056	9,272	20,764	1,775	162	1,281	8,342	1,707	740	1,015	121	2,478	59,491	-1.9%
	5%	5,081	7,478	9,593	21,346	1,845	175	1,341	8,709	1,762	764	1,038	128	2,587	61,847	2.0%

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

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APPENDIX M   OTHER ONE-WAY TABLES

M.1   Current client liability by age at valuation date

Group	Number of clients	JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	Loa+Exp (a) ($m)	Total ($m)
16-17	3,700	76	47	140	261	8	1	5	85	14	5	16	2	22	87	771
18-19	20,235	288	232	637	691	46	6	27	363	47	22	76	10	95	324	2,863
20-24	74,437	858	875	2,549	2,320	206	24	119	1,445	184	108	315	32	381	1,202	10,618
25-29	69,566	722	887	2,263	2,382	243	24	140	1,435	208	138	284	25	386	1,166	10,302
30-34	62,169	595	850	1,559	2,309	239	21	141	1,221	202	136	172	17	336	995	8,793
35-39	58,378	548	907	1,044	2,456	245	19	162	1,065	209	127	91	13	312	919	8,117
40-44	62,018	568	1,005	677	2,900	272	19	194	1,013	243	113	43	11	319	941	8,316
45-49	58,911	506	959	348	2,875	254	17	201	824	238	66	17	8	282	841	7,435
50-54	53,971	395	805	141	2,557	179	15	176	602	206	26	7	4	222	681	6,018
55-59	47,283	258	517	48	1,703	94	13	110	349	136	8	3	2	133	431	3,805
60-64	45,738	117	186	14	602	25	9	34	118	48	2	1	0	44	153	1,353
All	556,406	4,930	7,269	9,420	21,055	1,810	168	1,309	8,521	1,734	752	1,026	124	2,532	7,740	68,390

Notes:
(a) Loans and expenses allocated proportionally

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

Group	Number of clients	JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	Loa+Exp (a) ($m)	Total ($m)
<1yr	120,394	1,506	1,856	2,036	2,758	311	47	224	1,856	251	137	253	39	512	1,504	13,289
1-2 yr	57,589	568	871	1,200	1,643	180	21	135	994	147	91	142	15	271	801	7,078
2-3 yr	35,253	311	528	836	1,237	133	12	97	653	107	65	90	8	181	543	4,800
3-4 yr	27,071	219	401	671	1,079	107	8	85	518	92	53	67	6	146	440	3,891
4-5 yr	22,020	167	318	560	979	91	6	70	424	83	46	53	5	122	373	3,298
5-6 yr	20,514	153	297	522	972	93	6	67	398	82	43	47	4	116	357	3,157
6-7 yr	20,017	155	301	524	1,031	100	5	69	406	87	44	45	4	121	369	3,261
7-8 yr	15,665	116	225	395	933	78	4	57	321	77	36	33	3	98	303	2,678
8-9 yr	12,028	85	167	269	755	60	3	43	240	62	28	22	2	75	231	2,041
9-10 yr	10,503	76	144	230	694	55	2	37	209	56	24	17	2	66	206	1,818
10-15 yr	34,087	250	454	655	2,615	187	8	126	668	210	69	44	5	222	703	6,214
15-20 yr	19,072	145	246	261	1,799	106	4	64	351	137	27	14	2	126	419	3,701
20-25 yr	29,474	168	247	168	3,004	115	4	82	377	197	20	7	2	148	579	5,118
25+ yr	298	2	2	1	16	5	0	2	3	2	0	0	0	2	4	39
Off benefits	132,421	1,009	1,210	1,093	1,541	193	40	151	1,102	143	70	192	29	328	906	8,005
All	556,406	4,930	7,269	9,420	21,055	1,810	168	1,309	8,521	1,734	752	1,026	124	2,532	7,740	68,390

Notes:
(a) Loans and expenses allocated proportionally

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M.3 Current client liability by region

Group	Number of clients	JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	Loa+Exp (a) ($m)	Total ($m)
Northland	28,141	356	459	635	1,097	113	9	97	434	88	30	50	8	160	451	3,987
Auckland	188,255	1,330	2,607	3,011	5,528	724	52	327	3,350	453	235	294	34	873	2,402	21,220
Waikato	45,238	436	601	857	1,945	151	14	119	689	156	60	99	13	231	685	6,055
East Coast	32,695	326	396	710	1,513	142	16	123	478	109	63	98	12	161	529	4,675
Bay of Plenty	51,796	579	783	1,087	1,634	196	21	183	823	131	66	125	14	216	748	6,605
Taranaki	24,560	290	314	458	1,190	80	8	80	330	83	42	46	6	101	386	3,414
Central	36,421	365	450	596	1,717	112	11	97	524	140	63	83	9	167	553	4,885
Wellington	44,205	512	515	660	1,652	116	14	84	619	149	58	80	13	181	594	5,249
Nelson	21,147	181	249	315	773	36	5	42	302	74	24	29	4	96	272	2,401
Canterbury	43,012	200	476	573	2,133	86	8	83	536	179	63	71	6	206	590	5,210
Southland	36,310	353	417	517	1,521	56	9	74	425	143	48	51	6	137	480	4,238
Australia	4,626	1	2	0	351	0	0	1	9	31	0	0	0	4	51	451
All	556,406	4,930	7,267	9,419	20,704	1,810	168	1,309	8,511	1,703	752	1,026	124	2,528	7,689	68,390

Notes:

(a) Loans and expenses allocated proportionally

M.4 Current client liability by youngest child age, current SPS clients

Group	Number of clients	JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	Loa+Exp (a) ($m)	Total ($m)
0-2	28,408	266	296	2,801	498	177	10	109	974	88	97	238	14	265	744	6,577
3-4	16,215	153	176	1,354	297	103	6	64	511	52	53	95	7	140	384	3,394
5-6	11,104	112	131	819	217	73	4	46	325	37	33	48	4	91	248	2,188
7-8	8,047	90	104	517	166	52	3	33	218	28	21	24	3	63	169	1,493
9-10	6,339	83	93	337	139	41	3	27	155	22	14	13	2	47	125	1,101
11-12	5,477	91	92	207	124	33	2	22	118	18	10	8	2	38	98	862
13-14	2,885	63	57	64	71	15	1	11	55	10	4	3	1	19	48	422
All	78,475	858	949	6,100	1,513	494	31	313	2,357	254	231	429	32	662	1,815	16,037

Notes:

(a) Loans and expenses allocated proportionally

M.5 Current client liability by incapacity type, current SLP-HCD clients

Group	Number of clients	JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	Loa+Exp (a) ($m)	Total ($m)
Accident	4,500	7	16	6	542	2	0	7	60	38	2	1	0	28	90	798
Cancer	3,060	4	8	4	193	1	0	3	24	15	1	1	0	13	34	302
Cardio	7,364	6	15	4	558	2	0	12	60	40	2	1	0	30	93	824
Immune	3,853	4	11	3	348	1	0	7	39	27	1	1	0	19	59	519
Infectious	986	1	3	1	107	0	0	1	13	9	0	0	0	6	18	161
Musc-skel	10,983	9	25	6	1,005	3	0	18	113	84	3	2	0	58	169	1,496
Nervous Sys	7,754	9	19	7	1,039	3	0	8	101	74	3	3	0	42	167	1,475
Other dis	9,014	13	24	12	1,458	3	1	11	141	103	4	4	1	57	234	2,064
Pregnancy	17	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
Psych/hndcp	41,206	57	131	39	6,857	13	2	33	673	322	16	15	2	220	1,069	9,449
Respiratory	3,164	3	8	2	252	1	0	6	28	19	1	1	0	15	43	378
Sensory	2,933	3	6	3	409	1	0	4	43	27	1	1	0	15	66	579
Substance	1,756	3	8	2	216	1	0	2	27	16	1	0	0	12	37	324
All	96,590	117	274	89	12,985	30	5	112	1,322	775	34	31	5	515	2,079	18,373

Notes:

(a) Loans and expenses allocated proportionally

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M.6   Current client liability by incapacity type, current JS-HCD clients

Group	Number of clients	Benefit payment													Loa+Exp (a)	Total
		JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	($m)	($m)
Accident	5,654	52	220	34	203	10	2	8	94	19	3	4	1	31	87	768
Cancer	1,234	5	32	3	32	1	0	1	13	3	0	0	0	5	12	110
Cardio	3,888	18	126	9	111	5	1	6	44	10	1	1	0	15	44	391
Immune	3,664	21	150	12	116	6	1	6	52	11	1	1	0	17	50	443
Infectious	850	7	34	4	32	1	0	1	14	3	0	0	0	5	13	116
Musc-skel	12,108	68	476	37	374	16	3	16	171	40	4	4	2	58	162	1,428
Nervous Sys	2,228	18	93	15	106	4	1	3	41	10	1	2	1	13	39	347
Other dis	3,753	29	141	27	140	6	1	6	64	14	2	3	1	21	58	515
Pregnancy	1,256	14	22	92	28	6	1	4	37	4	3	9	1	11	29	260
Psych/hndcp	30,465	269	1,335	277	1,331	57	7	45	617	138	21	30	8	205	554	4,895
Respiratory	1,938	11	76	7	69	3	0	4	28	7	1	1	0	10	28	244
Sensory	899	6	34	4	30	2	0	1	14	3	0	0	0	4	12	110
Substance	3,912	43	201	32	178	7	1	5	84	18	2	3	1	29	77	681
All	71,849	560	2,939	554	2,751	123	18	105	1,273	280	40	58	16	424	1,167	10,309

Notes:
(a) Loans and expenses allocated proportionally

M.7   Current client liability by partner, current JS-WR, JS-HCD, SLP-HCD and EB clients

Group	Number of clients	Benefit payment													Loa+Exp (a)	Total
		JS-WR ($m)	JS-HCD ($m)	SPS ($m)	SLP-HCD ($m)	SLP-Carer ($m)	EB ($m)	OB ($m)	AS ($m)	DA ($m)	CDA ($m)	CCS ($m)	EI ($m)	HS ($m)	($m)	($m)
EB, no ptnr	2,646	32	32	26	50	5	16	10	30	5	2	4	1	10	28	250
EB, ptnr	1,509	12	12	13	18	3	9	2	14	2	1	2	0	4	12	104
SLP-HCD, no ptnr	79,584	85	201	51	11,640	20	3	79	1,151	687	24	23	4	441	979	15,388
SLP-HCD, ptnr	17,006	33	73	38	1,345	11	2	33	171	87	9	8	1	74	187	2,072
JS-HCD, no ptnr	57,674	473	2,483	460	2,316	101	13	84	1,062	238	30	47	13	355	954	8,628
JS-HCD, ptnr	14,175	87	456	95	436	23	4	22	212	42	10	12	2	69	229	1,697
JS-WR, no ptnr	75,413	1,835	1,281	886	1,428	177	29	127	1,085	132	47	92	33	324	1,839	9,314
JS-WR, ptnr	18,994	364	277	284	326	48	8	38	278	31	19	31	7	81	240	2,034
All	267,001	2,920	4,815	1,852	17,557	387	85	396	4,003	1,225	142	218	61	1,358	4,469	39,487

Notes:
(a) Loans and expenses allocated proportionally

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APPENDIX N PROJECTED NUMBER OF CLIENTS AND PAYMENTS

Projected numbers and payments are included as an electronic Appendix N.

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