Ministry of Social Development

&

The Treasury

New Zealand

Actuarial valuation of the Benefit System
for Working-age Adults
as at 30 June 2013

Alan Greenfield
Fellow of the Institute of Actuaries of Australia

Dr Hugh Miller
Fellow of the Institute of Actuaries of Australia

Dr Gráinne McGuire
Fellow of the Institute of Actuaries of Australia

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1   EXECUTIVE SUMMARY

A sustainable view: reducing long term welfare dependency

In April 2010, The Welfare Working Group (WWG) was established by Cabinet to conduct a fundamental review of the New Zealand welfare system and develop options to reduce long-term dependency. A February 2011 report of the WWG made the key recommendation that the reforms take a long-term view:

"The welfare system needs to recognise the value of investing early to reduce the long-term social, economic and fiscal costs of welfare dependency. Adopting an actuarial approach to measuring the forward liability will therefore be an important feature of any reform."
(from page 2 of the WWG Report)

In November 2011, the Government announced significant reforms to New Zealand's Social Welfare system, to take place over three years. The new strategy is focused on returning people to work via an 'investment approach', focusing resources where returns were likely to be greatest. The approach will result in early intervention and support to young people at the time of their entry into the welfare system and more intensive support for people who are capable of working, but otherwise likely to remain on benefit.

This actuarial valuation report forms part of this new approach. It projects lifetime patterns of benefit receipt to provide insight:

- Into MSD's performance in managing the benefit system
- To better target future investments to reduce long-term benefit receipt.

The valuation is intended to inform MSD's implementation of the investment approach and, as a result, help reduce the negative consequences of long-term benefit dependency.

Inside this report

This report provides the results of the third annual valuation of the NZ Social Welfare system. It estimates the lifetime cost of clients in the welfare system as at 30 June 2013. It provides:

- A time series to examine movements from year to year and to compare actual experience to forecast

- Liability results split out at a segment level, to help the Ministry of Social Development (MSD) understand how different parts of the welfare population have evolved during the past year.

This is the first valuation to measure and record the impact of Welfare Reform policy and operational changes introduced in 2012/13.[1] These include the introduction of:

- The Youth Service, in August 2012, to improve training and education outcomes for Youth 16-17, Young Parents 16-18, and youth not engaged in employment or training (NEETs)

- New work obligations for some clients, including sole parents with school-aged children from October 2012

- The trial of a new service delivery model in 24 sites providing more intensive work-focused case management for clients at risk of long-term benefit receipt.

The valuation also captures the continuing impact of the Future Focus reforms of September 2010.[2]

What is meant by 'liability'?

The definition of the 'current client liability', that is the life-time cost of current clients, to be valued as adopted by MSD and the Treasury to best capture the policy intent of the long-term investment approach, is:

All future lifetime costs of 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.

'Future client liability', which relates to clients entering the welfare system for each of the five years following the date of the valuation, is:

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 one year at the previous 30 June.**

Inside this summary

1.1   Results and findings

This summary focuses on results and findings. It provides an overview of significant issues and links to the detail inside the report. It is broken into the following sections:

- Results and findings, in a series of 'Snapshots' covering:
  - How the current liability has changed from 2012 to 2013
  - Some comparisons of actual with expected experience
  - The significance of age at entry to the welfare system

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[1] http://www.msd.govt.nz/about-msd-and-our-work/work-programmes/welfare-reform/
[2] http://www.msd.govt.nz/about-msd-and-our-work/newsroom/factsheets/future-focus/

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- How liabilities differ by client segment
- Key definitions and bases
- Reliances and limitations

1.1.1   Snapshot 1: current client liability

> **The current liability (lifetime cost of benefits for current clients) is lower than expected. The inflated and discounted estimate of the current client liability as at 30 June 2013 is $76.5B.**

Figure 1.1 **Movement from the 2012 current client liability to the 2013 current client liability[3]**
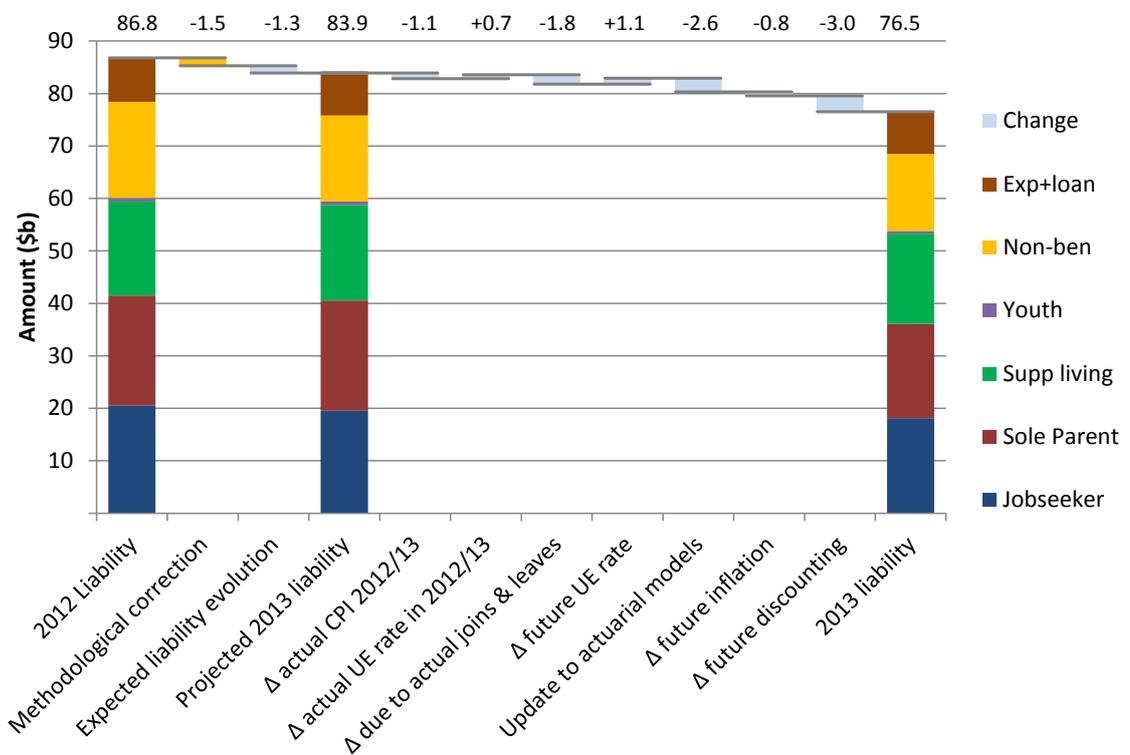
Note: Δ represents change

This valuation finds a reduction in the lifetime cost of benefits for current clients. The liability has decreased from the $86.8B, reported as at 30 June 2012.

Taylor Fry expected the current client liability at June 2013 to be $83.9B, but the actual liability is $76.5B, which is $7.4B lower than expected. The apportioning of this change is given in Figure 1.1, above. The coloured components in the figure correspond to groupings of MSD's segments, introduced in Section 2.10.

In order to analyse changes in the liability from the previous valuation to the current valuation, we:

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[3] This chart is a combination of Figure 5.1 and Figure 5.2 in the main body of the report

- First determined what the liability was expected to be, based on the forecasts made previously
- Then determined how actual experience differed from expected and the impact this has had.

We note the following.

Methodological correction and expected movements

- A total of $1.5B of liability has been removed due to the methodological correction, discussed in Section 16.4.1.
- We expected the liability to decrease by a further $1.3B over 2012/13. This was partly attributable to the lower forecast unemployment rate. This led to an expected liability at 30 June 2013 of $83.9B.

Unemployment rate and other economic impacts

- The CPI rate for 2012/2013 was lower than expected (-$1.1B) and the unemployment rate over that period was slightly higher than expected (+$0.7B).
- The forecast unemployment rate has risen for the next five years after the valuation date, increasing the liability by $1.1B.
- The combined changes to future inflation and discount rates (which are outside of MSD management's control) have decreased the liability by $3.8B. This was due to lower forecast inflation ($0.8B) and higher forecast investment returns ($3.0B).

Actual and forecast client movements

- The liability was reduced by $1.8B due to a lower number of clients than expected (more 'leaves' and fewer 'joins'). This was primarily driven by lower than expected numbers on the Unemployment Benefit, Domestic Purposes Benefit and Widow's Benefit. It is probable that policy and operational changes contributed to this reduction in liability — in particular, the revised work requirements in the October 2012 reforms and the piloting of the new service delivery model. See Sections 3 and 5.3 for further information.
- We have updated the transition and payment models to reflect emerging experience, particularly with respect to lower rates of client re-entry into the welfare system. This has had a significant impact on the valuation, decreasing it by $2.6B. The changes are discussed in detail in Section 5.4.

Further details on the analysis of change are provided in Section 5.

MSD is most able to influence the number of leaves and joins and changes to future behaviour, which impacts changes to actuarial models. Combined, these represent a $4.4B reduction in the liability. The following chart gives a split by client segment of the $1.8B reduction due to higher than expected leaves and lower joins.

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Figure 1.2 Change in liability due to joins and leaves being different to expected, by segment. Segments split by continuous duration have been combined
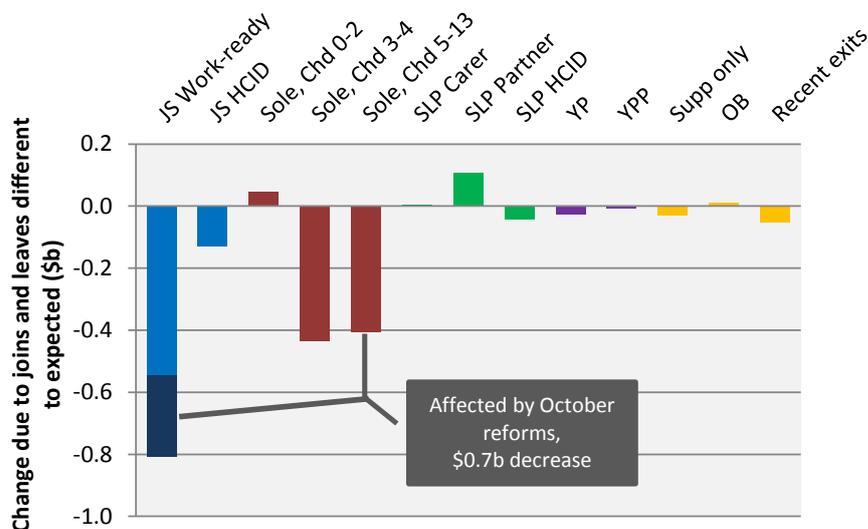
Almost all the reduction arises from Sole parents (including those with children 14 and older who are included in the Jobseekers segment) who collectively account for $1.1B of the reduction and other Jobseekers who account for a further $0.7B.

The $2.6b reduction due to updated actuarial models is discussed in detail in Section 5.4. The two largest effects of the change to the model are the:

- Lower assumed rate of re-entry into the welfare system for people who have recently stopped receiving benefits
- Lower projected rate of average Tier 1 benefit levels for Domestic Purposes Benefit (DPB) clients. As explained in Section 5.4.2 the lower trend observed in the last year or two is likely to be related to an increase in the number of clients receiving part-time work income following a reduction in the number of those clients leading up to the Global Financial Crisis.

The liability subdivided by benefit type is shown in Table 1.1. The table also shows the movement in liability due to the methodology change and movement due to the change in inflation and discount rates.

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Table 1.1 **Current client liability for 2012 and 2013, with impact of methodology, inflation and discounting changes separated out**

	Component	2012 current client liability ($b)	2012 CL after method-ological correction ($b)	2013, before Infl. & disc. change ($b)	2013 current client liability ($b)
Tier 1:	Domestic Purposes Benefit	18.7	18.4	15.7	15.1
	Invalid's Benefit	22.8	22.5	22.5	21.4
	Sickness Benefit	8.8	8.6	8.4	8.0
	Unemployment Benefit	3.9	3.8	3.4	3.3
	DPB-Care of the sick and infirm	2.1	2.0	1.9	1.8
	Emergency Benefit	0.3	0.3	0.3	0.3
	Orphans and unsupported children	1.5	1.5	1.5	1.4
	Woman Alone / Widows Benefit	2.0	2.0	1.5	1.5
	Tier 1 subtotal	**60.1**	**59.1**	**55.3**	**52.7**
Tier 2:	Accommodation Supplement	11.1	10.9	9.8	9.4
	Disability Allowance	2.1	2.0	1.9	1.8
	Child Disability Allowance	1.0	1.0	0.8	0.8
	Child Care Subsidy	1.2	1.2	1.1	1.1
	Tier 2 subtotal	**15.3**	**15.0**	**13.7**	**13.1**
Tier 3:	Hardship payments	2.9	2.8	2.7	2.6
	Employment Interventions	0.2	0.2	0.1	0.1
	Tier 3 subtotal	**3.0**	**3.0**	**2.8**	**2.7**
Other components:	MSD Expenses	8.0	7.8	8.1	7.7
	Net loans cost	0.4	0.4	0.4	0.4
	Other components subtotal	**8.4**	**8.2**	**8.5**	**8.1**
	Grand total	**86.8**	**85.3**	**80.3**	**76.5**

1.1.2 Snapshot 2: comparison of actual and expected experience in 2012/13

> **Actual payments were lower than expected. Combining both payments made to beneficiaries in the current and future client liabilities, we expected $6.61B in benefit payments to be made. Actual payments were 2.7%, or $180M, lower than this at $6.43B.**

More than half of this difference relates to lower than expected entries into the welfare system, whether from:

- Payments to clients who were part of the 30 June 2012 current client liability as recent exits from the system ($61m below expected)
- Payments to new clients who were not valued in the current client liability in the previous valuation ($47m below expected).

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Actual and expected payments over the 12 months to 30 June 2013 are shown in Table 3.1.

Increased work availability requirements for the Domestic Purposes Benefit (DPB) were introduced in October 2012, with some equivalent changes to the Widow's Benefit (WB) and Women Living Alone Benefit (WA). This has resulted in a marked change in number of clients on these benefits for the last three quarters of 2012/13, as seen in the figures below.

Figure 1.3 **Actual and expected numbers of clients on DPB, all clients**
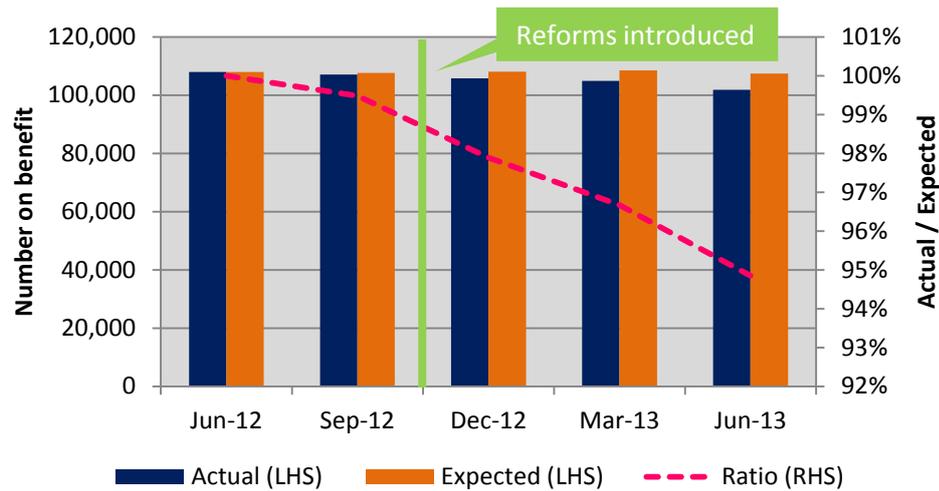
Figure 1.4 **Actual and expected numbers of clients on WA/WB, all clients**
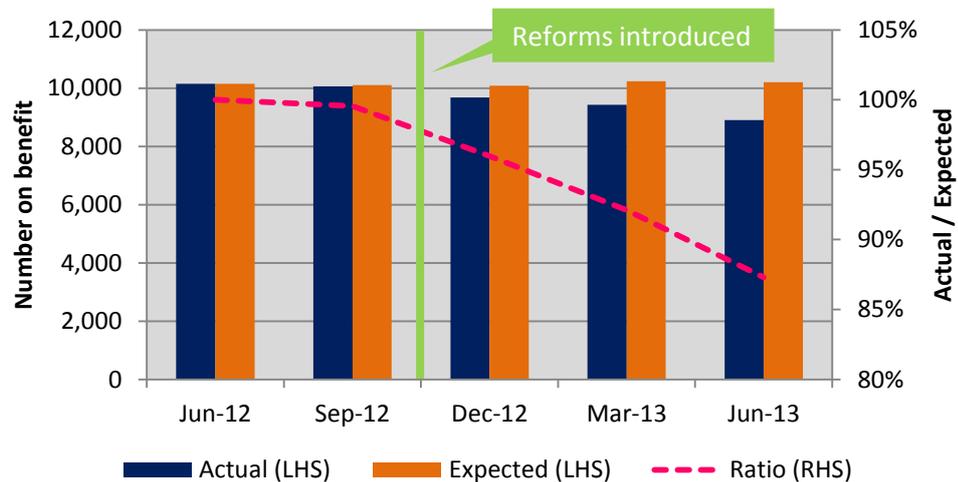
The number of clients on the Unemployment Benefit (UB) was also lower than expected, particularly in the December 2012 quarter.

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Figure 1.5 **Actual and expected numbers of clients on UB, all clients**
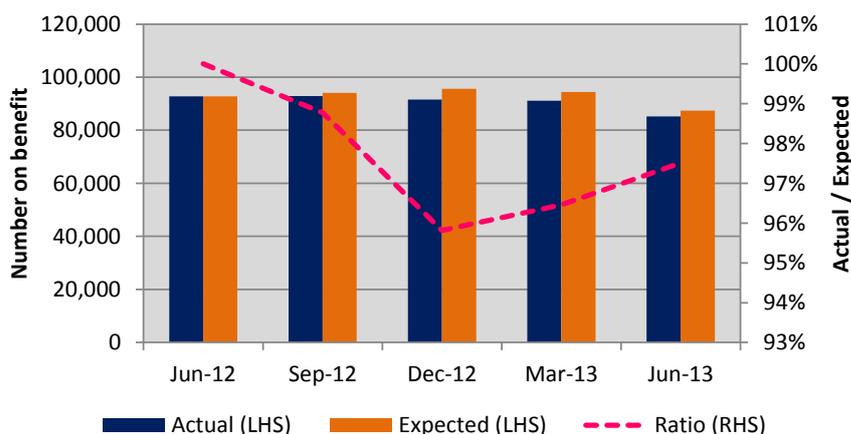
Actual payments were lower than expected across the whole country. However, the total difference was not evenly spread across regions. The Auckland, Canterbury and Southern regions account for 75% of the difference, despite representing only 50% of the aggregate payments – see Figure 1.6.

The largest differences were observed in the results for the Unemployment Benefit; the ratios of actual versus expected UB payments in Auckland, Canterbury and Southern regions were 92%, 79% and 92% respectively, compared to the national average of 97%.

Figure 1.6 **Actual and expected payments by client's region (as at June 2012)**
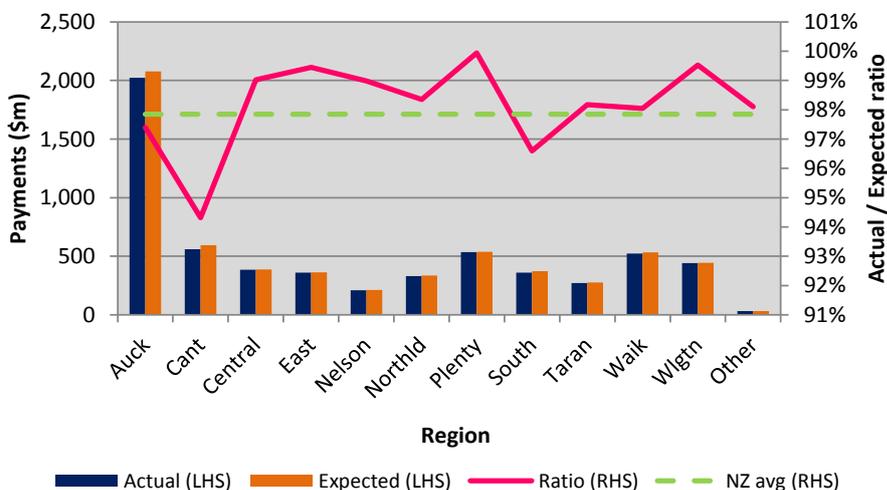
Snapshot 3: age at entry into the welfare system

> **A client's age at entry to the welfare system is a significant factor in a client's estimated lifetime cost. Most of the current liability is attributable to clients who entered the welfare system at a young age.**

Figure 1.7 shows the age at entry for clients aged 30-39 at the valuation date. Of these clients, 62% entered the system on some benefit under the age of 20. Of the total liability

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attached to the 30-39 year old age band, 79% is attributable to those clients who entered before age 20 (up slightly from the previous valuation).

Figure 1.7 **Numbers and liability by age at entry. The left hand chart is the age at entry into the welfare system for clients aged 30-39 at the valuation date. The right hand chart is the relative contribution to lifetime liability of those same clients.**
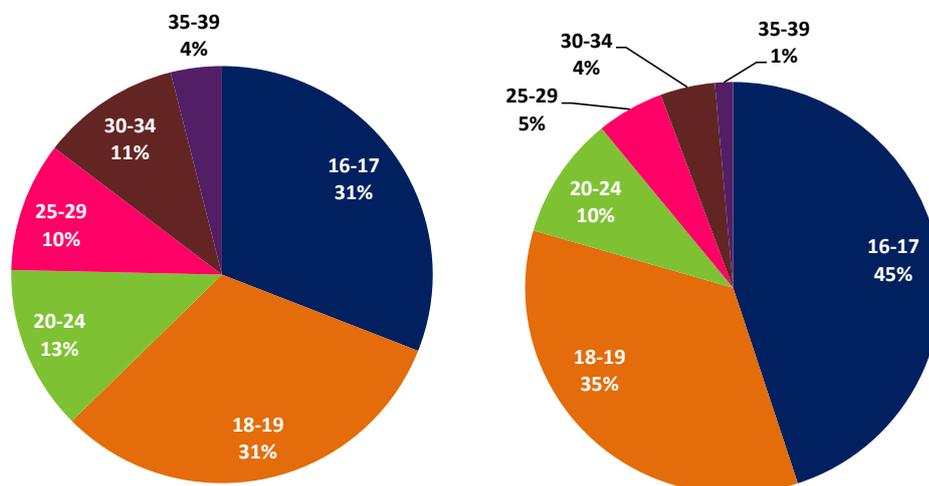
This highlights the importance of the youth segment and the potential long term impacts of early intervention.

Table 1.2 shows the average lifetime liability for different combinations of age at valuation and age at entry into the system. It suggests that age at entry into the system has a far more significant impact on lifetime liability than the age at valuation. The younger a client is when first entering the system, the higher the liability will be at any particular age.

Table 1.2 **Average liability for clients by age at valuation and age at entry into the welfare system, for clients aged less than 40.**

Age at valuation	Age first entering the system					
	16-19	20-24	25-29	30-34	35-39	Average
	$k	$k	$k	$k	$k	$k
16-19	153					153
20-24	177	84				149
25-29	198	105	57			153
30-34	191	111	70	51		150
35-39	185	112	93	67	53	146
Average	184	123	109	93	73	140

Figure 1.8 also shows the impact of young entry into the welfare system. Taylor Fry estimates that about a third of the total liability is attributable to clients that would have entered via a youth segment (see 2.10 for the definition of these segments). A further 40% would have entered before age 20 (but not in a youth segment). The portions above age

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37 have been estimated because the data history is not long enough to determine the date of first benefit for these clients.

Figure 1.8 **Current client liability split by current client age and status when first entering the welfare system (excluding net loans and expenses)**
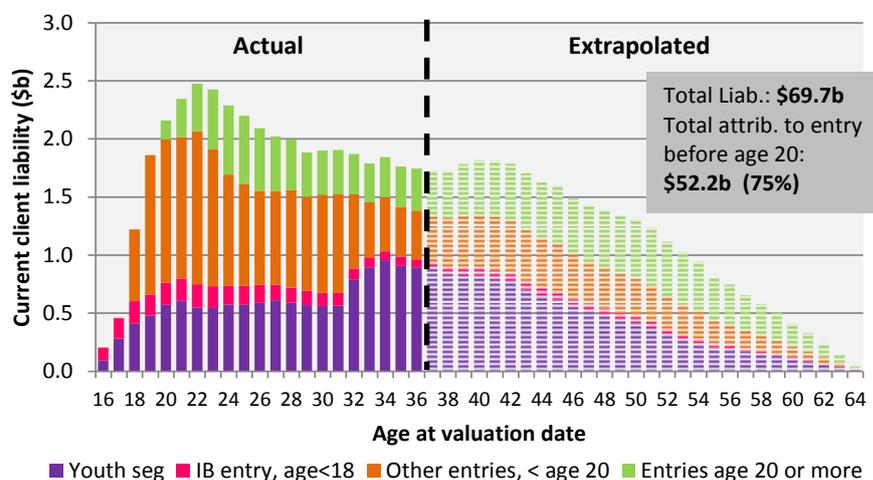
The spike in the liability for clients aged 32 and older observed in Figure 1.8 is most likely due to the numerous reforms to eligibility of 16 to 17 year olds in respect of Training and Sickness Benefits, Independent Youth Benefit, Job Search Allowance, Student Allowances and other related Supplementary Benefits which took effect on 1 January 1998.

Young people also represent a disproportionally high percentage of entries into the welfare system. Figure 1.9 below shows the age distributions for new and returning clients in the 2012/13 year. The grey area in each figure which shows the distribution for all new and returning clients shows that ages 18 to 25 are heavily over-represented in entries into the welfare system. The individual graphs show the distribution for new and returning clients in each of the main benefit types which can be compared to the (grey) distribution of all entrants. The effect is most pronounced in the Unemployment Benefit, where 18 to 25 year olds represent a third of all entries into the benefit.

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Figure 1.9 **Age distributions for future liability clients entering DPB, IB, SB and UB. Grey distribution represents future liability clients across all benefits as a benchmark**
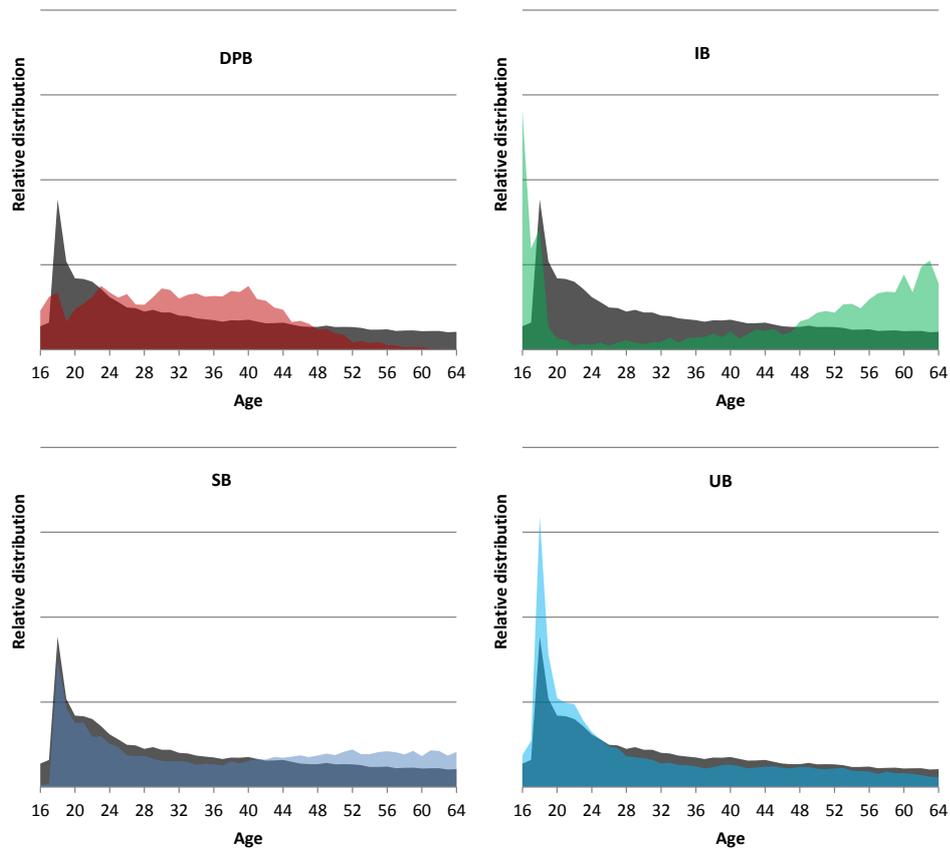
1.1.4   Snapshot 4: segment level results

> **Of the 17 client segments identified by MSD, the three client segment groups with the highest future average cost are Youth segments (particularly the Young Parent Payment), Sole Parents and Supported Living.**

MSD have defined 17 client segments based on benefit type and other characteristics, to allow better monitoring and management of the welfare system. Segmentation, using the 17 MSD categories, is useful to show the very large differences in expected lifetime cost attributable to each group of clients. These are shown in Figure 1.10 below.Figure 1.10

Figure 1.10 **Average lifetime cost per client, excluding net loans and expenses, by segment**
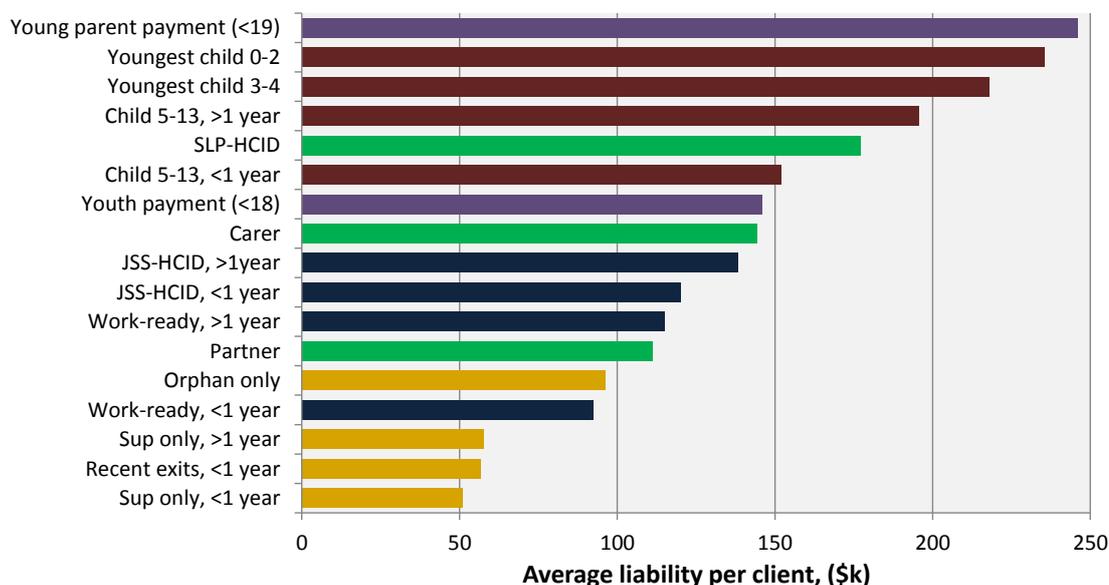
The costs for Youth segments (particularly the Young Parent Payment) are very high due to a combination of these clients' high risk of remaining on welfare and the large number of potential years they have on benefits. The next highest segments relate to Sole Parents, reflecting their tendency to remain on DPB for an extended period and then move on to other benefit types when they leave DPB. Supported Living average costs are also high; they are largest for the "Supported Living Payment - Health condition, Injury or Disability" segment (SLP-HCID, which corresponds to Invalid's Benefit), but lower for carers and partners of those on SLP-HCID. Note that there is still considerable variability within segments; for example, average costs are considerably higher for younger members of the SLP-HCID segment.

Non-beneficiaries segments, which include clients not receiving Tier 1 benefits and those who have recently exited the system, have the lowest average cost, but given their large numbers and the fact that their lifetime cost is about $56,500, their contribution to the overall liability is still substantial.

Monitoring clients who have recently exited the welfare system can also reveal important information. In particular, the rate of re-entry into the welfare system is a key driver of the overall valuation. Figure 1.11 shows the projected benefit segment for clients who have received benefits in 2012/13 but are not on benefits at the valuation date. It shows that just under 25% of these clients are expected to return to some type of benefit by June 2015. This rate is slightly lower than the previous valuation, reflecting a lower rate of client re-entry over the past 12 months.

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Figure 1.11 **Projected benefit state for Recent Exit segment**
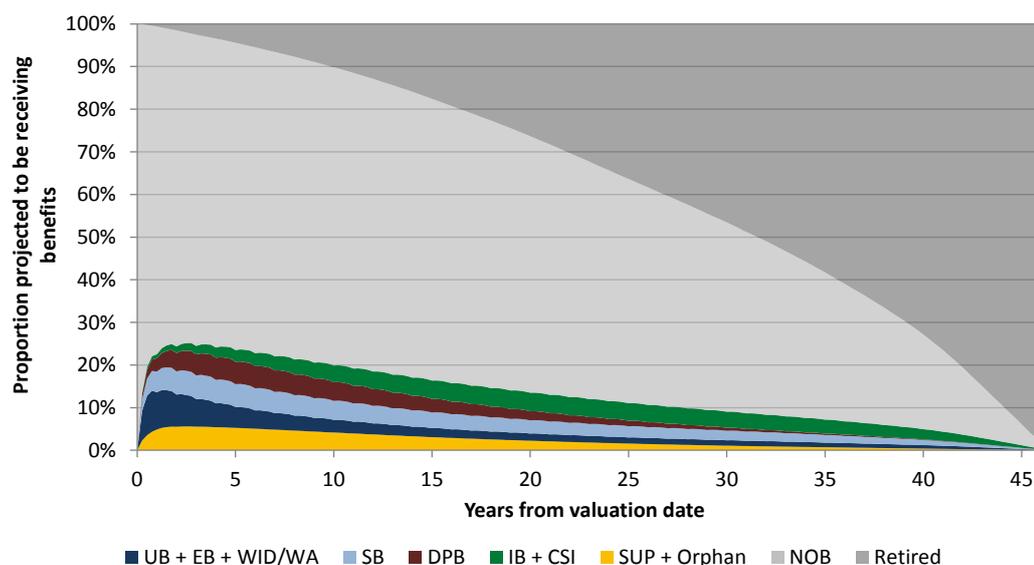
1.2 Key definitions and bases

1.2.1 Definition of the liability — exclusions

The valuation excludes New Zealand Superannuation and other benefits paid to people over the age of 65, as well as payments to students (Student Loans, Student Allowances, as well as Unemployment Benefit Student Hardship). It also excludes some benefits that fall outside of Vote Social Development, in particular Working for Families and Income-Related Rent Subsidies.

A complete listing of benefits within scope is given in Appendix C. Further details on the definition of the liability and the scope of the valuation are provided in Sections 2.5 and 2.6.

1.2.2 Inflation and discount basis

Under accounting and actuarial standards for insurance and accident compensation, liabilities must be estimated allowing for future inflation and the impact of investment return (that is, discounting the estimated future cash flows to allow for the "time value of money"). It is important to estimate liabilities allowing for both future inflation and the time value of money so that investment decisions can be made on a like-for-like basis. E.g. An investment of $100 now to save $150 in 10 years' time would result in a different decision than an investment of $100 now to save $150 next year. Note that such a basis is required whether there is a fund of assets supporting the liability or not.

The valuation uses the Treasury forecasts of the Consumer Price Index (CPI) and Government interest rates for inflation and discounting of the benefit system liability. Details of the assumptions used are provided in Section 17.

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Changes to inflation and discounting assumptions will have a significant impact on the valuation figures from year to year. However, these are outside the control of MSD. For this reason we separate the change in the valuation attributable to these items from other impacts to the valuation.

1.2.3 Uncertainty

The estimation of current and future client liabilities is subject to influences whose effect cannot be determined with complete accuracy. The extent to which the ultimate liability will turn out to differ from any estimate is subject to uncertainty.

Some of the major sources of uncertainty include:

- Future changes in how people move through the welfare system due to policy or behavioural shifts

- Uncertainty related to the economy and the economic forecasts used

- The extent to which the valuation model is an oversimplification of a complex "real-life" system.

Further commentary can be found in Section 6.

1.2.4 Sensitivity

Table 1.3 gives the sensitivities of the total current client liability to changes in the inflation and discount rates. Observe that changes of +/- 1% in these rates have a material impact on the liability.

Table 1.3 **Sensitivity of the total current client liability, excluding net loans cost and expenses, to changes in the inflation and discount rates**

Scenario	Liability ($B)	Change ($B)	Change (%)
Base	68.5		
Inflation + 1%	76.0	7.5	11.0%
Inflation - 1%	62.1	-6.3	-9.3%
Discount rate + 1%	62.1	-6.4	-9.3%
Discount rate - 1%	76.2	7.7	11.3%

Table 1.4 provides the sensitivities of the valuation to changes in the unemployment rates. As expected, the proportionate impact is strongest for the Unemployment Benefit.

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Table 1.4 **Sensitivity of estimated current client liability, excluding loans and expenses, to future unemployment rates**

Change in unemploy-ment rate	Treasury estimate (4.5% long term rate)	3.5% long term unemployment rate		5.5% long term unemployment rate		6.5% long term unemployment rate	
	Liability ($b)	Liability ($b)	Change	Liability ($b)	Change	Liability ($b)	Change
DPB	15.1	14.6	-3.3%	15.6	3.5%	16.1	7.1%
IB	21.4	20.9	-2.4%	21.8	1.9%	22.0	3.1%
SB	8.0	7.4	-7.9%	8.7	8.5%	9.5	18.5%
UB	3.3	2.8	-15.1%	3.9	19.2%	4.6	41.6%
Other Tier 1	4.9	4.6	-6.0%	5.2	6.0%	5.6	12.6%
Tier 2	13.1	12.5	-4.1%	13.6	4.2%	14.2	8.9%
Tier 3	2.7	2.6	-4.7%	2.8	4.9%	3.0	10.1%
Total	**68.5**	**65.4**	**-4.5%**	**71.7**	**4.7%**	**75.1**	**9.7%**

Table 1.5 provides the sensitivities of the current client liability to changes in the probability of moving off the current benefit, for the most significant benefit categories. For example, if the probability of moving off benefit decreases by 5% for all key Tier 1 benefits, the liability for those benefits increases by 2.4%. Note that while a reduction in the probability of moving off one benefit type implies that there will be more clients remaining on that benefit, it also means that there will be fewer clients transitioning to other benefits.

Table 1.5 **Sensitivity of current client liability valuation results (inflated and discounted) to changes in the probability of moving off the current benefit**

Probability changed	Change in probability of moving off/onto benefit	
	5% decrease	5% increase
All key tier 1	2.4%	-2.3%
Off DPB	1.0%	-0.9%
Off IB	0.5%	-0.5%
Off SB	0.6%	-0.5%
Off UB	0.4%	-0.3%
Off SUP	-0.1%	0.1%
Onto benefit (=off NOB)	-2.1%	2.1%

1.3   Reliances and limitations

In preparing this report we have relied on historical data and other quantitative information provided by MSD without audit or independent verification, though we have carried out internal consistency checks and some checks of the data against external sources for reasonableness in aggregate. Any material discrepancies in the data should be reported to us to enable us to consider whether this report should be amended accordingly. This year there have also been data quality issues related to the education

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data held by MSD and distinguishing between youth program benefit types, discussed in Sections 16.3.4 and 15.4.3 respectively. We have attempted to address these issues appropriately in our analysis.

There is an inherent limitation on the accuracy of liability estimates in this report caused by the fundamental uncertainty of attempting to predict the future. In our opinion, we have used techniques and assumptions which are appropriate, and the conclusions presented in this report are reasonable, given the information currently available. However, it should be recognised that the ultimate costs for the current and future client liability cohorts can be expected to differ, probably materially, from our estimates of those costs.

It is also worth noting that this is only the third time that a formal actuarial valuation of the NZ Social Welfare liabilities has been carried out. The benefits and data are complex and there have been recent legislative and operational changes, and inevitably more uncertainty arises than if there was an existing valuation framework and projections requiring only incremental re-calibration. Over time as more valuations are carried out this aspect of uncertainty will reduce.

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2   INTRODUCTION AND BACKGROUND

2.1   Introduction

The Welfare Working Group ("WWG") was established by Cabinet in April 2010 to conduct a fundamental review of the welfare system and develop options to reduce long-term dependency with a focus on:

- Improving work outcomes for sole parents and for people with disabilities and ill health

- How welfare should be funded and any lessons from the insurance industry and ACC in managing forward liability

- Whether the structure of the benefit system contributes to long-term dependency

Their February 2011 report recommended a comprehensive set of 43 recommendations to the Government. At a high level, the WWG recommended a work-focused welfare system, with a cross-government emphasis on preventing the need for welfare use, with targets and accountability mechanisms to reduce future payments.

A key theme of the report is the recommendation to take a long term view:

"The welfare system needs to recognise the value of investing early to reduce the long-term social, economic and fiscal costs of welfare dependency. Adopting an actuarial approach to measuring the forward liability will therefore be an important feature of any reform." (from page 2 of the WWG Report)

Recommendation 31 of the WWG Report states that *"the new work-focused welfare system should manage the performance of the system using a regularly estimated actuarial calculation of the forward liability".*

Taylor Fry Consulting Actuaries ("Taylor Fry") provided advice to the Ministry of Social Development ("MSD") and The Treasury in our "feasibility report" titled "Actuarial advice of feasibility: A long-term approach to improving employment, social and financial outcomes from welfare benefits and services" dated 27 October 2011 and authored by Alan Greenfield[4].The feasibility report found that an investment approach in the welfare context based on an actuarial valuation of lifetime costs for benefit recipients was novel, but feasible using best practice from social insurance and the insurance industry. The report recommended a three-level framework, shown in Figure 2.1.

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[4] http://www.msd.govt.nz/documents/about-msd-and-our-work/publications-resources/evaluation/taylor-fry-ia-feasibility/taylor-fry-feasibility-of-an-ia-for-welfare-report.pdf

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Figure 2.1 **Proposed three-level framework, 2011 feasibility report**
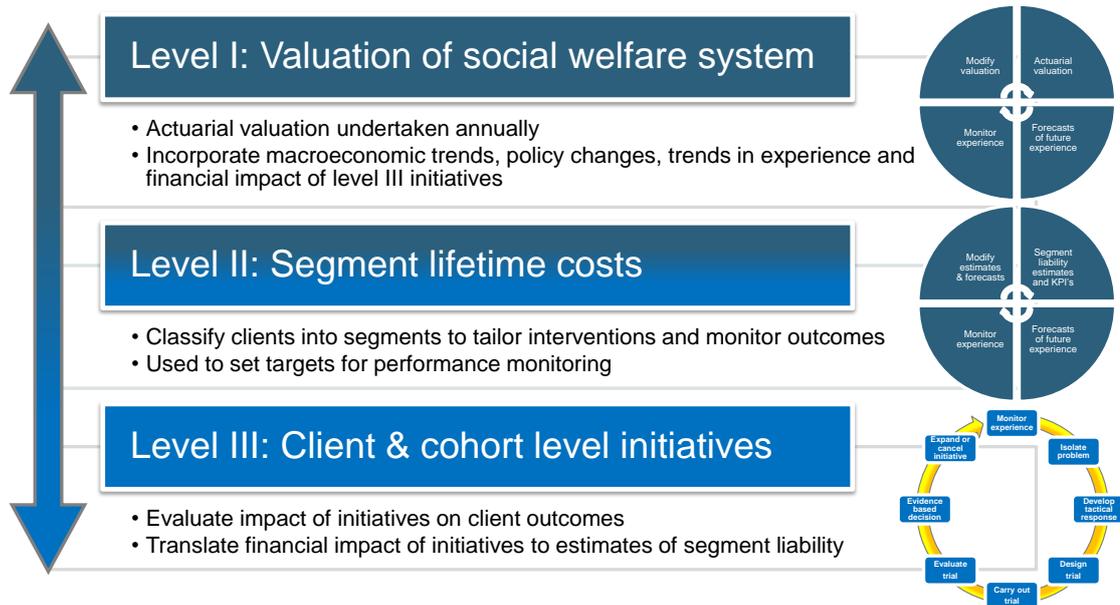
In November 2011, the Government announced reforms to the New Zealand welfare system to be staged over three years, with the primary aim of getting people off welfare and into work. This coincided with the adoption of a long-term investment approach to welfare. Taylor Fry was commissioned to undertake the first actuarial valuation of the NZ Social Welfare system. This report valued the welfare system as at 30 June 2011 and was publically released in September 2012[5].

Subsequently, the Government passed a series of legislative reforms under the title of Welfare Reform[6]. The legislation includes simplified benefit categories, a greater work focus, new expectations for partners of beneficiaries and work preparation activities. These changes are discussed further in Section 2.4. Taylor Fry also performed a valuation of the welfare system as at 30 June 2012 (the 'previous valuation'), with the report publically released in September 2013[7]. The 2012 valuation preceded the impact of the majority of these changes.

2.2   Development of the 2013 valuation

This is the third valuation of the NZ Social Welfare system and estimates the lifetime cost of clients in the welfare system as at 30 June 2013. It reflects the initial impacts of the Welfare Reform policy and operational changes introduced over the 2012/13 year. It also serves as a baseline for the remaining changes taking place in the 2013/14 financial year,

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and to better understand ongoing performance thereafter. See Section 2.4 for further information on Welfare Reform.

The time series nature of successive valuations allows us to examine movements from year-to-year, and to compare actual experience to forecast. In particular, in this report, more attention has been given to how the clients have moved through different 'segments' of the welfare system compared to previous forecasts. It also includes an early assessment of the impact of policy and operational changes that have been applied to:

- Youth Payment and Young Parent Payment (August 2012)
- Sole Parents and related changes to Women's Alone Benefit and Widow's Benefit (October 2012)

As with the 2012 valuation, the current report spans both Level I and Level II of the framework presented in Figure 2.1. The segment level component of the report gives us a picture of clients' life-time transitions through the benefit system, including take-up of second and third tier assistance, and expected transfers to other benefit types. Work and Income can use this information to target employment and work-readiness services to reduce long-term benefit receipt, and by extension, the future cost of the benefit system. Annual valuations will continue to tell a performance story about how effectively Work and Income is managing the future cost of the benefit system.

2.3   Purpose of the valuation

In the insurance context valuations of outstanding claims liabilities are required to ensure the financial solvency of the insurer or scheme. They are also carried out as a means of analysing the underlying cost of the insurance to inform the pricing and ongoing management of the portfolio.

In the context of the New Zealand benefit system there is no requirement to ensure solvency. However, the other applications noted above have relevance in the welfare context. In particular an actuarial valuation will bring a long-term perspective to the financial management of the benefit system by providing a detailed understanding of:

- The future cost of the system
- The lifetime cost of segments in the system (e.g. those entering at age 16 and 17)
- The long-term financial effects of changes to the system, for example:
    - Policy reform
    - Operational changes
    - Demographic changes
    - Economic changes
- Key drivers which affect the future costs of the system, e.g. duration on benefits, age, etc.

This detailed understanding can be used to bring a long-term perspective to managing the system, for example:

- Investment decisions (based on cost-benefit analyses) in relation to return to work measures for particular client groups can be carried out with an understanding of the long-term cost

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- Costings of policy reforms and operational changes can consider the long-term financial impact

- The valuation can inform an internal framework for accountability based on managing the influence of the drivers of the liability that management are able to influence

- Monitoring of actual experience in comparison to forecasts from the valuation can alert managers to first signs of changing costs and assist in developing appropriate responses

2.4 Policy changes since the previous valuation

2.4.1 Reforms implemented in 2012/13

The valuation result will partly reflect the changes in the welfare system that have occurred due to reforms implemented in the 2012/13 year. There were two major rounds of reform which are described below. There have also been significant changes in behaviour for both youth and DPB following these reforms. The changes are discussed at various points in the report, including Sections 4 and 5.

Some of the improved experience in 2012/13 is associated with policy changes, and some likely due to operational changes and the new service delivery model. At this stage, it is difficult to isolate the impact of operational changes relative to the significant policy changes. Following the remainder of Welfare Reform policy changes in 2013/14 and in the absence of further legislative change, ongoing performance improvements in experience are expected to be driven primarily from improved operational performance.

Youth Service

A new program to help young people find options for education, training and work-based learning was introduced in August 2012. This is expected to impact the path of some young people through the welfare system. Changes include:

- Incentive payments for attending activities such as parenting courses and health checks
- Childcare assistance for education and training
- Having specialist providers case manage youth who have dropped out of school and who are not undertaking training or work-based learning

Work requirements for DPB, Widows Benefit and Partners

From the 15th of October 2012 there were some significant changes to DPB:

- Recipients whose youngest child is aged between five and thirteen years have part time work availability requirements
- Recipients whose youngest child is aged fourteen or older have full time work availability requirements

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These have had a significant impact on the Sole Parent segments, which is evident in the modelling of the data at the time of the 30 June 2013 valuation. Some equivalent changes were made to the Widow's Benefit and to Partners of clients on UB, SB and IB, with some impacts related to these also visible.

New Service Delivery Model

Also in October 2012, Work and Income began to trial a new service delivery model in 24 sites. The new model customises the level of work-focused support, with the most active case management provided on a one-to-one basis for clients at risk of long-term benefit receipt who can work, with support. National roll-out of the new service delivery model takes place from July 2013, the impact of which will be reflected in the next valuation.

2.4.2   July 2013 reforms

Another round of reforms began in the middle of July 2013. This places it after the 30 June 2013 valuation date and the impact of these reforms are not allowed for in this valuation. Instead, the current valuation represents a "baseline" from which the impact of these reforms can be judged next year. The main changes are:

- The creation of a new Jobseeker's benefit. Clients on UB[8], SB, WA, WB and DPB (with youngest child at least 14) will be treated as a single group in terms of benefits and review. There will be work and work preparation expectations for more clients. A subcategory within this benefit will exist for those who can only work part-time or cannot look for work temporarily (e.g. if they have a health condition, injury or disability).
- The creation of the Sole Parent Support benefit. This will cover clients on DPB or WB who have a youngest child aged under 14. The conditions and payment levels for this benefit are the same as the previous DPB.
- The creation of Supported Living Payments. This will cover people who previously received IB or CSI benefit.

Additionally there are some new obligations related to travelling overseas, placement of dependent children in education and the possibility of full-time study while on benefits.

2.5   Definition of liability

This is, to our knowledge, the only full actuarial valuation of an unfunded, uninsured social welfare system covering the full range of benefits such as in the New Zealand system (Actuarial valuations are carried out for various national social security schemes covering retirement, old age and disability.). Given the similarity of social welfare to accident compensation insurance (i.e. income support for those unable to work), it seems natural to proceed in the same manner as an outstanding claims liability valuation for an accident compensation scheme. However, there is an important distinction between the two systems. The liability for outstanding claims in an insurance context is well defined, i.e. a

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[8] Common acronyms described in Section 2.12

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liability arises out of the occurrence of an incident that will give rise to a claim and there is a contract between the insured and the insurer which defines the amounts to be paid.

In the case of the New Zealand benefit system, legislation sets the entitlements the government must provide to citizens in circumstances defined in the *Social Security Act 1964* (e.g. single parents, invalids, unemployed etc.). However, there are no accepted rules or standards which define exactly what amounts should be considered a "liability" at a point in time. There are a variety of potential definition options, although accepting an overly broad definition such as the lifetime cost of the whole New Zealand population would include subpopulations outside MSD's ability to actively manage.

The definition of liability agreed in consultation with the Ministry and the Treasury that best captures the policy intent of the long-term investment approach is:

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.

One of the main purposes of the valuation is to provide information to MSD to allow investment decisions to prevent long-term benefit receipt. A definition encompassing lifetime costs on all benefits best reflects this objective.

The decision to estimate the liability for all clients in receipt of a benefit in the year prior to the valuation was a compromise between the obvious choice of those on benefits at the date of the valuation and dealing with problems related to such a choice including seasonal effects and the fact that clients who recently ceased to receive benefits have a very high chance of returning to benefits within 12 months. This is discussed further in Section 16.2.2.

2.6   Scope of this valuation

2.6.1   "Current" & "future" liability

We have valued the "current client liability": the life-time cost of current clients, described above. We have also valued the additional liability related to other clients entering the welfare system for each of the 5 years following the date of the valuation, which we have termed "future client liability": the life-time cost of future clients. Thus we have:

Current client liability: the lifetime cost of current clients

The current client liability is comprised of all future lifetime costs of benefit payments and associated expenses for working-age clients who had received a benefit payment in the 12 months up to and including the effective date of the valuation.

Future client liability: the lifetime cost of future clients

The future client liability is comprised of all future benefit payments and associated expenses for working-age clients who enter the benefit system in the next five years either:

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- For the first time, or
- After being off benefit for more than 1 year at the previous 30 June

These definitions are represented graphically below in Figure 2.2, which shows the types of costs on the left (benefit payments and MSD expenditure), current client liability and additional future client liability across the diagram.

Figure 2.2 **Definition of liability**

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

Future client liability: life-time costs of future clients
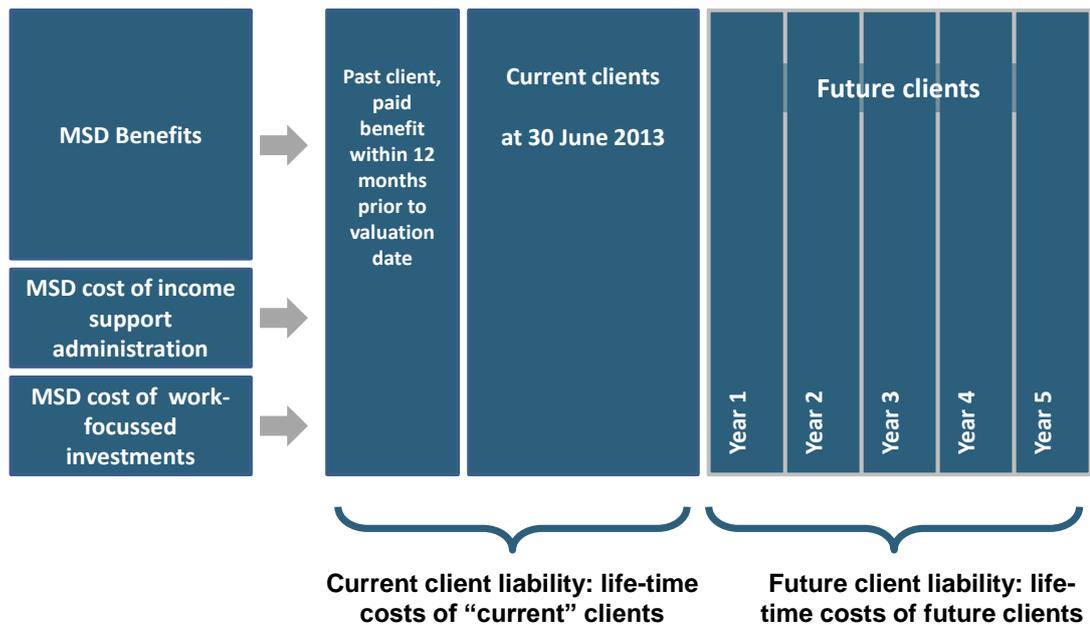
2.6.2   Benefits in scope

The following benefit categories have been created for use in the valuation:

- Tier 1:
    - UB: Unemployment Benefit and related benefits, including Youth Payment
    - IB: Invalid's Benefit
    - SB: Sickness Benefit and related benefits
    - DPB: Domestic Purposes Benefit – Sole parent and Emergency Maintenance Allowance, including Young Parent Payment
    - DPB-CSI: Domestic Purposes Benefit – Care of Sick and Infirm
    - EB: Emergency Benefit
    - OB: Unsupported Child and Orphan Benefit
    - WA/WB: Widow's Benefit and Domestic Purposes Benefit – Woman Alone

- Tier 2:
    - AS: Accommodation Supplement and related assistance
    - DA: Disability Allowance and related assistance
    - CDA: Child Disability Allowance
    - CCS: Childcare Subsidy including OSCAR payments to clients

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- Tier 3:
    - EI: Employment Interventions such as training costs provided as supplementary assistance
    - HS: Non-recoverable Hardship Assistance, including Temporary Additional Support

Note that most of these categories combine several benefit types from MSD's data. For example, UB combines all unemployment related benefits including Youth Payment, Unemployment Benefit Training and Unemployment Hardship benefits. Also note that benefits payable to youth (aged 16-17) have been included within scope. 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. The detailed listing of benefits included within each category can be found in the relevant Sections in Part C.

The new youth payments (Youth Payment for those under age 18 and Young Parent Payment for those under 19) have been grouped with UB and DPB for modelling purposes. This is consistent with our approach in the previous valuation. However, we note that these payments are still identifiable in the projections reviewing results by client age.

A complete listing of benefits within scope can be found in Appendix C.

2.6.3   Benefits excluded from scope

Some benefits have been **excluded** from scope:

- All benefits payable to clients over the age of 65, including New Zealand Superannuation, Veterans' Pensions and supplementary assistance for clients over age 65
- Student Loans and Allowances
- Unemployment Benefit Student Hardship (see reasoning in Section 16.2.2)
- Some other benefits fall outside of Vote Social Development, in particular Working for Families

The rationale to exclude benefit payments over age 65 and student benefits principally reflects the purpose of the valuation as a tool to assist in achieving **employment** outcomes for current clients.

2.6.4   Net loans cost

There are a number of ways in which clients become indebted to MSD. For the purposes of this valuation all debts to MSD are termed "loans":

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Loans arise for the following reasons:

- **Overpayments:** Where a client is paid more than their entitlement, on discovery this gives rise to an amount to be recovered by repayment or deductions from benefits

- **Overpayments due to fraud:** Where there are overpayments and there is sufficient proof to refer clients for prosecution for fraud this gives rise to an amount to be recovered by repayment or deductions from benefits

- **Benefit advances:** Where a client is advanced a benefit for reasons such as hardship, which is later recovered by deductions from benefits, or repayment if the client no longer receives benefits

- **Recoverable assistance:** income-tested, interest-free recoverable financial assistance to clients and non-beneficiaries for defined needs

In this valuation the various subcomponents relating to type of loan and recovery have been valued separately. The sections below detail the approach taken to each, noting that we have combined overpayments and fraud to form one category "overpayments" and combined benefit advances and recoverable assistance to form a second category "recoverable assistance".

For completeness we should also mention underpayments which occur when MSD pays less to a client than their entitlement. When this is discovered the client is paid in full. Underpayments are not valued separately as the data supplied has been corrected for all known past underpayments.

2.6.5 MSD Expenditure

The definition of liability given in Section 2.5 includes the phrase "costs of benefit payments and associated expenses". Consistent with liability valuations in insurance which include the costs of managing claims, the expenses of running the benefit system have been included in the estimated liability. We do not attempt to allocate expenses at a client or segment level, but recognise that such an allocation is unlikely to be evenly spread as MSD targets work-related investments across the welfare system.

MSD expenses included within the scope of the valuation are those required to administer the benefits for working-age adults in the valuation, and to help clients prepare for and return to work. The scope agreed on with the Ministry and the Treasury is detailed further in Section 14 and Appendix C. Expenditure has been analysed and categorised under the following headings.

- Income support administration
  - Benefit processing ("income" share of Tailored Sets of Services to Help People into Work or Achieve Independence appropriation)
  - Integrity services
  - Collections
  - Temporary measures

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- Work focused investments
  - OSCAR (Out of School Care and Recreation subsidy to providers)
  - Training and employment support (includes Employment Assistance, Vocational Skills Training, Mainstream Supported Employment Programme, Youth Transition Services)
  - Work-focused case management (includes "work" share of Tailored Sets of Services appropriation; e.g. Job Connect, employment coordinators, work brokerage)

Note that Tailored Sets of Services were apportioned by MSD between income support administration and work focused investments on the basis of time survey data.

2.6.6   Inflation and discount basis

Under accounting and actuarial standards for insurance and accident compensation, liabilities must be estimated allowing for future inflation and the effect of investment return (i.e. discounting the estimated future cash flows to allow for the "time value of money").

However, as there are currently no required standards for the valuation of social welfare benefits (see Section 2.7), several options were discussed. It was considered whether liabilities should be estimated:

- In dollar values as at the date of the valuation (i.e. ignoring the impacts of future inflation and investment return)

- In inflated and discounted values using assumptions that are:
  - Constant, i.e. that do not change over time, perhaps based on a long term average
  - Variable based on The Treasury forecasts used by other agencies for the valuation of liabilities for Crown accounts

It is considered important to estimate liabilities allowing for both future inflation and the time value of money so that investment decisions can be made on a like-for-like basis. E.g. An investment of $100 now to save $150 in 10 years' time would result in a different decision than an investment of $100 now to save $150 next year. Note that such a basis is required whether there is a fund of assets supporting the liability or not.

Following discussion of various alternatives with MSD and the Treasury it was decided to use the Treasury forecasts for Consumer Price Index (CPI) inflation and Government interest rates for inflation and discounting of the benefit system liability. Details of the assumptions used are provided in Section 17.

Changes to inflation and discounting assumptions will have a significant impact on the valuation figures from year to year. However, these are outside the control of MSD. For this reason we separate the change in the valuation attributable to these items from other impacts to the valuation.

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2.6.7   Tax basis: gross versus net

Consideration was given as to whether liabilities should be estimated gross or net of tax. Based on advice from MSD and the Treasury liabilities have been estimated gross of tax to be consistent with Crown accounts. It should be noted that this reflects the liability from MSD's perspective, but over-states the liability from a whole-of-government perspective.

2.7   Compliance with actuarial and accounting standards

There are currently no accounting or actuarial professional standards strictly applicable to the valuation of social welfare liabilities. However, in general we carried out the valuation in accordance with standards applicable to the valuation of accident compensation liabilities.

That is, we have complied generally with the New Zealand Society of Actuaries Professional Standard No. 4.1 entitled "Valuations of general insurance claims". We have also attempted to comply with International Financial Reporting Standards ("IFRS"). Specifically, estimates of liability incorporate an allowance for future inflation, investment return and administration expenses on a basis specified by the Standards.

However, we have not estimated nor incorporated a prudential margin as is sometimes required by such standards. In our opinion this seems unwarranted given the use to which the valuation will be put.

It is worth noting that since the previous valuation the International Actuarial Association has published an International Standard of Actuarial Practice 2 (ISAP 2) "Financial Analysis of Social Security Programs". This standard became operational from the 13th of October 2013. We do not believe that the standard's intention is to cover the type of social welfare system in New Zealand; the focus appears to be on schemes with narrower scopes and elements of funding. In any event, we consider that this valuation complies with the sections of ISAP 2 that may be considered relevant.

2.8   Valuation process and timing

It has been proposed that valuations of the New Zealand social welfare system are undertaken on an annual basis as at each 30 June. Further, in the year between valuations quarterly monitoring of experience against forecasts arising from the previous valuation is also carried out. Figure 2.3 shows the intended timetable for future valuations.

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Figure 2.3 **Valuation and monitoring timetable**
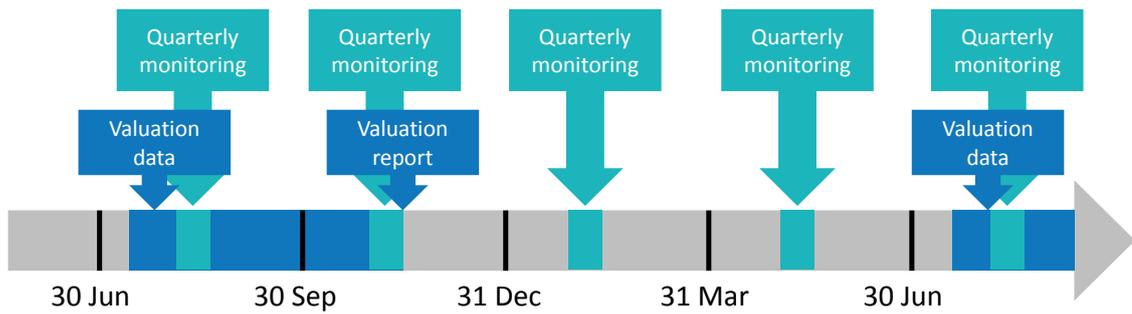
Each quarterly monitoring item in the timetable shown above has a one month delay from the end of each quarter to allow sufficient time for all new benefit recipients to be entered into the system, and for data to mature (e.g. payment adjustments due to abatement against earned income). The need for the one month delay became apparent after testing the effectiveness of monitoring without any lag.

2.9   Aggregate, segment and cohort level results

The original feasibility report recommended three levels of valuation, each geared towards a different level of management:

- Level I: Aggregate liability valuation. This aims to reflect the macroeconomic environment, significant policy initiatives and trends in experience.

- Level II: Segment level liability estimates. Clients are separated into meaningful, mutually exclusive segments for operational control. Targets and KPIs can be set for each, for performance monitoring.

- Level III: Client & cohort level initiatives: Specific programmes and initiatives on small subsets of the client base can be tested and evaluated.

The distinction between segments (used for Level II) and cohorts (used in Level III) is illustrated in Figure 2.4.

Figure 2.4 **Illustration of segments and cohorts across the population of beneficiaries**
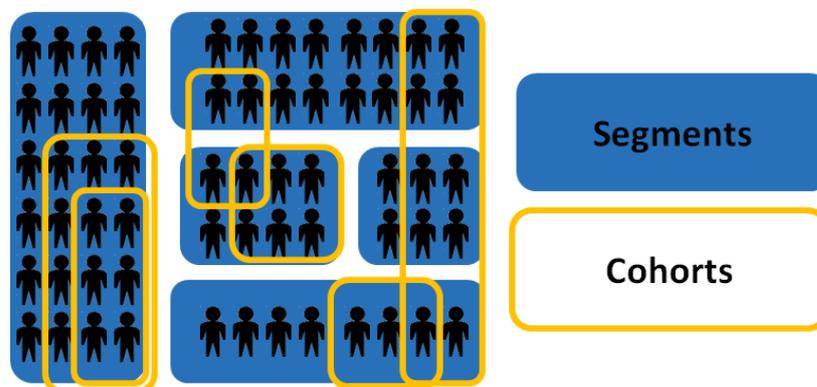
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For the 30 June 2011 valuation Taylor Fry produced two sets of estimates. The aggregate, or Level I valuation, is referred to as the previous report. We also completed a segment level, or Level II valuation. These levels were combined into a single valuation for the 2012 valuation, as the Level II results were very close to Level I and duplication of work was removed. We have continued to use this single approach for the 30 June 2013 valuation.

2.10   Segments adopted by MSD

MSD has chosen 17 segments for the client base to value and monitor. The statistical basis that contributed to the selection of segments was discussed in Part D.1 of the 2012 valuation report. These segments can be grouped into five "top tier" segments which are defined by a person's benefit type, and then divided into "lower tier" segments using other variables such as duration (whether a client has been continuously on benefits for less than or more than a year) or child age. These are presented in the table below. The segments are unchanged from the previous valuation.

Table 2.1 **Summary of segments adopted by MSD**

Jobseeker support	Sole parents	Supported living	Youth	Non-beneficiaries
Work-ready, <1 year	Youngest child 0-2	Carer	Youth payment, <18	Sup only, <1 year
Work-ready, >1 year	Youngest child 3-4	Partner		Sup only, >1 year
HCID, <1 year	Child 5-13, <1 year	HCID	Young parent payment, <19	Orphan only
HCID, >1year	Child 5-13, >1 year			Recent exits, <1 year

The "HCID" acronym in Jobseeker Support (JS) and Supported Living (SLP) top tier segments stands for "Health condition, Injury or Disability". It takes the place of the pre-reform Sickness Benefits (within Jobseeker Support) and Invalid's Benefit (within Supported Living). On occasion we will use the acronyms JS-HCID and SLP-HCID to distinguish between them.

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We give some further detail on the exact definition of segments:

- The Jobseeker Support top tier segment includes the following old benefit types:
    - Unemployment benefits
    - Sickness benefit (now HCID)
    - Widows and women living alone benefits
    - Emergency benefit
    - DPB-Sole Parent where the youngest child is at least 14 years old

- The Sole Parents segment are those receiving DPB-Sole Parent benefit, but have a youngest child less than 14 (and thus lower work requirements compared to Jobseeker Support).

- The Supported Living top tier segment contains those receiving carer's benefit (CSI) and Invalid's Benefit (IB), and has been divided into three segments. The first segment is for those clients receiving CSI. The second is for partners of people with an incapacity (generally both an incapacitated person and their partner will receive IB). Finally the HCID segment in Supported Living (SLP-HCID) is for those clients who receive IB and have an incapacity.

- The Youth segment is split into those receiving the Young Parent Payment and those who receive the Youth Payment. As shown in the table, these segments have slightly different age cut-offs to be consistent with MSD payment qualification criteria.

- The Non-beneficiaries segment contains people not receiving Tier 1 benefits (other than the Orphan benefit). For our valuation we have classified someone as receiving supplementary benefits if they receive AS, DA or CDA (equivalently, this is any Tier 2 benefit excluding CCS). Supplementary recipients are further split based on their duration. The definition of monitoring recent exits until they have had a full year off benefits is somewhat arbitrary, but consistent with our approach to Level I and Level II valuations.

- We use a continuous duration measure for duration related splits to top tier segments, using the same definition as MSD. Continuous duration is the length of the current spell on benefits since the client was last off benefits for at least 14 days.

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2.11   Documentation

This report summarises our analysis and estimation of the liability, both current and future, as at 30 June 2013. The report consists of the following parts.

PART A: Executive Summary & Introduction

Section 1: Executive summary

Section 2: Introduction and background

Part B: Results

Sections 3 to 6: Presentation of summarised and more detailed results and comparisons.

Part C: Valuation by Component

Sections 7 to 14: Description and summary of all the models and forecasts by segment, with separate sections for the future liability, net loans cost and expenses.

PART D: Methodology

Sections 15 to 17: Covering Scope, Data, Valuation Approach, Economic Assumptions.

Part E: Reliances & Limitations

Section 18.

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2.12   Glossary

The following tables give definitions for common acronyms and terms used in this report.

Table 2.2 **Acronyms for benefit types**

Term	Definition
AS	Accommodation supplement (and related assistance)
CCS	Childcare subsidy (including OSCAR payments to clients)
CDA	Child disability allowance
DA	Disability allowance (and related assistance)
DPB	Domestic purposes benefit – sole parent (including Emergency Maintenance Allowance)
DPB-CSI (or CSI)	Domestic purposes benefit – care of sick and infirm
EB	Emergency benefit
EI	Supplementary Assistance: Employment interventions (including training provided as supplementary assistance)
EMA	Emergency maintenance allowance (combined with DPB in this valuation)
HS	Non-recoverable hardship assistance
IB	Invalid's benefit
IYB	Independent youth benefit (combined with UB in this valuation)
NOB	Not on benefits (in a given calendar quarter)
OB	Orphan and unsupported child benefits
OTH	Other benefit, referring to those clients not on a key benefit, includes supplementary assistance, but not including UBSH, CCS, EI and HS.
SB	Sickness benefit
UBSH	Unemployment Benefit Student Hardship (excluded from scope)
UB	Unemployment benefit (and related benefits)
WA/WB	Domestic purposes benefit – women alone and widow's benefit

Table 2.3 **Terms used for segments**

Term	Definition
HCID	Health condition, Injury or Disability
JS	Jobseeker Support
SLP	Supported living payment
WR	Work Ready

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Table 2.4 **Terms used for "Loans"**

Term	Definition
Loans	Covers all cases where a client can become indebted to MSD, i.e. via overpayments of benefits or assistance (inadvertently or through fraud) or via recoverable assistance (including both benefit advances and other recoverable assistance).
Net loans cost	The liability for the cost of loans after allowance for recoveries
Overpayments	Payments (benefit or assistance) where a client is inadvertently paid more than their entitlement. In the valuation overpayments include those due to fraud.
Recoverable assistance	In this report recoverable assistance includes benefit advances and recoverable assistance.
Recoveries	Repayments of overpayments and recoverable assistance to MSD
Underpayments	Payments (benefit or assistance) where a client is inadvertently paid less than their entitlement. These do not appear in the valuation because payment data is automatically adjusted when an underpayment is discovered, and clients are repaid the amount of the underpayment.

Table 2.5 **Terms used for MSD expenses**

Term	Definition
Benefit processing	Expenses related to benefit processing, defined as the ("income" share of Tailored Sets of Services to Help People into Work or Achieve Independence appropriation)
Collections	Services to manage the collection of overpayments and recoverable assistance loans from former clients and other balances owed (for working-age benefits included in the scope of the valuation)
Income support administration	Expenses are analysed under two main categories, Income support administration is the category related to delivering benefits to clients
Integrity services	Services to minimise errors, fraud and abuse of the benefit system
OSCAR	Out of School Care and Recreation subsidy to providers
Temporary measures	Time-limited expenses
Training and employment support	Includes Employment Assistance, Vocational Skills Training, Mainstream Supported Employment Programme, and Youth Transition Services
Work focused case management	Includes "work" share of Tailored Sets of Services appropriation; e.g. Job Connect, employment coordinators, work brokerage
Work focused investments	Expenses are analysed under two main categories, Work focused investments is the category related to helping clients prepare for and return to work.

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Table 2.6 **Other common terms and acronyms used in report**

Term	Definition
ABP	Average benefit paid per quarter to clients in receipt of a benefit that quarter.
Qualifying recipient	A client recognized as part of the current client liability as having received a qualifying benefit in the 12 months up to the valuation date. With a small abuse of terminology, the term can also be applied to the future client liability, where it means those beneficiaries who are not currently qualifying but will receive a qualifying benefit in the near future.
Qualifying benefit	Benefit types for defining a client to be "in the system" and requiring valuation. This includes DPB, IB, SB, UB, EB, DPB-CSI, WA/WB, OB, IYB, AS, DA and CDA. Notable exclusions are UBSH, CCS, EI and HS (in the absence of other benefits payable to the same client). Explanation of this is provided in section 16.2. The practical outcome of this definition is that the full future lifetime cost for CCS, EI and HS *where there is an underlying Tier 1 or Tier 2* benefit / assistance are valued.
Relative exposure	This term is used on figures throughout the report. Depending on the context it refers to the number of beneficiaries (transition and payment model figures) or the number of potential beneficiaries (*other benefits and assistance* probability models)
System/benefit system	Refers to the NZ benefit system as administered by MSD. Implicitly applied only to those benefits within scope of the liability – i.e. the main benefits and supplementary/hardship assistance listed above.

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PART B
RESULTS

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3 COMPARISON OF ACTUAL AND FORECAST EXPERIENCE

3.1 Introduction

The models developed in the 30 June 2012 valuation were based on data to 30 June 2012. Subsequent experience, relating to the 12 months to 30 June 2013, can be compared with predictions made by these models. The results of these comparisons are given in the following sections, and make use of the corrected allocation between current and future client liabilities, discussed in Section 16.4.1.

3.2 Overall actual versus expected payments

Actual and expected payments over the 12 months to 30 June 2013 are shown in Table 3.1. Combining both payments made to beneficiaries in the current and future client liabilities, we expected $6.61b in benefit payments to be made. Actual payments were 2.7%, or $180m, lower than this at $6.43b. Of this, $132m relates to current liability clients (mainly higher than expected system exits, with about $20m attributable to lower than expected CPI increases to benefit rates). The remaining $47m relates to the future liability clients, mainly due to lower than expected new benefit grants. In this result:

- DPB and WA/WB were subject to work availability and work preparation requirements from October 2012. This appears to have led to a material reduction in numbers and payments – see Figure 3.2 and Figure 3.3. These two benefit categories account for 70% of the observed difference in Tier 1 benefit payments and a similar amount of the difference in supplementary benefits.

- Lower than expected SB and UB payments accounted for most of the remaining difference, and were 1.4% and 3.2% lower than expected respectively. This is despite the unemployment rate being slightly higher than projected, and is consistent with the improved performance seen in the change analysis in Section 5.

- IB payments over the year were very close (0.03% higher) to expected.

- A new work-focused delivery model was introduced in 24 trial sites. Our understanding from MSD is that this has led to improved outcomes for clients, but at this stage it is difficult to isolate the impact of this separately from the broader policy reforms.

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Table 3.1 **Actual versus expected benefit payments**[9]

Benefit	Current liability			Future liability			Total		
	Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
	$m	$m		$m	$m		$m	$m	
DPB	1,575	1,648	96%	58	67	87%	1,634	1,715	95%
IB	1,297	1,293	100%	19	23	85%	1,316	1,316	100%
SB	714	717	99%	72	79	91%	786	797	99%
UB	582	602	97%	126	129	98%	708	731	97%
CSI	119	118	101%	7	7	99%	126	125	101%
EB	32	33	99%	7	7	102%	39	39	99%
OB	95	94	101%	5	6	88%	100	100	100%
WA/WB	104	112	93%	6	7	78%	110	120	92%
Total T1	**4,518**	**4,618**	**98%**	**301**	**325**	**92%**	**4,818**	**4,944**	**97%**
AS	967	982	98%	73	88	83%	1,039	1,070	97%
DA	117	122	96%	3	4	67%	120	126	95%
CDA	82	87	94%	2	4	65%	84	90	93%
CCS[10]	111	112	99%	6	8	84%	117	120	98%
Total T2	**1,277**	**1,303**	**98%**	**84**	**103**	**82%**	**1,361**	**1,406**	**97%**
EI	18	19	95%	4	4	94%	22	23	95%
HS	215	219	98%	16	19	81%	230	238	97%
Total T3	**233**	**238**	**98%**	**20**	**24**	**83%**	**252**	**261**	**97%**
Grand total	**6,027**	**6,160**	**98%**	**404**	**452**	**90%**	**6,432**	**6,611**	**97%**

3.3 Actual and expected numbers of clients and average benefits paid

Differences between actual and expected total payments can be attributed to differences in the numbers of clients receiving benefits or differences in the average amounts that they receive, or both. For the comparison shown in Table 3.1 the difference is evenly split between the two – both numbers of clients on benefit and average benefits per quarter were lower than expected. The quarterly differences in numbers for the benefits with the largest proportional deviations, UB, DPB and WA/WB, are shown in Figure 3.1, Figure 3.2 and Figure 3.3 respectively. Interestingly:

- The difference in UB numbers was most pronounced in the December 2012 quarter
- The departure in DPB and WA/WB numbers grew consistently over the four quarters.

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[9] Throughout the report totals in tables may not equal the sum of subcomponents due to rounding
[10] CCS, EI and HS totals exclude payments to clients not receiving some other type of benefits. Excluded payments total $64.7m for CCS, $19.4m for HS and $1.7m for EI.

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Figure 3.1 **Actual and expected numbers of clients on UB, all clients**[11]
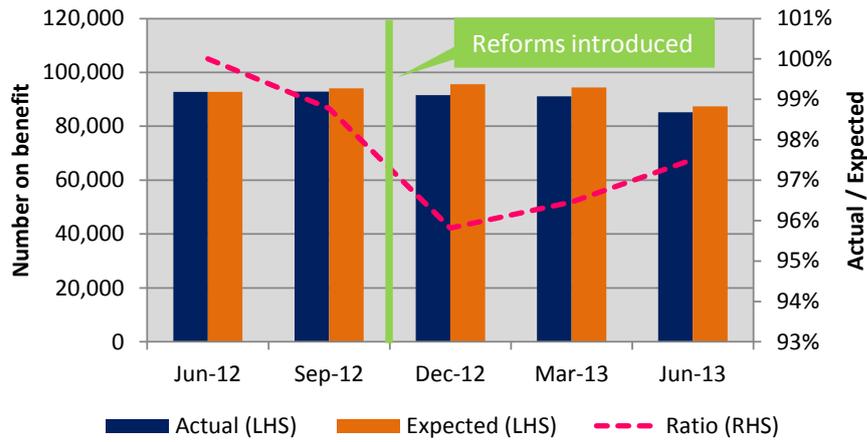
Figure 3.2 **Actual and expected numbers of clients on DPB, all clients**

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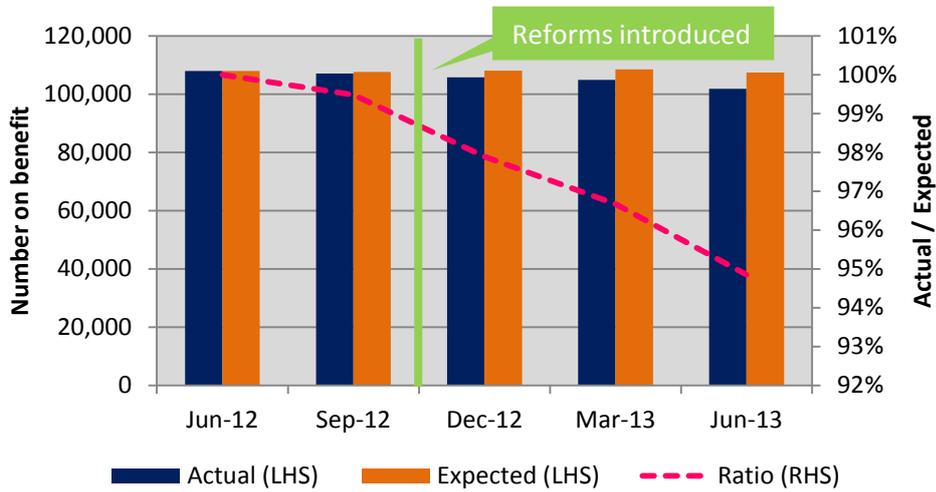
[11] Clients numbers in this section refers to our quarter based definition, discussed in 15.5 . This will tend to give higher numbers than official MSD figures, which report the numbers at the end of each quarter.

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Figure 3.3 **Actual and expected numbers of clients on WA/WB, all clients**
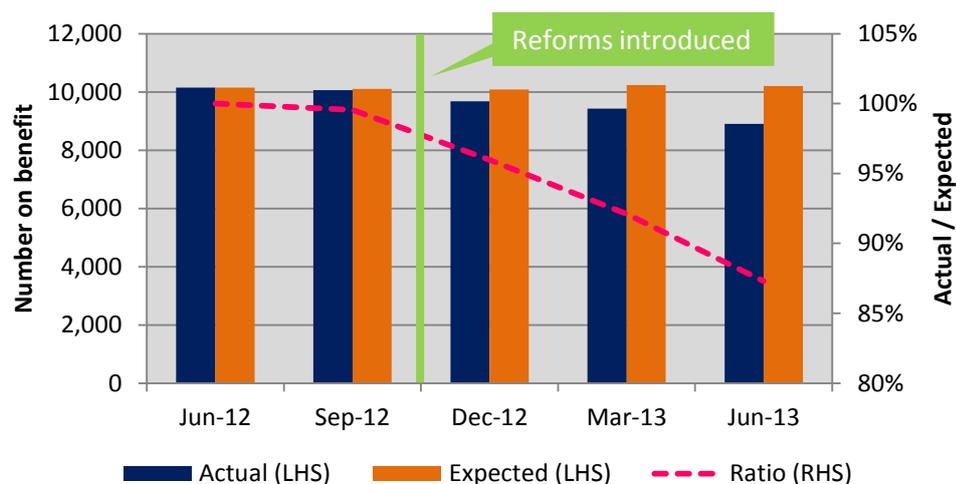
Average benefits paid were generally very close to the expected levels, generally out by at most a couple of percentage points. DPB rates were 2.6% below expected. This is consistent with the lower than expected numbers, as more people exited the benefit and so did not collect a full quarter's benefit, lowering the overall average.

Additional actual versus expected results for the 2012/13 year are provided in Appendix E.

3.4   Actual and expected results by segment

The actual and expected segment level results for clients in the 2012 current client liability are shown in the table below.

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Segment		Avg qtrly number on benefit			Average qtrly benefit paid			Total payments		
		Actual	Expected	Ratio	Actual	Expected	Ratio	Actual	Expected	Ratio
		000s	000s		$	$		$m	$m	
Jobseeker Support	**WR < 1**	35.3	36.6	96%	2,625	2,712	97%	370	397	93%
	WR > 1	40.9	40.7	100%	3,614	3,569	101%	591	581	102%
	HCID < 1	20.8	21.2	98%	3,176	3,203	99%	264	271	97%
	HCID > 1	44.6	44.1	101%	3,582	3,525	102%	638	622	103%
Sole Parent	**Ch 0-2**	30.1	30.2	100%	5,309	5,414	98%	638	654	98%
	Ch 3-4	17.6	17.8	99%	5,222	5,354	98%	369	380	97%
	Ch 5-13; < 1	3.9	4.0	97%	4,685	5,006	94%	73	80	91%
	Ch 5-13; > 1	34.2	34.3	100%	5,160	5,270	98%	705	722	98%
Supp Living	**Carer**	7.3	7.4	99%	4,569	4,490	102%	134	133	101%
	Partner	8.2	8.3	100%	3,474	3,524	99%	114	117	98%
	HCID	81.9	81.9	100%	4,217	4,238	100%	1,381	1,389	99%
Youth	**Youth payt**	1.2	1.2	101%	2,699	2,512	107%	12.7	11.7	108%
	Young Parent	1.5	1.5	100%	4,788	4,866	98%	28.7	29.3	98%
Non-ben	**Sup <1yr**	29.7	30.3	98%	1,006	1,026	98%	119	124	96%
	Sup >1yr	57.2	57.2	100%	1,084	1,082	100%	248	247	100%
	Orp only	4.4	4.4	100%	3,512	3,479	101%	62	61	101%
	Recent exits	31.2	33.3	94%	2,227	2,547	87%	278	339	82%
Total		**449.9**	**454.2**	**99%**	**13,397**	**13,561**	**99%**	**6,027**	**6,160**	**98%**

Again, results are generally close to what was expected. Main features include:

- The low duration segments tended to have lower than expected numbers and payments. This suggests that most of the observed improvement in the welfare system relates to improved outcomes for clients who had been in the system for a relatively short amount of time.

- Nearly half the difference in actual less expected payments is attributable to the Recent Exits segment. This means that the rate at which these clients re-entered the welfare system was materially lower than expected.

- Payments to clients starting in the Youth Payment segment were $1m higher than expected, and payments to the Young Parent Payment were $0.6m lower than expected. These numbers are small, so it is difficult to draw firm conclusions based on the actual versus expected results alone. Also, there are some potential allocation issues between these two segments – see the discussion in 15.4.3.

3.5 Other trends in actual versus expected results

Appendix E has actual and expected results split out in a variety of different ways. We highlight a couple of interesting results here.

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Whilst actual payments were lower than expected across the whole country, the results were not evenly spread across regions. In fact, the Auckland, Canterbury and Southern regions account for 75% of the difference, despite representing only 50% of the aggregate payments. The key reason for this was that the lower than expected UB payments were almost entirely concentrated in these regions; actual versus expected ratios for UB payments in Auckland, Canterbury and Southern regions were 92%, 79% and 92% respectively, compared to the national average of 97%. The ratios across all benefits for each region are shown in Figure 3.4.

Figure 3.4 **Actual and expected payments by client's region (as at June 2012)**
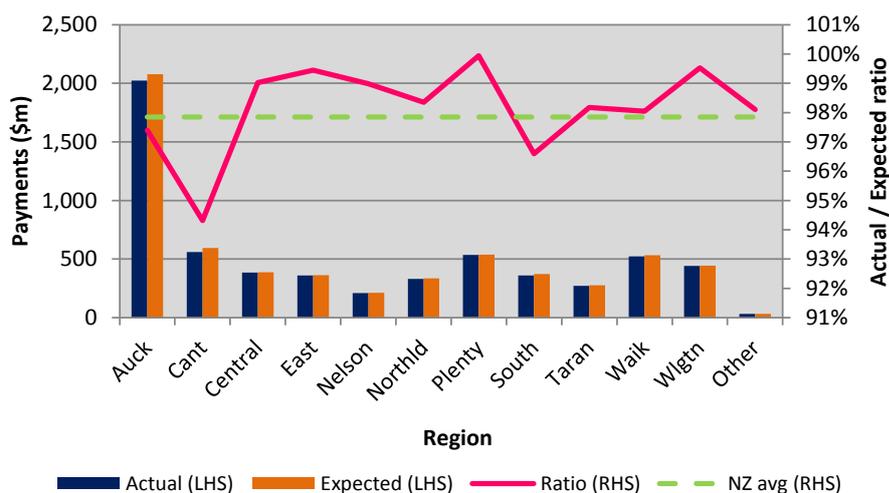
We also note:

- The bulk of the difference in actual and expected for UB and Tier 2 benefits was concentrated in the 20 to 39 year old age range.
- Low payments due to lower than expected entries by recent exits were fairly evenly split across all benefit types. This split is shown in Table 3.3. This suggests a general improvement in clients staying off benefits once entering the system.

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Table 3.3 Actual versus expected payments by benefit type for clients in the recent exits segment at 30 June 2012

Benefit	Actual payts ($m)	Expected payts ($m)	Ratio	Benefit	Actual payts ($m)	Expected payts ($m)	Ratio
DPB	38	52	74%	ACC	46	57	81%
IB	8	10	81%	DIS	1	3	50%
SB	47	55	85%	CDA	1	2	28%
UB	93	101	92%	CCS	15	23	64%
CSI	3	4	62%	**Tier 2 Total**	**63**	**85**	**74%**
EB	6	7	88%				
OB	1	3	40%	EMI	3	4	85%
WA/WB	2	3	72%	HSP	13	16	82%
Tier 1 Total	**198**	**234**	**85%**	**Tier 3 total**	**16**	**20**	**83%**
				Grand total	**278**	**339**	**82%**

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4   RESULTS

4.1   Estimate of current client liability as at 30 June 2013

4.1.1   Overall results

The inflated and discounted estimate of the current client liability as at 30 June 2013 is **$76.5b**. By inflated and discounted we mean that this is the sum of the projected future payments, including CPI increases to benefit rates, and discounted at Treasury rates to allow for the time value of money. This can be thought of as the amount needed to be set aside today to pay for all payments attributable to the current cohort of clients, assuming that amount would earn interest according to Treasury's discount rate schedule.

This liability can be subdivided into payments by benefit type. This is shown in Table 4.1 and Figure 4.1.

Table 4.1 **Current client liability subdivided by benefit type**

Component		Inflated and discounted liability ($b)
Tier 1:	Domestic Purposes Benefit	15.06
	Invalid's Benefit	21.37
	Sickness Benefit	8.04
	Unemployment Benefit	3.28
	DPB-Care of the sick and infirm	1.81
	Emergency Benefit	0.29
	Orphans and unsupported children	1.39
	Woman Alone / Widows Benefit	1.45
	Tier 1 subtotal	**52.70**
Tier 2:	Accommodation Supplement	9.40
	Disability Allowance	1.83
	Child Disability Allowance	0.78
	Child Care Subsidy	1.05
	Tier 2 subtotal	**13.06**
Tier 3:	Hardship Assistance: Non-recoverable	2.57
	Employment Interventions	0.14
	Tier 3 subtotal	**2.71**
Other components:	MSD Expenses	7.70
	Net loans cost	0.37
	Other components subtotal	**8.07**
Grand total		**76.54**

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Figure 4.1 **Current client liability by benefit type, proportion of total**
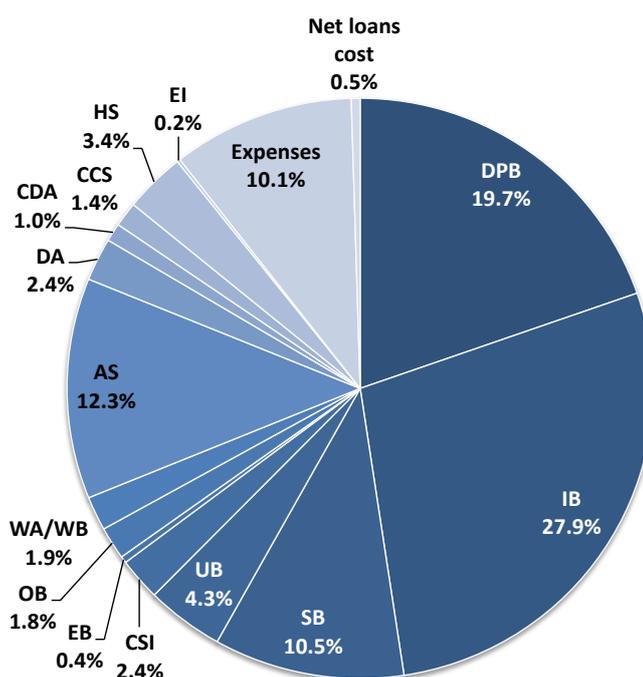
We make the following comments regarding these benefit type results:

- The average duration on benefit has a large impact on the liability. For instance, in 2012/13 IB payments were only 85% higher than UB payment amounts, yet the liability in respect of future IB payments is nearly six times UB. This is because current clients are likely to move off UB much more quickly in the future compared to IB clients.

- The four largest benefits (DPB, IB, SB and UB), plus their associated Accommodation Supplement payments make up the bulk of the liability, roughly three quarters.

- We present the results by benefit types that exist before the July 2013 reforms. This is because they are the benefits in effect at the valuation date, as well as being the benefits for which there is historical experience to project. Most benefits can be "mapped" to a new benefit (see Section 2.4). The main differences are for DPB and WA/WB; some clients on these benefits will enter the new Jobseekers benefit, while others will enter the Sole Parent benefit.

4.1.2   Segment level results

The liability can be subdivided across the segments adopted by MSD management. These segments were introduced in Section 2.10. Table 4.2 shows the segment level current client liability results. Note that, in contrast to Table 4.1, these results are split based on a client's segment at the valuation date, and totals include future cash flows arising from different benefit types for that person. Net loan cost and expenses have not been allocated across segments, as correct allocation across segments is difficult. The Youth segments make up a relatively small part of the aggregate valuation (but with a very high average lifetime cost). The remaining cost is spread fairly evenly across the other top tier segments.

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Table 4.2 Current client liability forecasts by client segment at 30 June 2013[12]

Top tier segment	Segment[13]	Number at valn date	Total liability ($m)	Average lifetime cost ($k)	Average future years on benefit
Jobseeker Support	Work-ready, <1 year	44,859	4,141	92	9.6
	Work-ready, >1 year	40,116	4,608	115	9.9
	HCID, <1 year	24,132	2,897	120	10.8
	HCID, >1year	46,729	6,458	138	11.4
	Sub-total	155,836	18,104	116	10.4
Sole Parents	Youngest child 0-2	29,502	6,949	236	17.6
	Youngest child 3-4	17,669	3,850	218	16.2
	Child 5-13, <1 year	4,041	614	152	11.5
	Child 5-13, >1 year	33,685	6,591	196	14.2
	Sub-total	84,897	18,005	212	15.7
Supported Living	Carer	8,203	1,184	144	10.5
	Partner	8,353	928	111	8.7
	HCID	84,888	15,043	177	13.2
	Sub-total	101,444	17,155	169	12.6
Youth	Youth payment (<18)	1,496	219	146	15.5
	Young parent payment (<19)	1,361	335	246	18.9
	Sub-total	2,857	553	194	17.1
Non-beneficiaries	Sup only, <1 year	34,604	1,762	51	6.7
	Sup only, >1 year	63,210	3,655	58	7.7
	Orphan only	4,928	474	96	7.5
	Recent exits, <1 year	154,704	8,762	57	5.9
	Sub-total	257,446	14,653	57	6.5
All segment sub-total		602,480	68,470	114	9.9
Expenses			7,698		
Net loans cost			372		
Total			76,540	127	

One slightly counter-intuitive result from the table is that the average number of future years on benefit is similar for the two work-ready segments (9.6 and 9.9 years), despite the average lifetime cost being 20% greater for the high duration segment ($92k and $115k). This is due to a lower average age combined with a higher propensity to exit benefits in the low duration segment, which leads to two offsetting effects:

- A higher number of possible years on benefit amongst the lower duration segment

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[12] Costs due to net loans and expenses have not been allocated across segments
[13] The duration measure used in the segment definitions are based on "continuous duration", which means time since the client last had a 14 day spell off benefits.

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- A lower probability of being on benefit amongst the lower duration segment

This leads to the similar number of projected years on benefit. However the average lifetime cost for the lower duration segment is lower because more of the cash flows relate to the distant future and so they are discounted more heavily.

A number of factors are visible here that have driven change compared to the equivalent 2012 results:

- Overall numbers in segments are generally lower, particularly for long-duration Work-ready Jobseeker segment and the Sole Parent segments. Segment numbers are discussed in further detail in Section 5.3.

- Numbers in the Recent exits segment are down significantly (20%) from the previous valuation. This is mostly due to the methodological correction applied, which removed a number of clients not eligible for the current liability definition. This is discussed further in Section 16.4.1.

- Average lifetime cost has fallen in all segments, by 7% overall[14]. Some of this is attributable to lower inflation and higher discount rates forecast, while some reflects lower expected time on benefits.

- Average future number of years on benefit is another means of understanding how people are moving through the system. This has reduced in most segments, suggesting a slight improvement in clients exiting the welfare system and remaining off benefits. The change in the average number of years on benefit can be seen in Table 4.3:

  - Supported living segments are about 1% higher than last year, implying that they are tending to remain on benefits slightly longer

  - Sole parent segments are generally very similar to 2012 years on benefit – much of the reduction associated with these segments are due to other compositional factors.

  - Jobseeker segments are about 1% less than the previous valuation, except for low duration work-ready clients, which decreased by 3%.

  - Supplementary segments are 4% to 5% lower than the previous valuation. The rate at which these clients, as well as recent exits, are re-entering the welfare system has been lower in recent years – see Section 5.4.

  - The youth segments have fallen markedly – by 9%. This appears to be a combination of an increased rate of exiting welfare at younger ages (particularly ages 19 to 23) and a higher rate of remaining off benefits once exited. The uncertainty associated with these changes is discussed in Section 10.4.

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[14] After adjustment for methodological correction – see Section 16.4.1.

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Top level segment	Segment	Total liability, 2012[15] ($m)	Change in numbers in segment	Change in projected years on benefit	Other changes[16]	Infl. & disc. changes	Total liability, 2013 ($m)
Jobseeker support	**Work-ready, <1 year**	4,823	-4.9%	-3.1%	-2.1%	-4.8%	4,141
	Work-ready, >1 year	5,623	-11.6%	-0.9%	-2.1%	-4.5%	4,608
	HCID, <1 year	3,153	-1.9%	-0.2%	-1.7%	-4.6%	2,897
	HCID, >1year	6,927	-0.6%	-1.0%	-0.7%	-4.5%	6,458
	Sub-total	20,525	-5.1%	-1.2%	-1.5%	-4.6%	18,104
Sole Parents	**Youngest child 0-2**	8,172	-5.8%	-0.6%	-4.8%	-4.6%	6,949
	Youngest child 3-4	4,474	-4.2%	-1.1%	-4.8%	-4.6%	3,850
	Child 5-13, <1 year	723	-7.0%	0.0%	-4.5%	-4.4%	614
	Child 5-13, >1 year	7,582	-4.9%	0.0%	-4.2%	-4.5%	6,591
	Sub-total	20,950	-5.2%	-0.5%	-4.6%	-4.5%	18,005
Supported Living	**Carer**	1,178	5.5%	-0.4%	-0.3%	-4.1%	1,184
	Partner	1,012	-4.4%	0.7%	-0.7%	-4.0%	928
	HCID	15,737	0.0%	1.2%	-1.2%	-4.5%	15,043
	Sub-total	17,927	0.1%	1.2%	-1.1%	-4.4%	17,155
Youth	**Youth payment (<18)**	259	6.5%	-11.6%	-5.9%	-4.7%	219
	Young parent payment (<19)	446	-11.9%	-6.2%	-5.0%	-4.4%	335
	Sub-total	705	-3.1%	-9.4%	-6.3%	-4.5%	553
Non-beneficiaries	**Sup only, <1 year**	2,074	-5.0%	-4.7%	-1.3%	-4.9%	1,762
	Sup only, >1 year	4,119	-1.9%	-3.9%	-0.9%	-5.0%	3,655
	Orphan only	479	2.4%	1.7%	-1.3%	-3.8%	474
	Recent exits, <1 year	10,264	-5.6%	-3.3%	-1.4%	-5.2%	8,762
	Sub-total	16,935	-4.5%	-2.3%	-2.3%	-5.1%	14,653
All segments	**Total excl. loans +expenses**	77,043	-4.0%	1.1%	-4.0%	-4.6%	68,470

Table 4.4 provides results by benefit type for top tier segments. It can be seen that although all the top tier segments (besides Youth) have similar total liabilities, the benefit types that make up each of these totals is quite different. Jobseeker Support and Non-beneficiaries segment liabilities are fairly evenly spread across all benefit types, reflecting

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[15] After adjustment for methodological correction – see Section 16.4.1.

[16] Other changes are primarily due to how people are projected to move around the system (e.g. projected to receive more Jobseekers and less Supported Living benefits). This is affected by model updates as well as the composition (e.g. age, gender etc) of the current client cohort

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the fact that these clients transition between benefit types fairly liberally. Unsurprisingly, the bulk of Sole Parent and Supported Living segment liabilities consist of DPB and IB payments respectively.

Table 4.4 **Current client liability split by top tier segment and benefit type**

	Number at valn date	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average ($k)
Jobseeker Support	155,836	2,417	4,265	4,457	1,662	1,352	2,490	1,460	18,104	116k
Sole Parents	84,897	9,235	1,581	1,035	428	1,182	2,857	1,687	18,005	212k
Supported Living	101,444	254	12,836	400	116	815	1,369	1,365	17,155	169k
Youth	2,857	282	43	32	35	23	85	54	553	194k
Non-beneficiaries	257,446	2,876	2,650	2,120	1,036	1,569	2,604	1,799	14,653	57k
Sub - total	602,480	15,063	21,374	8,044	3,277	4,941	9,405	6,365	68,470	114k
Expenses									7,698	
Net loans cost									372	
Total									76,540	127k

It is interesting to note that of the Tier 1 benefit payments, decreases compared to 2012 are dominated by lower projected DPB and UB payments. This persists across all segments. For example, future DPB payments to Non-beneficiaries are 18% lower than in 2012, compared to IB payments which are only 5% lower. These changes reflect the recent experience seen in the welfare system, and are discussed further in Sections 7 to 11 of the report (see for example Figure 8.8).

The difference in average lifetime cost across segments means that some segments have a disproportionately large or small impact on total liability relative to the number of clients in that segment. For instance, sole parents represent 14% of the clients valued, but 26% of the total liabilities. These differences are illustrated in Figure 4.2 (for top tier segments) and Figure 4.3 (for all segments). It can be seen that Sole parents and Supported Living segments have a disproportionately high contribution to overall lifetime cost. In comparison to the previous valuation, Sole Parent segments have fallen about a percentage point of total future cost, while Supported living segments have increased about a percentage point to 25.1%.

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Figure 4.2 Contributions of top tier segments towards client numbers and liability total
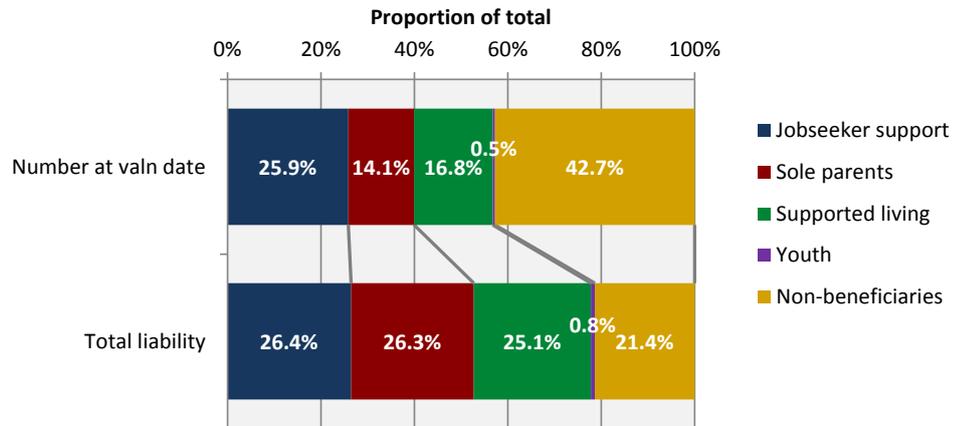

Figure 4.3 Contributions of all segments towards client numbers and liability total
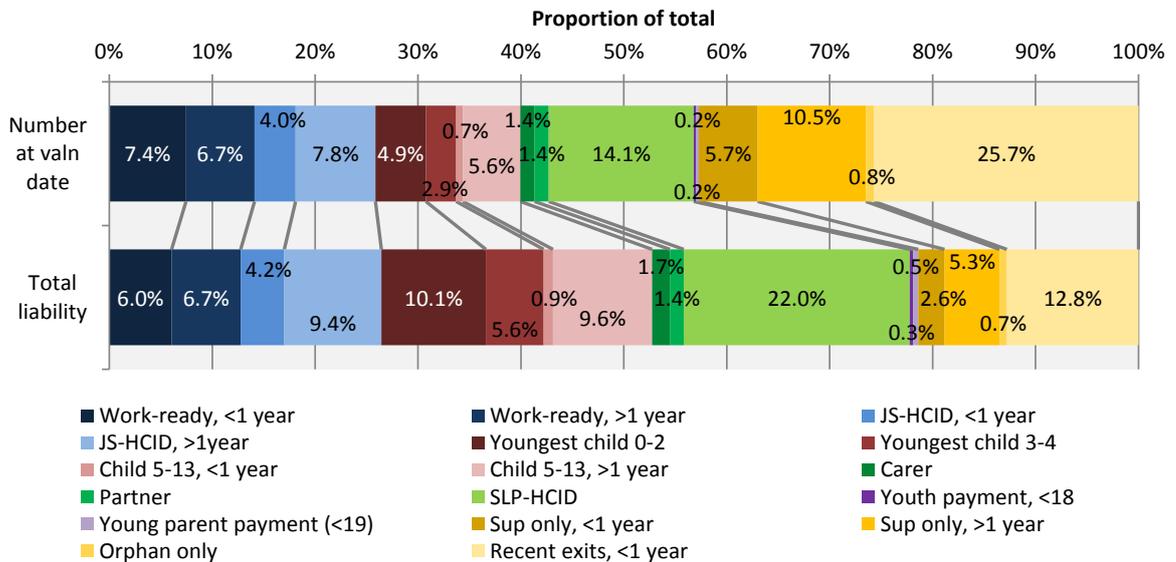
Total liability in a segment is a combination of the number of clients in the segment and the average lifetime cost per client. We have ranked the segments by average lifetime cost in Figure 4.4. The costs for Youth segments (particularly young parent payment) are very high due to a combination of these clients' high risk of remaining on welfare and the large number of potential years they have on benefits. The next highest segments relate to Sole Parents, reflecting their tendency to remain on DPB for an extended period and then move to other benefit states when they leave DPB. Supported Living average costs are also high; they are largest for SLP-HCID (corresponding to IB), but lower for carers and partners of those on SLP-HCID. Non-beneficiaries represent the lowest average cost, but given their large numbers and the fact that their lifetime cost is about $56,500 (excluding net loans cost and expenses), their contribution to the overall liability is still substantial. Note that there is still considerable variability within segments; for example, average costs are considerably higher for younger members of the SLP-HCID segment.

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Figure 4.4 **Average lifetime cost per client, excluding net loans and expenses, by segment**
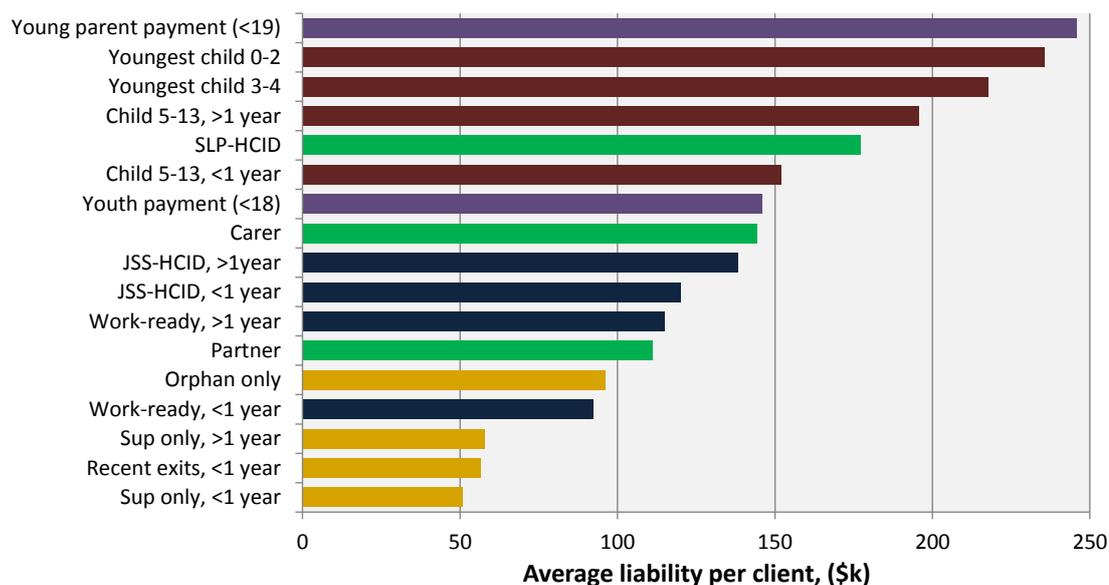

4.1.3 Splits by other variables

It is possible to split the liability valuation across any of the variables included in the valuation model. We present some here, but have included a number of others in Appendix H. The table and chart below shows the total and average lifetime liabilities by **age at the valuation date**.

Table 4.5 **Current client liability by client age band at 30 June 2013 (in $b)**

Age band	Number in age band	Tier 1					Tier 2		Tier 3	Other compon-ents	Total
		DPB	IB	SB	UB	Other T1	AS	Other T2			
16-17	3,376	0.17	0.27	0.04	0.04	0.02	0.08	0.03	0.02	0.08	0.74
18-19	23,629	0.98	0.74	0.27	0.21	0.12	0.43	0.17	0.12	0.36	3.39
20-24	85,344	3.86	2.48	1.04	0.62	0.52	1.72	0.70	0.45	1.34	12.72
25-29	73,038	3.13	2.32	0.97	0.47	0.53	1.53	0.62	0.40	1.18	11.15
30-34	67,985	2.46	2.42	1.01	0.40	0.56	1.37	0.52	0.37	1.08	10.20
35-39	65,550	1.86	2.65	1.07	0.36	0.62	1.22	0.45	0.35	1.01	9.59
40-44	70,839	1.39	3.06	1.15	0.37	0.72	1.15	0.43	0.35	1.01	9.62
45-49	63,535	0.77	2.87	1.02	0.33	0.68	0.87	0.32	0.29	0.84	7.99
50-54	57,017	0.33	2.47	0.83	0.26	0.60	0.61	0.23	0.21	0.65	6.21
55-59	47,928	0.09	1.53	0.49	0.16	0.41	0.33	0.13	0.12	0.38	3.64
60-64	44,239	0.02	0.55	0.17	0.07	0.16	0.11	0.05	0.03	0.14	1.28
Total	**602,480**	**15.06**	**21.37**	**8.04**	**3.28**	**4.94**	**9.40**	**3.66**	**2.71**	**8.07**	**76.54**

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Figure 4.5 **Average liability per client by age band at 30 June 2013, split by future segment that payments relate to**
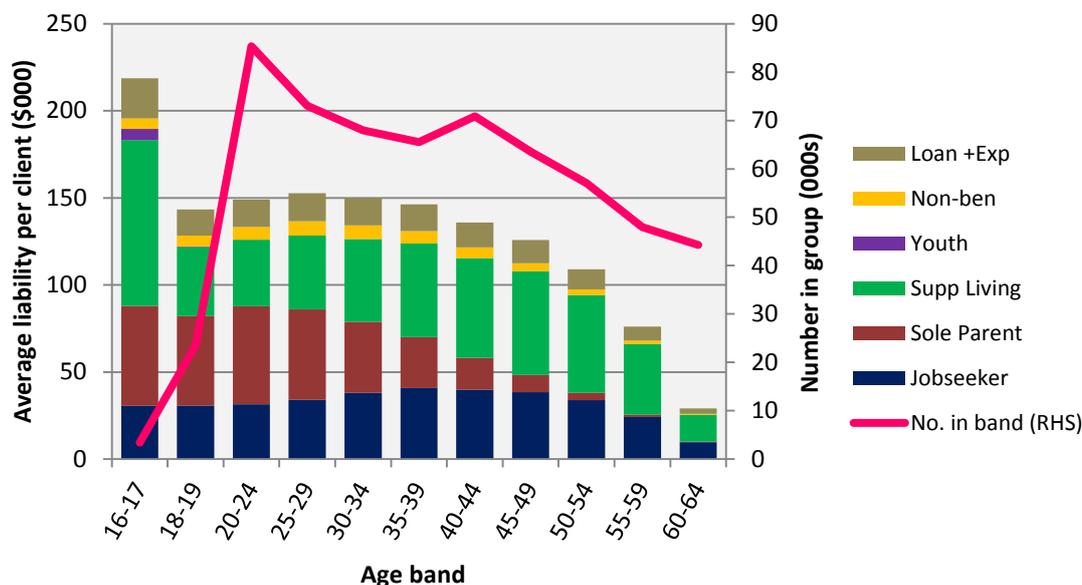

The trends shown in the chart are interesting. Firstly the cohort under age 18 has a significantly higher average liability, suggesting they are at high risk of remaining on benefits for an extended period. This difference compared to other ages arises in part due to different eligibility criteria for benefit receipt. That is, clients under age 18 also need to show circumstances such as a severe and permanent disability, illness or injury, teen parenthood, or the loss of support from their family. Qualification under these criteria leads to these clients having a higher likelihood for receiving welfare throughout their lifetime.

In contrast, the liability per client is relatively stable across ages 18 to 39. For those 40 and older, the average liability starts decreasing, as would be expected due to the approach of retirement age.

Another important breakdown of the liability is the allocation amongst clients with different durations on benefit. Figure 4.6 shows the average liability according to continuous duration – that is, the time a client has continuously been on benefits at the valuation date. The leftmost group shows the average liability for those clients currently not on benefits. Unsurprisingly, this average liability is relatively low but is still significant. The remaining groups show the average liability for those clients who have increasingly large continuous durations. The increasing trend is clear, with clients who have received benefits for at least five years having a liability more than 50% higher than those in their first year.

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Figure 4.6 **Average key benefit liability based on client duration**
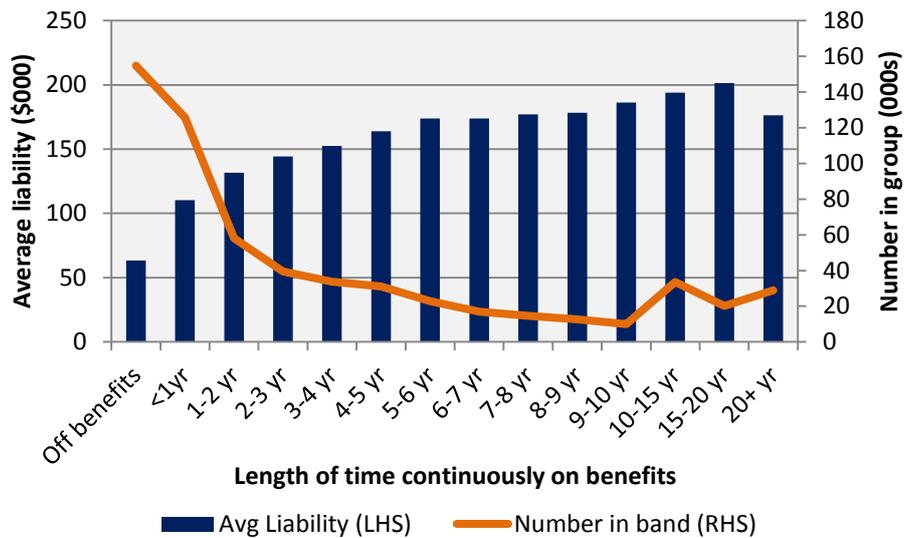
Results by duration are particularly relevant as the Government has explicit targets to reduce long-term welfare dependence. It is worth noting that the strong trend in average liability occurs despite the fact that higher average durations imply less total available time to age 65, since average age tends to increase with duration too.

4.2 Estimates of future client liability 2013/14 to 2017/18

The future client liability estimates are shown in the figure and table below. These amounts are inflated and discounted, with the discount date being 31 December of the corresponding financial year. Thus these figures can be thought of as the amount needed to be set aside each year in the future to meet the future costs of people entering the system.

Figure 4.7 **Future client liability for beneficiaries entering system over the next five years, split by segment at entry into welfare system**

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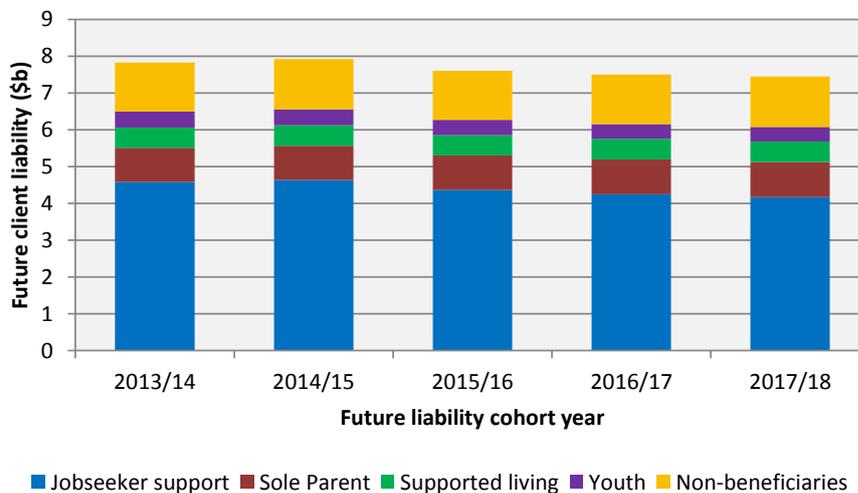
We make the following comments:

The future liability across the five years has a slight downward pattern, with the 2017/18 total about 5% lower than 2013/14. This reflects:

- The current projection for the unemployment rate. The number of clients entering the system is sensitive to both the **absolute level** of the unemployment rate, as well the **size and direction of recent changes**. When the rate falls quickly relatively few new clients enter the system. However, once the rate stabilises at a new level, the number of new clients increases, partly attributable to the growth of the working age population.
- Projected discount rates are lower in the near future and rise thereafter (see Section 17.3). This will tend to increase the liability for earlier years compared to later years. This effect is partly offset by the lower benefit inflation rate projected in the near future.

Broadly speaking, future client liability components are in similar proportions to the current client liability. The main relative differences are:

- IB comprises 28% of the current client liability, but only about 17% of the future client liability. This is because relatively few people enter the liability directly as new IB clients each year.
- In contrast UB (8%) and SB (13%) are relatively larger than their share of the current client liability (4% and 11%, respectively). This is because they make up a greater share of clients newly entering the benefit system each year.

DPB payments represent 21% of the future client liability, about equal to their 20% share of current client liability.

The 2013/14 future client liability is 10.2% of the current client liability. Thus the annual future client liabilities represent a significant portion of total liabilities.

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Table 4.6 **Future client liability estimates, inflated and discounted to 31 December each year**

Component	Future client liability ($b) corresponding to financial year:				
	2013/14	2014/15	2015/16	2016/17	2017/18
Tier 1					
DPB	1.61	1.63	1.58	1.57	1.57
IB	1.36	1.37	1.32	1.31	1.31
SB	1.03	1.05	1.00	0.99	0.98
UB	0.61	0.61	0.56	0.53	0.51
DPB-CSI	0.19	0.19	0.19	0.18	0.18
EB	0.05	0.05	0.05	0.05	0.05
OB	0.14	0.14	0.14	0.14	0.14
WA/WB	0.15	0.15	0.14	0.14	0.14
Tier 1 subtotal	**5.13**	**5.19**	**4.98**	**4.90**	**4.86**
Tier 2					
AS	1.16	1.17	1.12	1.11	1.11
DA	0.13	0.14	0.13	0.13	0.13
CDA	0.08	0.08	0.08	0.08	0.08
CCS	0.18	0.19	0.18	0.18	0.18
Tier 2 subtotal	**1.55**	**1.57**	**1.51**	**1.50**	**1.49**
Tier 3					
EI	0.28	0.28	0.27	0.26	0.26
HS	0.02	0.02	0.02	0.02	0.02
Tier 3 subtotal	**0.30**	**0.30**	**0.29**	**0.29**	**0.28**
Other components					
Expenses	0.79	0.80	0.77	0.76	0.76
Net loans cost	0.05	0.05	0.05	0.05	0.05
Other subtotal	**0.84**	**0.85**	**0.82**	**0.81**	**0.81**
Grand total	**7.82**	**7.92**	**7.60**	**7.50**	**7.44**

4.3   Forecast total cash flows 2013/14 to 2017/18

The cash flows arising from the current and future client liabilities can be combined to give a complete picture of projected payments over the next five years. These payments are shown in Figure 4.8.

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Figure 4.8 **Total cash flows, excluding expenses and loans**
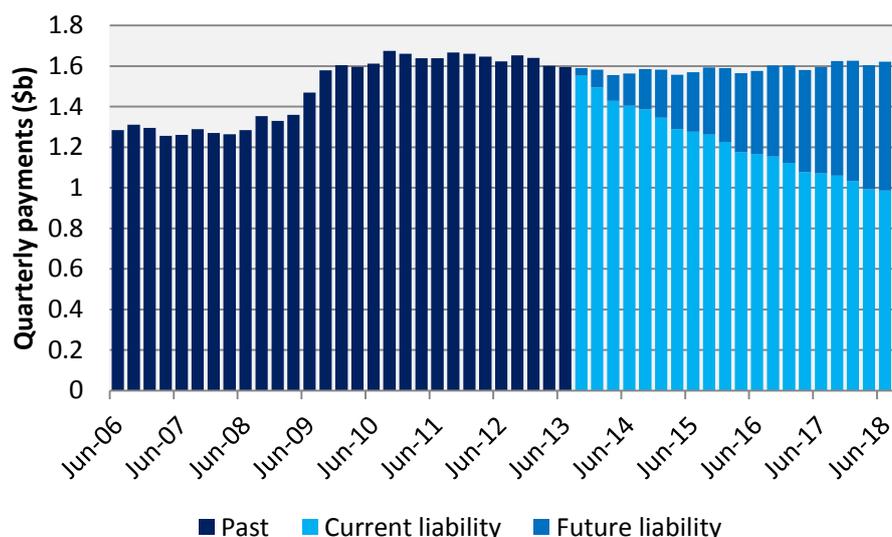
Note: the current liability cash flows have been adjusted to remove the impact of double counting of clients (see Section 16.2.2).

We make the following comments:

- Payments are projected to fall slightly for the next few years and then rise back to a similar level to 2012/13 after five years. The growth in average benefit rates are offset by the slight decrease in client numbers expected over the next five years. Payments in 2017/18 are projected to be 99.96% of those in 2012/13.

- The level of total payments increased significantly due to the global financial crisis at the end of 2008 and has largely remained at that high level since then.

- The seasonality is observable, with March quarters about 1% lower than trend. This pattern is largely driven by the number of days in each quarter, rather than any intrinsic differences in behaviour.

- The future client liability component grows from virtually nothing to 39% of the total payments by June 2018.

We can also look at the total number of clients projected to be on Tier 1 benefits. Figure 4.9 shows the number of people projected to receive some Tier 1 benefits in each quarter. Interestingly this is forecast to decrease by about 2.2% per year. This is partly attributable to the forecast decrease in unemployment (see Table 17.4), which affects all key benefit types, although some more than others (see Section 6.3.1). It is also attributable to the lower rate of benefit re-entry amongst recent exits (see Section 5.4). The projected cash flow results imply that the decrease in numbers receiving key benefits is slightly higher than the increase in average benefits received, both due to inflation and other factors such as the mix of clients remaining on benefits. Note that forecasts do not include the impact of planned welfare reform changes that occur after June 2013.

The increase during late 2008 and 2009 following the global financial crisis is even more apparent for the total number of clients on key Tier 1 benefits than for total payments.

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Figure 4.9 **Number of clients in receipt of Tier 1 benefits**
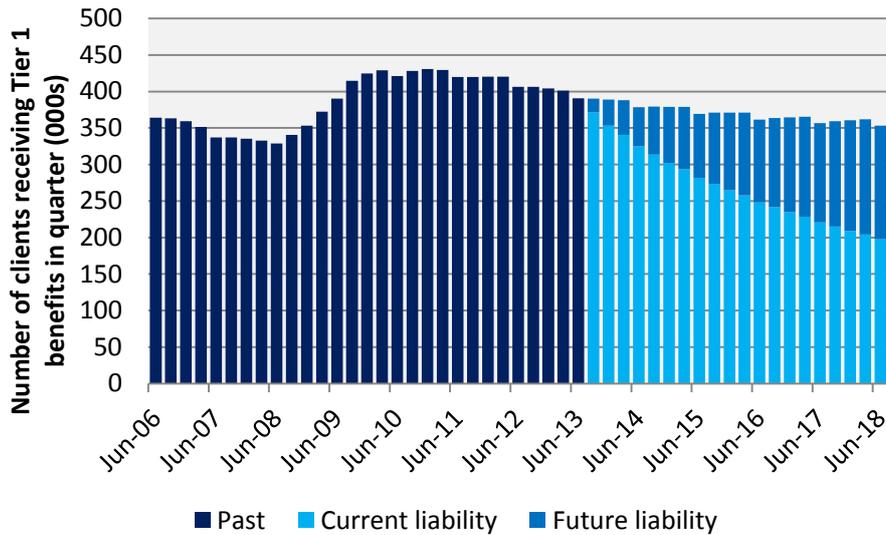
Note: the current liability numbers of clients have been adjusted to remove the impact of double counting (see Section 16.2.2).

The cash flows in Figure 4.8 can also be split by the future segment that a client is in. These are shown in Figure 4.10 below. Broadly speaking, the allocation amongst segments is forecast to be relatively stable. Jobseeker payments decrease slightly as an overall proportion over the next five years, from 36% to 33%, while supported living is expected to grow from 27% to 30%.

Figure 4.10 **Total cash flows, excluding expenses and loans and split by future client segment**

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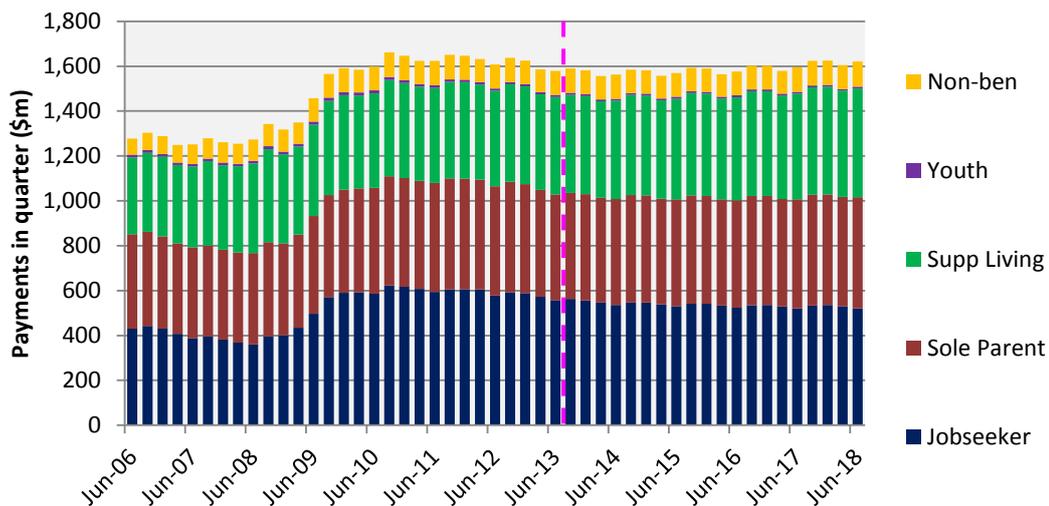
4.4 Current client liability projections

The expected evolution of the current client liability can be calculated. This involves combining current client and future client liability components, as well as tracking which clients fall under the valuation definition at various future dates. The projection allows for:

- The removal of payments that occur between valuation dates
- The increase in liability associated with higher benefit levels due to inflation
- The change in the number of clients on benefits and the types of benefits that they receive
- The changing level of expected investment returns

The projected liabilities are shown in Figure 4.11, and the components that lead to the projection in Table 4.7.

Figure 4.11 **Projected current client liability over time**
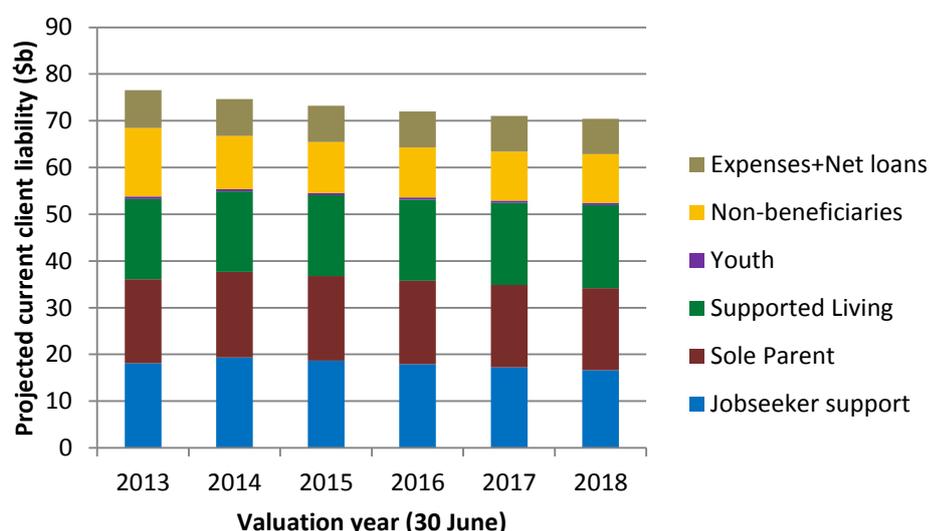
Table 4.7 **Components in projection of current client liability. Amounts are inflated and discounted to the starting valuation date in each row**

Starting valn date, 30 June	Starting Liability	Less: Expected payts	Less: expected leaves	Plus: expected entries	Plus: unrolling discount	Projected liability 12 months later
	$b	$b	$b	$b	$b	$b
2013	76.5	-6.4	-4.7	7.3	2.0	74.7
2014	74.7	-6.5	-4.6	7.4	2.2	73.2
2015	73.2	-6.5	-4.3	7.1	2.5	72.0
2016	72.0	-6.5	-4.2	7.0	2.7	71.0
2017	71.0	-6.5	-4.1	7.0	3.0	70.4
2018	70.4					

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The current client liability is expected to steadily decrease from the current level of $76.5b to $70.4b in June 2018. Some of the main factors in this result are:

- Projected investment returns are expected to be higher in the future (see Section 17.3), meaning that less money would notionally have to be set aside. This reduces the liability over time.

- Numbers of clients is expected to decrease steadily, with the projected number of welfare exits being larger than entries (see Figure 4.9). The main drivers of this, as discussed in Section 4.3, are lower projected unemployment and a lower rate of client re-entry into the welfare system. This reduces the liability over time.

- Benefit levels are expected to increase in line with CPI. This tends to increase the liability over time.

We estimate that the inflation and discount rate effects are roughly offsetting, so that the decreasing pattern observed in the liability amounts largely mirrors the projected decrease in client numbers over the next five years.

4.5   Other results

4.5.1   Breakdown of expenses

We have made the following allocation of expenses to the various categories:

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Table 4.8 Expense category breakdown for current and future client liabilities

Expense category	Current client liability ($m)	Future client liability 2013/14 ($m)	Future client liability 2014/15 ($m)	Future client liability 2015/16 ($m)	Future client liability 2016/17 ($m)	Future client liability 2017/18 ($m)
Income support administration						
Benefit processing	3,129	320	326	313	310	308
Integrity services	391	40	41	39	39	38
Collections	126	13	13	13	13	12
Temporary measures[17]	0	0	0	0	0	0
Sub- total	**3,646**	**373**	**379**	**365**	**361**	**359**
Work-focused investments						
Work focused case management	1,964	201	204	197	195	193
OSCAR	217	22	23	22	21	21
Training and employment support:						
Employment Assistance	1,178	121	123	118	117	116
Vocational skills training	270	28	28	27	27	27
Youth support services	383	39	40	38	38	38
Mainstream supported employment program	41	4	4	4	4	4
Job support scheme[18]	0	0	0	0	0	0
Life skills training[19]	0	0	0	0	0	0
Sub-total Training and employment support	*1,872*	*191*	*195*	*187*	*185*	*184*
Sub-total	**4,052**	**415**	**422**	**406**	**402**	**399**
MSD Expenses total	**7,698**	**788**	**801**	**771**	**763**	**758**

Figure 4.12 shows the current client liability for expenses apportioned by category.

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[17] Temporary measures include payments related to special events such as the Canterbury Earthquake. No forecast of such future events has been attempted. Hence the liability is estimated as nil.

[18] Job support scheme and life skills training expenditure occurred in several of the 5 years of history used to apportion expenses between categories. However, in the most recent two financial years expenditure on both items was nil. It has been assumed that this will continue.

[19] See note above.

Figure 4.12 **Current client liability: MSD expenses by category**
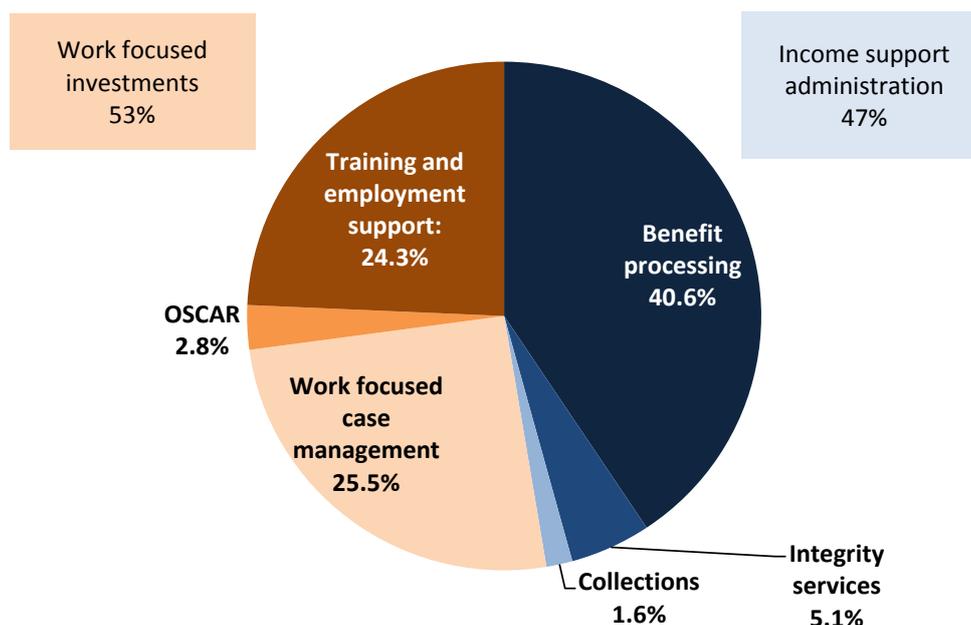
Relative to last year:

- A lower proportion of expenses has been allocated to benefit processing costs (46% last year)

- A higher proportion of expenses has been allocated to work focused case management (19% last year)

- Expenses as a proportion of the total current client liability are a little higher. In the previous aggregate valuation expenses represented 9.2% of the total, compared with 10.1% in this valuation. This effect is partly due to forecast expenses being similar to last year while forecast benefits are slightly lower, and also due to a change in the expense rate projection – see Section 5.4.

4.5.2 Breakdown of net loans cost

As described in the methodology, we have valued six separate components related to loans cost, which are largely offsetting. These components are shown in Table 4.9. Negative amounts represent recoveries on loans made by MSD.

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Table 4.9 **Net loans cost breakdown**

Loans category	Current client liability ($m)	Future client liability 2013/14 ($m)	Future client liability 2014/15 ($m)	Future client liability 2015/16 ($m)	Future client liability 2016/17 ($m)	Future client liability 2017/18 ($m)
Further overpayments /fraud on existing debtors	72	0	0	0	0	0
Recoveries on overpayments /fraud on existing debtors	-196	0	0	0	0	0
Overpayments /fraud related to future payments	2,446	247	244	228	218	209
Recoveries on overpayments /fraud related to future payments	-2,022	-204	-201	-188	-180	-172
Net cost – overpayments /fraud	**301**	**43**	**42**	**40**	**38**	**37**
Recoverable assistance payments	1,425	152	151	141	136	130
Recoveries on recoverable assistance	-1,354	-144	-143	-134	-129	-124
Net cost – recoverable assistance	**71**	**7.6**	**7.5**	**7.1**	**6.8**	**6.5**
Total net loans cost	**372**	**50**	**50**	**47**	**45**	**43**

The net cost due to overpayments and fraud has decreased by 18%, a combination of:

- Lower (inflated and discounted) benefit payments
- A small improvement in the total percentage of overpayments and fraud expected to be recovered.

The net cost of recoverable assistance has increased by 50%, primarily due to the fall in the collection rate of recoverable assistance compared to recoverable assistance paid to clients.

These changes reflect the higher uncertainty of estimating net loans cost – because the "net" loans cost is a small fraction of the total payments being paid and recovered, small changes in the gap between the two can cause significant relative changes to the net cost. However, net loans cost represents a very small portion of the aggregate valuation, so the overall impact of this uncertainty on the current and future client liabilities is small.

We discuss the further limitations of our estimation of net loans cost in Section 13.3. **In particular, we do not attempt to estimate the amount of overpayments and fraud that remains undetected in the welfare system.**

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4.5.3   Age at entry into the welfare system

One striking set of results relate to the liability split by the age of clients at first entry to the welfare system. The data used in this report has about 20 years of history, so age at entry is only accurately known for clients under 40. Figure 4.13 shows the age at entry for clients aged 30-39 at the valuation date. Of these clients, 62% entered the system on some benefit under the age of 20. Furthermore, these clients contribute more heavily to the liability. Of the total liability attached to the 30-39 year old age band, 79% is attributable to those clients who entered before age 20. This highlights the importance of the youth segment and the potential long term impacts of early intervention.

Figure 4.13 **Numbers and liability by age at entry. The left hand chart is the age at entry into the welfare system for clients aged 30-39 at the valuation date. The right hand chart is the relative contribution to lifetime liability of those same clients.**
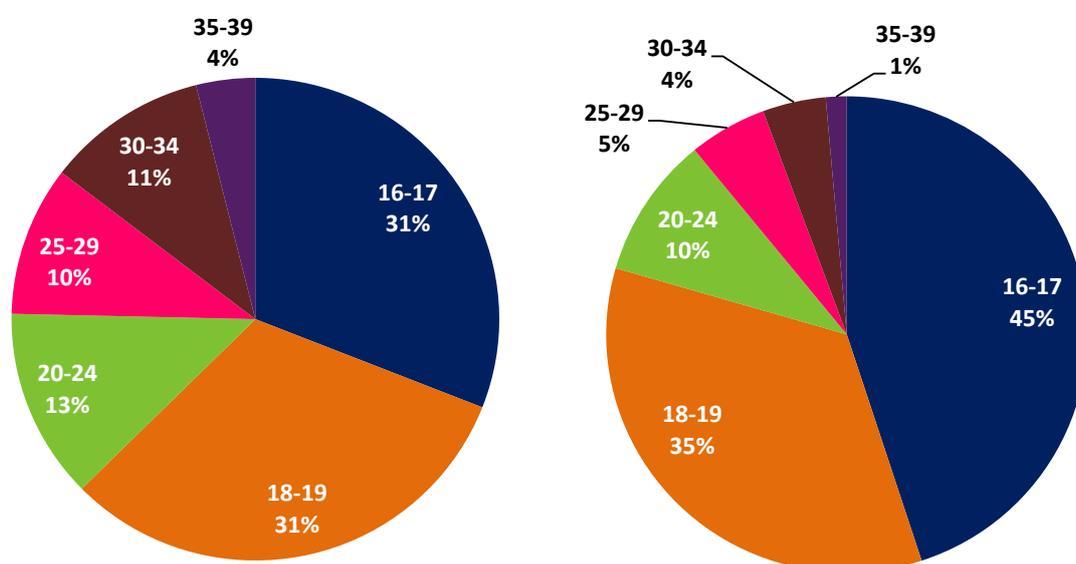
Table 4.10 shows the average lifetime liability for different combinations of age at valuation and age at entry into the system. It suggests that age at entry into the system has a far more significant impact on lifetime liability than the age at valuation. The liability for clients currently aged 35-39 but entering in the 16-19 age band ($185k) is about 70% higher than those entering in the 20-24 band ($112k), and 100% higher than those entering in the 25-29 age band ($93k).

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Table 4.10 **Average liability for clients by age at valuation and age at entry into the welfare system, for clients less than 40.**

Age at valuation	Age first entering the system					
	16-19	**20-24**	**25-29**	**30-34**	**35-39**	**Average**
	$k	$k	$k	$k	$k	$k
16-19	153					153
20-24	177	84				149
25-29	198	105	57			153
30-34	191	111	70	51		150
35-39	185	112	93	67	53	146
Average	184	123	109	93	73	140

Finally, Figure 4.14 shows the impact of Youth and other young client entries into the welfare system across all ages. We estimate that about a third of the total liability is attributable to clients that would have entered via a youth segment. A further 40% would have entered before age 20 (but not in a youth segment). This estimation required some extrapolation for clients over age 37, owing to the lack of available data for age at first entry for these clients.

Figure 4.14 **Current client liability split by current client age and status when first entering the welfare system**
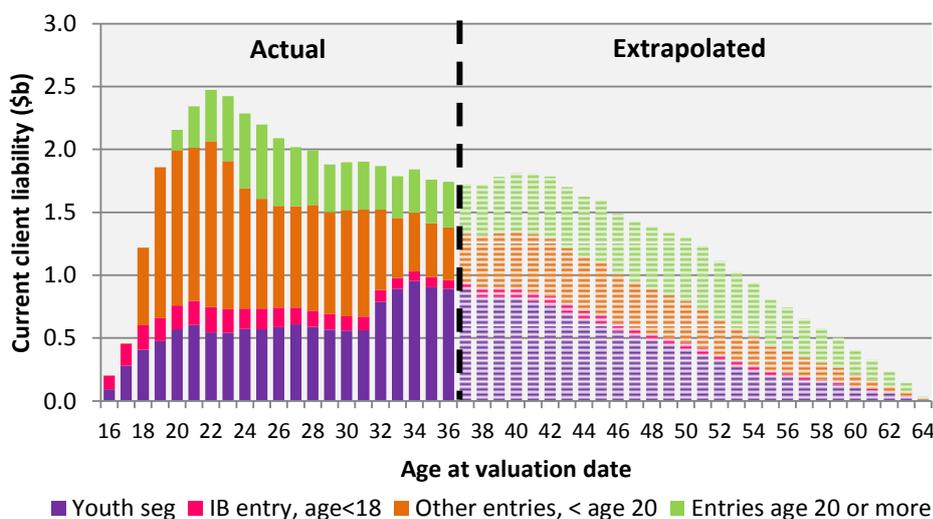
4.5.4   Distribution of individual lifetime liability

The current client liability is the sum of the individual level liability calculated for each client in the valuation cohort. These individual level liabilities allow for a range of demographic and benefit history characteristics (see Section 16.3.3), so that those clients with high likelihood of remaining in the system can be distinguished from the lower risk clients.

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The figure below shows the distribution of individual level liabilities. We see that:

- The 10% of clients with the highest individual liabilities have an average lifetime cost (inflated and discounted) of $292k. This group is dominated by clients currently in Sole Parent and Supported Living segments.

- The 10% of clients with the lowest individual liabilities have an average lifetime cost of $14k. The lowest deciles – 7, 8, 9 and 10 are all dominated by recent exits.

- The median liability is about $91k, and 20% of clients have a liability greater than $190k.

- The top 10% of clients represent 26% of the total current client liability. The top 30% (those clients with a liability above $150.1k) represent 60% of the total.

- The bottom 10% of clients represent about 1.2% of the current client liability, and the bottom 30% account for 7% of the total.

Figure 4.15 **Average individual liability by ranked decile. Relative contributions to each decile by current segment is shown in colour. Excludes expenses and net loans**
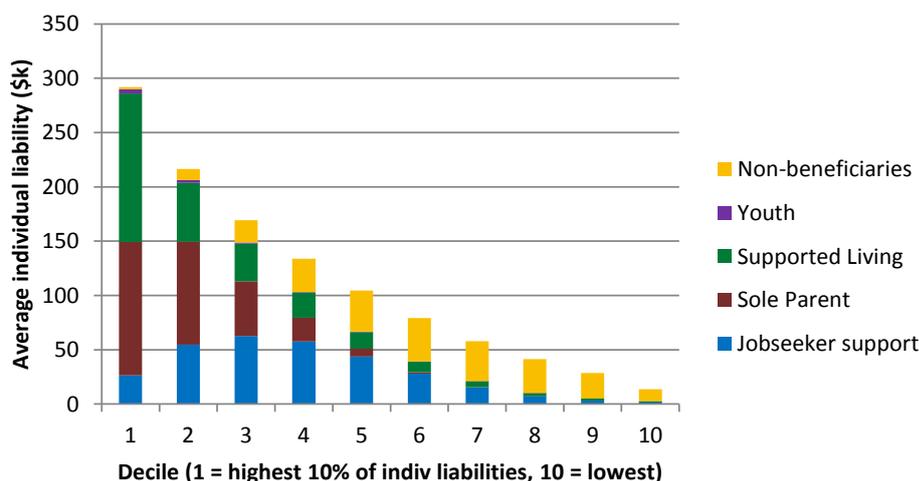
4.6   Cohort lifetime person projections

One further way of understanding the projection results is to look at how the projection applies to individual clients, cohorts and segments; we can run the projection and assess the propensity for various groups to remain on benefits, and move between different types. Figure 4.16 shows such a plot for those clients who start in the Jobseeker segment. It shows that while clients begin the projection on UB, SB, WA/WB or DPB (with youngest child age 14 or more), by 10 years into the projection:

- The majority (55%) of the cohort who have not retired are not on benefits

- Of those clients still on benefits, most are receiving SB or IB, with relatively few receiving UB – in fact, there are six times as many on SB or IB compared to UB

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Figure 4.17 and Figure 4.18 show equivalent plots for some of the other key segment groups. We make a number of observations:

- Time in DPB has generally decreased in comparison to the equivalent 2012 plots

- Clients generally remain in Supported Living (IB, CSI), rather than transfering to other benefit types

- Sole parents often remain on DPB benefits for a significant length of time, but also have a reasonable chance of moving to a new non-DPB benefit after that period

- Clients on supplementary benefits only, tend to exit the welfare system the fastest, although reasonable numbers transfer back into Tier 1 benefits

- Clients who were not receiving any benefit on the valuation date have a 24.4% chance of returning to benefits within two years. This compares to 24.9% in the previous valuation.

- An average client in one of the Youth segments has a **31% chance of being on Tier 1 benefits in 15 years time**. This compares to 35% in the previous valuation. Further, more than 22% will be on Tier 1 benefits 40 years after the valuation date (either having remained on benefit or having cycled off and back onto benefit). This contributes to the high average lifetime liability for these segments.

Figure 4.17 **Likelihood of being in various states over the course of the projection, for various segment groups**
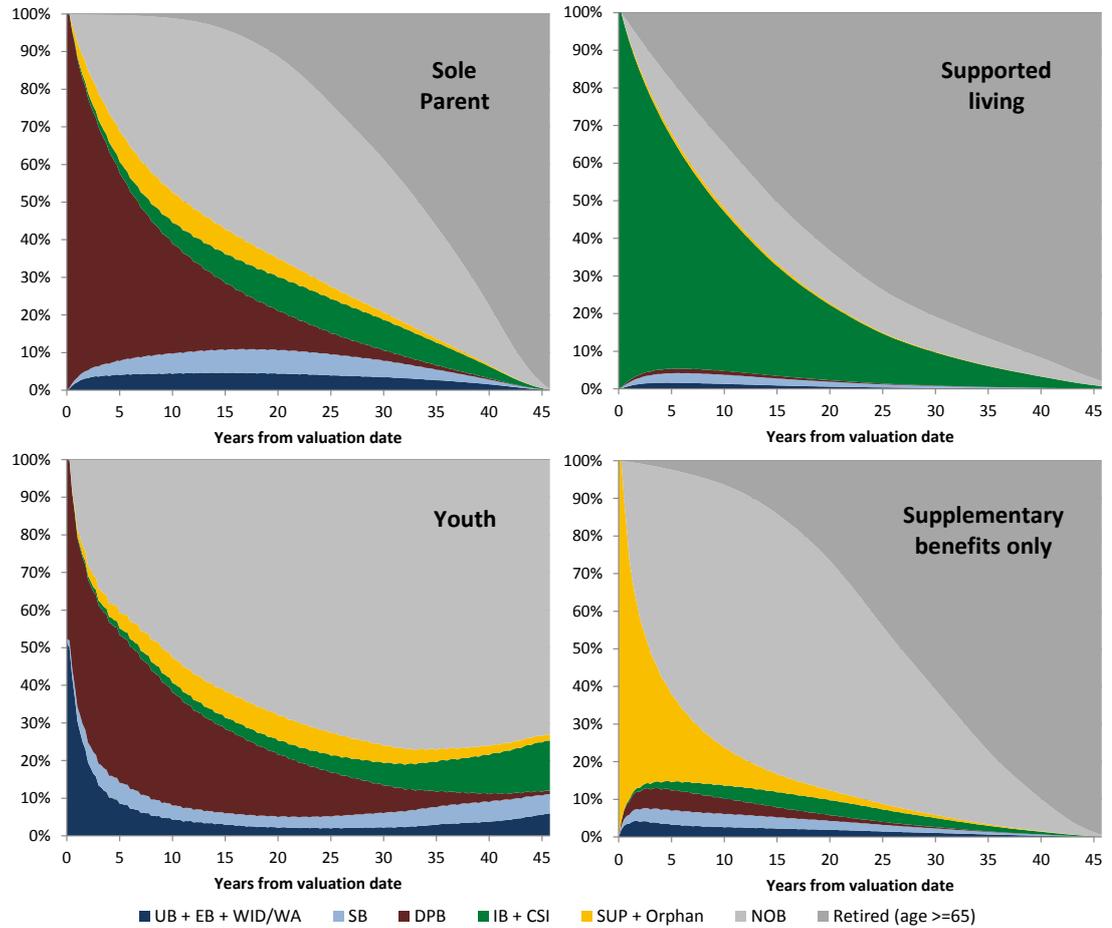
Figure 4.18 **Likelihood of being in various states over the course of the projection, for those clients in the Recent exits segment at the valuation date**
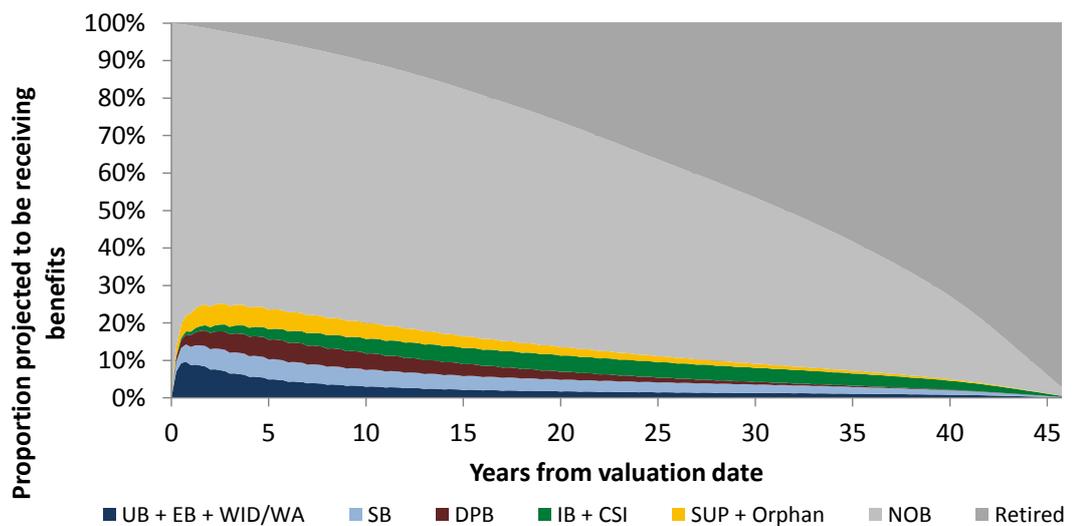
4.7 Partial dependence plots

One challenge in interpreting the results is distinguishing between the impacts of correlated effects. For instance, clients with younger ages tend to have higher average liabilities and clients with a longer history of benefit receipt will also have a higher average liability. However, these variables tend to be negatively correlated – older clients tend to have a longer history of benefits. The partial dependence plot is an attempt to isolate these effects, by looking at the average impact of a single variable across the client base while holding everything else constant.

An example is shown in Figure 4.19, which is the partial dependence plot for age for clients in the Jobseeker Work-ready <1year segment. The age effect on the partial dependence plot, holding all other effects (such as duration and history) constant, shows a $160,000 difference in average liability between the youngest ages and the oldest. The shape also shows a steeper shape at the youngest ages; the difference between age 18 and 28 is $58k, compared to $18k for 28 to 38 years.

Figure 4.19 **Partial dependence plot for age, Jobseeker Support Work-ready <1year segment[20]**
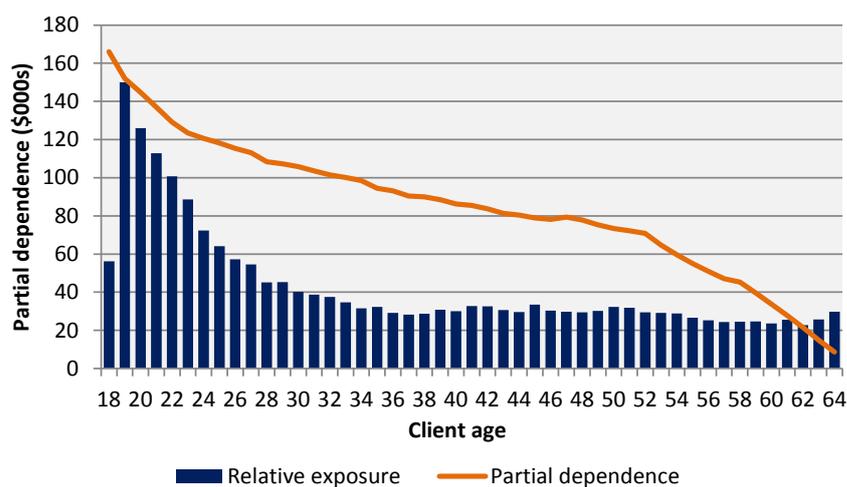
The second example in Figure 4.20 shows the partial dependence effect for ethnicity in the Sole Parent segment for clients with children aged 0-2. Holding the distribution of other variables constant, Maori ethnicity has a partial dependence $20k-$50k higher than any other category.

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[20] Relative exposure in these plots refers to the relative number of clients in each group – here age band.

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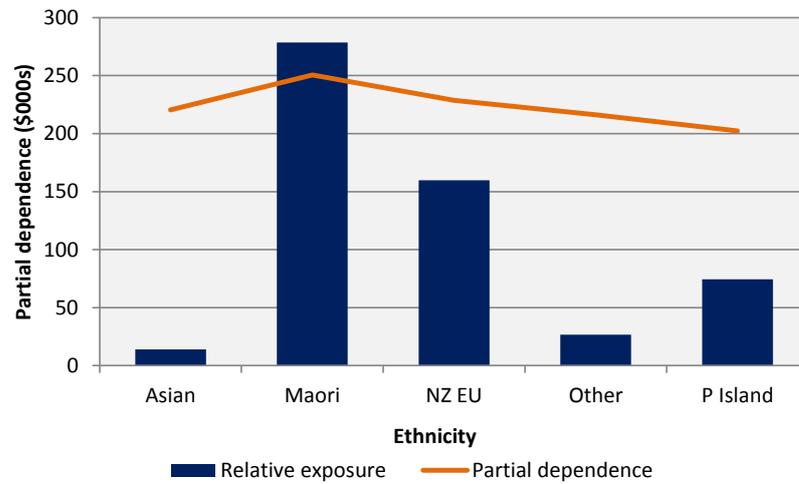
We provide a number of other partial dependence plots in Part C of this report.

5 CHANGES IN ESTIMATES OF LIABILITY FROM THE PREVIOUS ESTIMATE

This section compares the estimate of liability made in this report as at 30 June 2013 with the estimate made in the valuation report as at 30 June 2012.

From one valuation to the next it is possible to measure changes to the estimated liability arising from the following categories:

- **The expected change in the liability, i.e. changes consistent with the definition of the liability and valuation forecasts.** For example, the forecasts may predict an increased number of people on benefits due to people joining the system, resulting in an increase in the current client liability.

- **Changes due to experience differing from projected since the previous valuation.** For example, numbers receiving the unemployment benefit may not have developed as expected. Also, economic variables such as inflation and the unemployment rate may have evolved differently to that projected.

- **Changes due to updates to economic forecasts.** Changes to forecast inflation, discount rates and unemployment rates will affect the liability estimate.

- **Changes due to updated models.** Recent historical behaviour causes changes to model parameters used in the projection. For instance, if fewer people leave the sickness benefit than expected, the projected future rate of people leaving is likely to fall in accordance with this.

The first such change analysis was presented in the 2012 valuation. The structure of the 2013 change analysis is similar, although we have provided extra detail related to some specific items of change.

Additionally, a methodological correction has been applied to the 2012 results as a first step. It was discovered a group of clients were inadvertently included in the Recent Exits segment of the current client liability (rather than future client liability). See Section 16.4.1 for further information.

5.1 Updating the valuation according to expectations

The first step in analysing changes in the liability from the previous valuation to the current valuation is to determine what the liability was expected to be, based on the forecasts made previously. This calculation is shown in Figure 5.1.

Figure 5.1 **Movement from the 2012 current client liability to the projected 2013 current client liability**
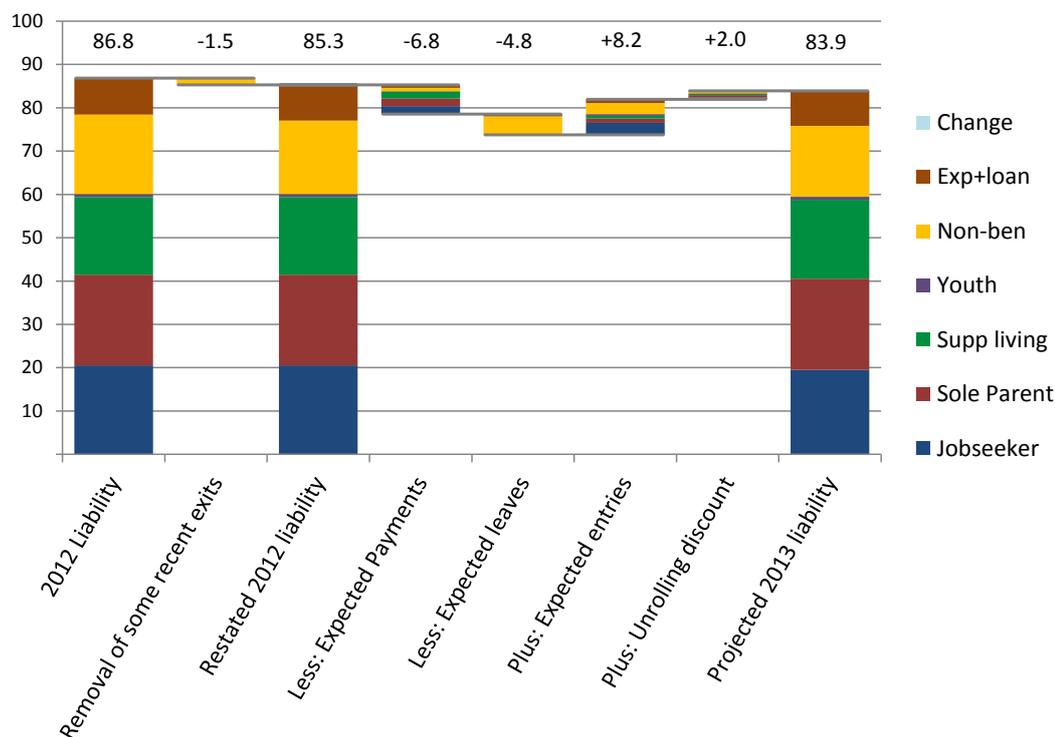
The 2012 current client liability was found to be $86.8b in the previous valuation. Based on our projections, we expected the corresponding value in 2013 to be $83.9b, consisting of the following components:

- A total of $1.5b of liability has been removed due to the methodological correction, which removes a group of clients from the recent exits segment (Section 16.4.1).

- We expected $6.8b in payments, including net loans payments and MSD expenses, to be made in 2012/13. This reduces the value of the liability, as those payments are no longer part of the future cash flows.

- We expected a $4.8b decrease in the liability due to clients who were valued in the 2012 current client liability that are no longer in the 2013 current liability cohort. These are clients who had recently exited at the time of the 2012 valuation and were expected to remain off benefits for the 2012/13 year. Since they have been off benefits for more than 12 months, they no longer satisfy the current liability definition.

- We expected an $8.2b increase in the liability due to people entering the system who were not in the 2012 current client liability cohort (i.e. the future client liability for 2012/13, less their expected 2012/13 payments).

- Finally, we expected the liability to increase by $2.0b due to the impact of unrolling a year's worth of discount rates. This can be thought of as the interest accrued on the liability, had it been invested over the year.

5.2   Movement from the previously expected 2013 liability to the current valuation

We expected the current client liability to be $83.9b, but the actual liability as presented in Section 4 is $76.5b, which is $7.4b lower than expected. The attribution of this change is given in Figure 5.2.

Figure 5.2 Movement from the expected 2013 liability to the actual valuation
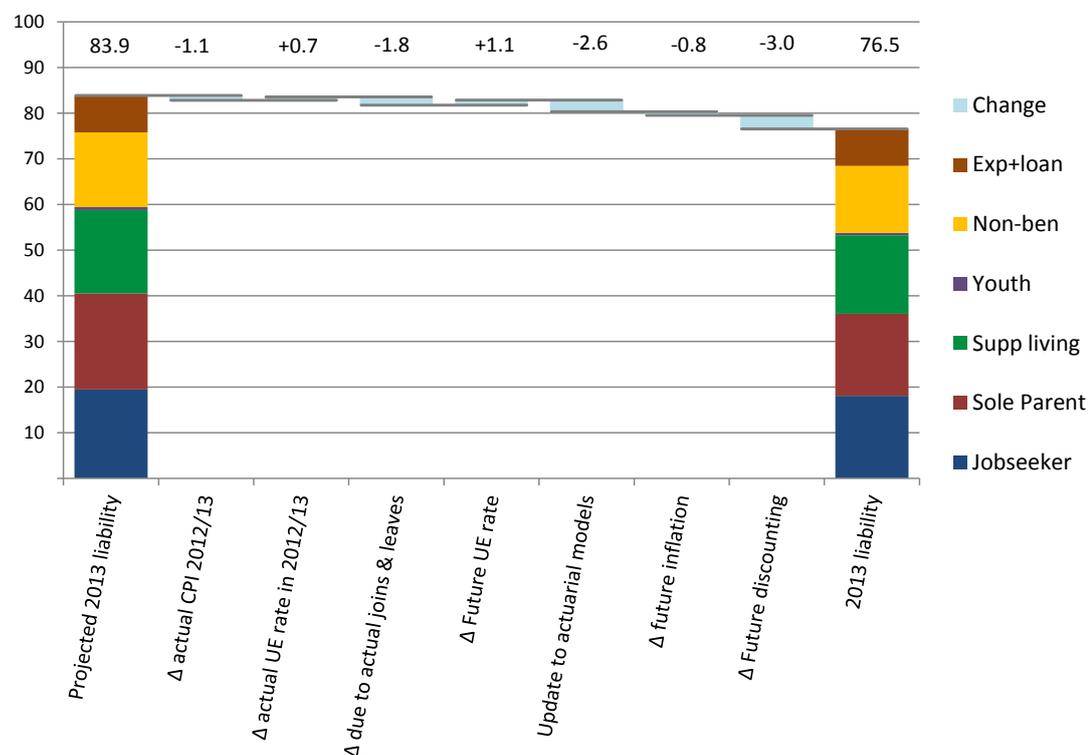
Note: Δ = change

The following components make up the difference:

- The CPI increase applied to benefits on the 1st of April 2013 was 0.77%, which is 1.33% lower than the projected 2.1%. This reduced the liability by $1.1b, as the payment level of future cash flows is reduced by the difference.

- The unemployment rate fell from 6.8% to 6.4% over 2012/13. In contrast, it had been expected to fall smoothly to 6.06%. All other things being equal, we would have expected this to increase the liability by $0.7b, as slightly more people remain on benefit and additional people enter. The difference is relatively small due to the path of the unemployment rate over the year; in fact, the actual rate fell to 6.2% by the March 2013 quarter, which was lower than the 6.24% expected, before rising to 6.4% in the last quarter.

- The liability is reduced by $1.8b due to the composition of the current client liability cohort being different to what was expected. This is mainly due to a lower number of clients falling in the current client liability definition than expected (more leaves and fewer joins), but also partly attributable to the mix of clients on benefit (see Section 5.3).

- The future unemployment rate is now forecast to be higher over the next five years than it was at the previous valuation, mainly reflecting the slightly worse than expected experience over 2012/13. This tends to lengthen stays on benefit and increase numbers entering, and increases the liability by $1.1b.

- We have updated the transition, payment and expense models to reflect emerging experience. This has led to a $2.6b decrease in the valuation. See Section 5.4 for further information.

- Inflation forecasts for 2013/14 through to 2017/18 have been lowered somewhat compared to the previous valuation, with the cumulative effect by 2017/18 being 1.1% lower. This reduces the valuation by $0.8b.

- Discount rates have generally increased compared to the previous valuation. Over the first 20 years of the projection forward rates are about 0.5% higher than last year. However this impact is partly offset by a lower long term rate of 5.5% (compared to 6% last year). The overall impact is a decrease in the liability of $3.0b.

The two items which can be regarded as most within MSD's control are the decreases relating to:

- Change due to actual leaves and joins: To what extent did the numbers and characteristics of people on benefit differ to what was expected

- Change due to updates to actuarial models: These models are updated to reflect recent experience of how clients are moving through the welfare system and the average benefit payments they receive during a quarter

We discuss these items in further detail in the next two subsections.

The large impact of inflation and discounting assumptions means it is useful to look at the updated valuation results before applying these changes. These results, split by component, are shown in Table 5.1. Of particular note is that the net change in the current client liability due to changes in inflation and discounting is a decrease of $3.8b.

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Component		2012 current client liability ($b)	2012 CL after correction ($b)	2013, before Infl. & disc. change ($b)	2013 current client liability ($b)
Tier 1:	Domestic Purposes Benefit	18.7	18.4	15.7	15.1
	Invalid's Benefit	22.8	22.5	22.5	21.4
	Sickness Benefit	8.8	8.6	8.4	8.0
	Unemployment Benefit	3.9	3.8	3.4	3.3
	DPB-Care of the sick and infirm	2.1	2.0	1.9	1.8
	Emergency Benefit	0.3	0.3	0.3	0.3
	Orphans and unsupported children	1.5	1.5	1.5	1.4
	Woman Alone / Widows Benefit	2.0	2.0	1.5	1.5
	Tier 1 subtotal	**60.1**	**59.1**	**55.3**	**52.7**
Tier 2:	Accommodation Supplement	11.1	10.9	9.8	9.4
	Disability Allowance	2.1	2.0	1.9	1.8
	Child Disability Allowance	1.0	1.0	0.8	0.8
	Child Care Subsidy	1.2	1.2	1.1	1.1
	Tier 2 subtotal	**15.3**	**15.0**	**13.7**	**13.1**
Tier 3:	Hardship Assistance	2.9	2.8	2.7	2.6
	Employment Interventions	0.2	0.2	0.1	0.1
	Tier 3 subtotal	**3.0**	**3.0**	**2.8**	**2.7**
Other components:	MSD Expenses	8.0	7.8	8.1	7.7
	Net loans cost	0.4	0.4	0.4	0.4
	Other components subtotal	**8.4**	**8.2**	**8.5**	**8.1**
	Grand total	**86.8**	**85.3**	**80.3**	**76.5**

5.3 Change due to actual leaves and joins

In the previous section we saw that $1.8b of the decrease in the current client liability was due to the cohort population being different to expected. This can be attributed to different numbers in the various segments, as shown in Figure 5.3. Note that in this section, we allocate clients to segments based on their benefits received over the quarter, rather than their status at quarter end.

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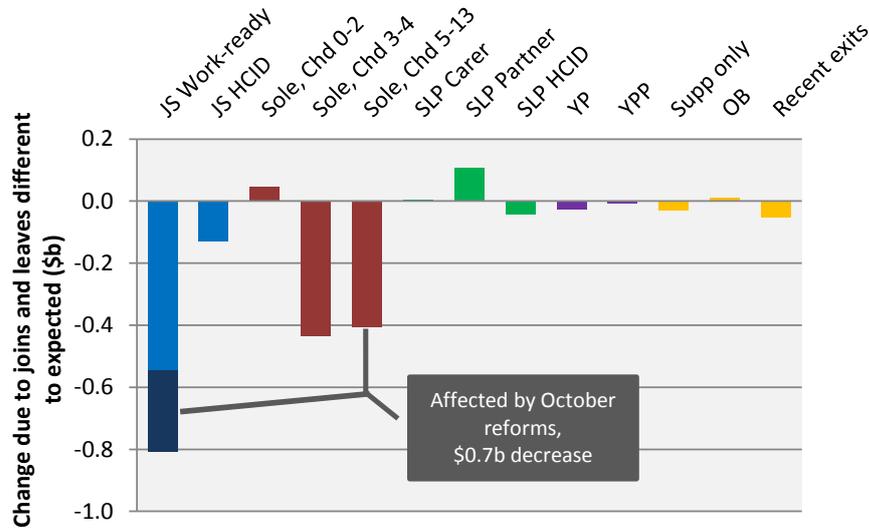
We observe that:

- The bulk of the reduction arises from those Sole parent segments with youngest child older than 2 and the Jobseeker work-ready segments. They collectively account for $1.6b of the reduction. All other segments had smaller changes in absolute terms. These results reflect those already seen in the actual versus expected analysis of Section 3.

- Two of the segments experienced small increases – SLP-partner and Sole parents with youngest child 0-2.

- The $0.81b reduction attributable to the Jobseeker work-ready segments can be further subdivided by (pre July 2013) benefit type. This is shown in Figure 5.4. Of note is that $0.5b is attributable to UB, while $0.2 is attributable to DPB (those with youngest child 14 and over). Combining the latter figure with the WA/WB reduction and the oldest Sole Parent segments, **$0.7b of the reduction can be attributed clients groups which were directly affected by the October reforms** – DPB with youngest child at least 5 and clients on WA/WB.

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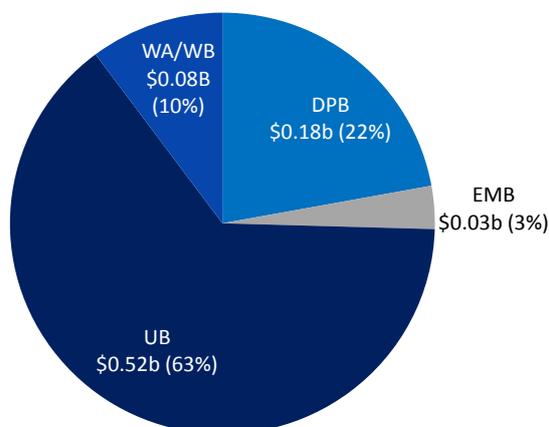
The changes in the various segments can be attributed to:

- The change in numbers in segment, relative to what was expected
- The average lifetime liability of those in the segment, relative to what was expected

The change in the average liability reflects how the characteristics of a segment have changed. For example, if the average age of people in a segment decreased more than expected then this would tend to increase the average liability. Table 5.2 below attributes the overall changes to numbers and average lifetime liability.

The table shows that overall the bulk of the decrease can be attributed to numbers of clients within segments, but that there has been a slight increase in average liability to partially offset this effect. This is particularly pronounced in the Jobseeker segments, where the average liability has increased by 2-3% compared to what was expected. The Youth segments are notable for having a 3% decrease in average liability due to the distribution of clients.

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Change in segment level liability due to numbers in segment and average liability[21]. Segments split by continuous duration have been combined

Segment	Numbers			Average liability (excl loans and exp)			Total liability (excl loans and exp)		
	Expct 000s	Actual 000s	Ratio	Expct $000	Actual $000	Avg	Expct $m	Actual $m	Total
JS Work-ready	118	108	91%	103	106	103%	12,151	11,345	93%
JS HCID	82	80	97%	131	134	102%	10,765	10,636	99%
Sub-total	**201**	**187**	**93%**	**114**	**117**	**103%**	**22,915**	**21,980**	**96%**
Sole, Chd 0-2	32	32	99%	249	254	102%	7,970	8,016	101%
Sole, Chd 3-4	20	18	91%	234	233	99%	4,669	4,235	91%
Sole, Chd 5-13	43	41	95%	202	202	100%	8,643	8,237	95%
Sub-total	**95**	**90**	**96%**	**225**	**226**	**101%**	**21,282**	**20,487**	**96%**
SLP Carer	8.7	8.6	99%	144	147	102%	1,250	1,255	100%
SLP Partner	7.9	8.7	110%	110	112	102%	876	982	112%
SLP HCID	87	86	99%	180	182	101%	15,659	15,617	100%
Sub-total	**103**	**103**	**100%**	**172**	**173**	**101%**	**17,785**	**17,854**	**100%**
YP	1.7	1.7	95%	177	169	96%	308	281	91%
YPP	1.4	1.4	101%	281	273	97%	391	383	98%
Sub-total	**3.1**	**3.1**	**98%**	**223**	**217**	**97%**	**699**	**663**	**95%**
Supp only	105	103	98%	57	58	102%	6,016	5,987	100%
OB	5.0	5.0	101%	96	97	101%	477	488	102%
Recent exits	111	111	100%	58	57	99%	6,423	6,369	99%
Sub-total	**221**	**219**	**99%**	**59**	**59**	**100%**	**12,916**	**12,844**	**99%**
Grand total	**623**	**602**	**97%**	**121**	**123**	**101%**	**75,598**	**73,829**	**98%**

We have attempted to apportion the distributional changes in the populations to the underlying variables, for the segments that have seen the largest changes. Such apportionments are difficult because of the complex interactions that exist between different variables, but they can be useful nonetheless. Figure 5.5 shows the impact of different client characteristics between the expected current client cohort and the actual cohort seen at June 2013, for Work-ready Jobseekers. Each bar represents the impact on the average liability due to unexpected changes in those characteristics, with the summation of those bars equalling the overall change in average liability seen in Table 5.2.

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[21] Numbers and amounts assigned based on status during the quarter as opposed to status at the end of the quarter.

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Figure 5.5 **Estimation of the impact of distribution change on the average lifetime liability for the Work-Ready Jobseeker segments**
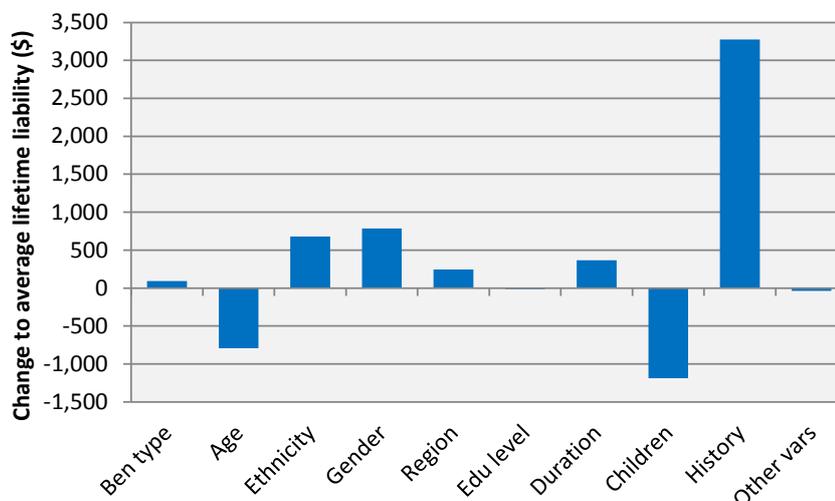

The overall lifetime cost for the segments increased by $3,400 (after allowing for 2012/13 unemployment rates but before allowing for model updates or new inflation and discounting rates). The bulk of this change is attributable to the client benefit history variables – those variables that indicate how many quarters a client has spent in the various benefit types. This suggests that the reduction in client numbers seen for these segments has not been spread completely evenly. Rather, those clients with longer histories (and those higher liabilities) have been under-represented in the extra exits from the system, while those with shorter histories (and lower liabilities) have had additional exits). In terms of the other effects:

- The overall age distribution has risen slightly, which lowers the average lifetime liability by about $800.
- The average child age of those work-ready jobseekers on DPB has risen slightly, decreasing the average liability by $1,200.
- The ethnicity and gender distributions have changed in a way that increases the average liability, by about $700 and $800 respectively.

Figure 5.6 shows the equivalent information for the two youth segments combined. The average liability for these segments has fallen by $4,200. The main decreases are attributable to changes in the distributions of ethnicity, duration and client benefit history characteristics (a combined decrease of $5,000). This suggests the population of clients in the Youth segments is a "newer" population with less time in the system and thus a better chance of exiting the system. The main offsetting factor was benefit type – the proportion of clients in the YPP (or DPB) segment, rather than YP, is higher than expected which increases the average liability by $2,200. Note that there is higher than usual uncertainty attributable to the youth segments, due to the data issues discussed in Section 15.4.3.

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Figure 5.6 **Estimation in the impact of distribution change on the average lifetime liability for the two Youth segments**
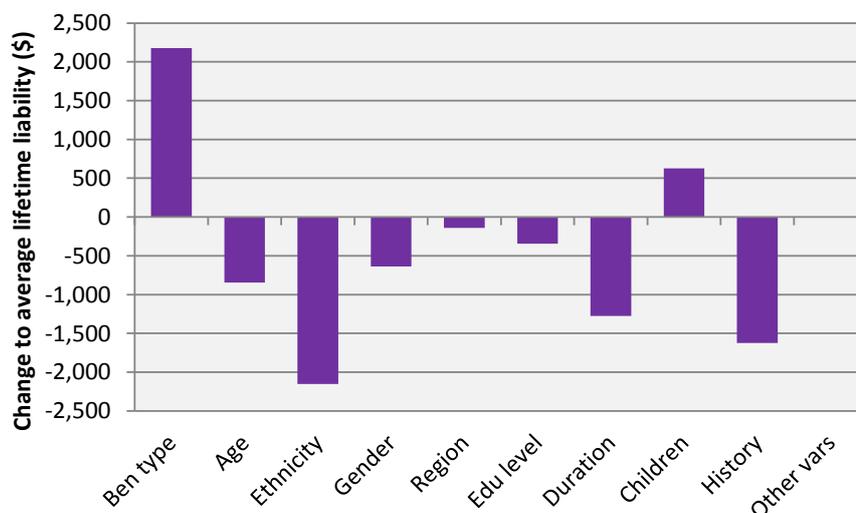
5.4 Updates to actuarial models

The change analysis shows that changes to actuarial models have decreased the current client liability by $2.6b. Changes to actuarial models are a normal part of the valuation control cycle, as recent experience is incorporated into future projections. This year the change is primarily driven by changes to five aspects of the projection:

- The rate at which people exit the DPB benefit state
- The rate of re-entry into the welfare system of people who have exited
- The Tier 1 payment levels for DPB clients
- The level of Accommodation Supplement for SB clients
- The projected expenses attributable to the current client liability

We summarise the impact of the changes due to each of these models in Table 5.3 below. The contribution from all other models is relatively small, representing a decrease of $0.35b.

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Table 5.3 **Impact of updates to actuarial models**[22]

Model	Current client liability	Change	Cumulative change
	$b	$b	$b
Liability using 2012 models	**82.9**		
Impact of all model updates except the five listed below	82.6	-0.3	-0.3
Impact of transition rate out of DPB	82.1	-0.5	-0.8
Impact of AS model for SB clients	81.9	-0.2	-1.0
Impact of Tier 1 ABP model for DPB clients	81.0	-0.9	-1.9
Impact of re-entry rate of clients who exit the welfare system	79.8	-1.2	-3.1
Impact of expense and loan models	80.3	0.5	-2.6
Liability using 2013 models	**80.3**		**-2.6**

We give further detail on the significant model changes below.

5.4.1 Rate of re-entry into the welfare system

Figure 5.7 shows the historical and projected rates of re-entry into the welfare system. Over the past couple of years these rates have been near record lows, meaning that more people tend to remain off benefits after departure. We have slightly lowered the projected rate of re-entry to reflect this experience over the past two to three years.

The valuation is highly sensitive to the rate of client re-entry, so the 0.2 percentage point drop in the projected re-entry rate leads to a $1.2b decrease in the overall liability.

Re-entry rates peaked during the GFC but have been steadily falling and are now lower than pre-GFC levels. The GFC period coincided with a change to the processing of new benefits to accommodate increasing numbers of applicants. Recent years have seen a return to a more intensive triage prior to benefit grant, with the aim of helping more people who initially inquire about benefits from actually progressing onto the benefit. This change may have contributed to the lower levels of benefit re-entry.

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[22] Current client liability uses 2012 assumptions for inflation and discounting, consistent with the ordering of the breakdown in Figure 5.2

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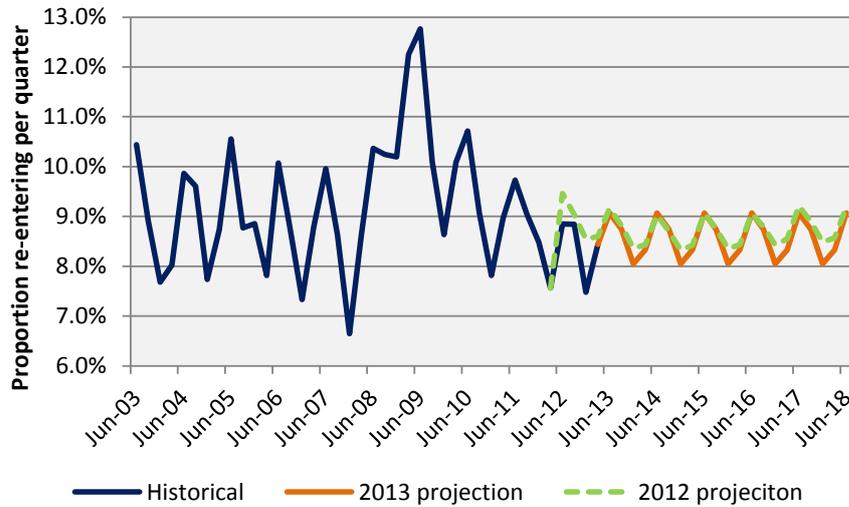
5.4.2   Payment models for DPB and SB clients

Both the Tier 1 payment model for DPB clients and the Accommodation Supplement model for SB clients have seen strong historical upward trends (in real terms) up to June 2012. Last valuation we continued this trend for a number of years, as shown in Figure 5.8 and Figure 5.9 below. However, these growth trends have flattened over the past year, and we have removed the extrapolation from both models.

Figure 5.8 **Average Tier 1 benefits paid to DPB clients, historical and projected, in June 2013 values**
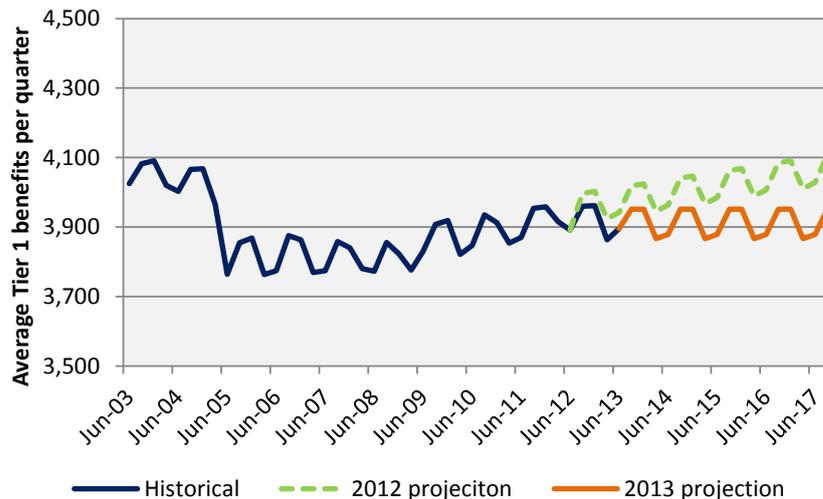
In understanding the trend in DPB payment levels, we observe:

- In general our expectation is that benefits are expected to remain flat in real terms (the chart shows average payment rates after adjusting for past CPI). This is consistent with the increases in benefit rates being CPI linked.

- Shifts from the constant level would mainly be related to changes in policy, slow demographic changes (e.g. numbers of children), and changes the number of clients with part time income.

- The large shift following the GFC observed in the chart is likely to be related to reductions in part time work income. We understand from MSD that the numbers of beneficiaries receiving part-time income did indeed decline during the GFC and has started to return to pre-GFC levels in recent years.

We believe that the flattened trend is reasonable, in the absence of further shocks, economic or otherwise.

Figure 5.9 **Average Accommodation Supplement paid to SB clients, historical and projected, in June 2013 values**
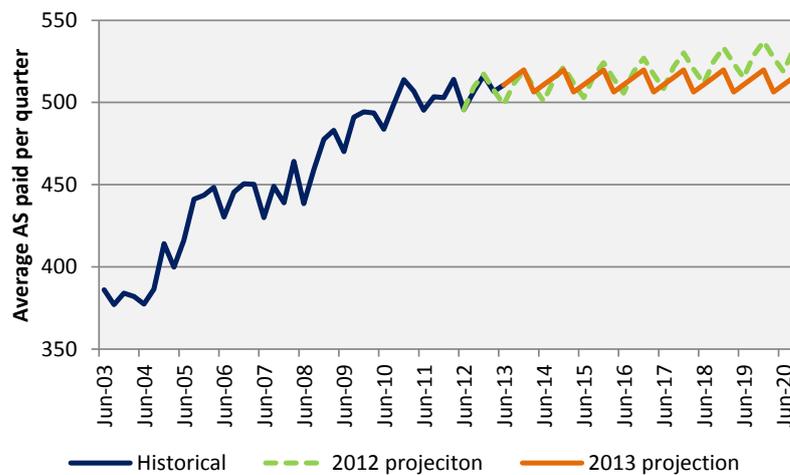
In a similar fashion to DPB Tier 1 payments, the strong historical trend in Accommodation Supplement payments to SB clients has flattened over the past 12 months and we have reflected this in the projection. The accommodation supplement is not tied to changes in CPI but is tied to changes in housing costs. Nevertheless we have assumed that over the long term these costs will rise in line with CPI. Hence the flat trend (in June 2013 values) seems appropriate. At subsequent valuations we would generally forecast the future level at a rate similar to the recent past (implying only small up or down shifts in the level) unless a strong trend with known cause re-emerges.

The change to the DPB Tier 1 payment model reduced the liability by $0.9b, while the change to the SB Accommodation Supplement model reduced the liability by $0.2b.

5.4.3   Transition rate out of DPB

The rate of clients exiting DPB has increased markedly over the past year, from 6.2% per quarter in 2011/12 to 7.0% per quarter in 2012/13. This can be seen in Figure 5.10. Much of this increase is probably attributable to the October 2012 policy changes. Projection of this rate is difficult and carries significant uncertainty:

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- Some reforms can often cause a temporary "boost" to rates as the sub-population most heavily affected by the reforms exit quickly. Once this has taken place over the first year or so, rates return to their historical level.
- Other reforms can systematically alter client behaviour over the long term. This would correspond to transition rates remaining high for an extended period of time.

It is too early to determine to which situation the current reforms most closely correspond. We have elected to project transition rates returning quickly to their pre-reform historical levels. These rates are still slightly higher than what was projected in 2012, leading to a $0.5b decrease in the liability. The increase partially reflects the higher levels observed in June and September 2012 quarters, prior to the reforms. The projection levels of this particular model should be evaluated carefully in the next valuation, when more data is available.

Figure 5.10 **Quarterly rate at which clients exit DPB, either exiting the system or moving to another benefit type**
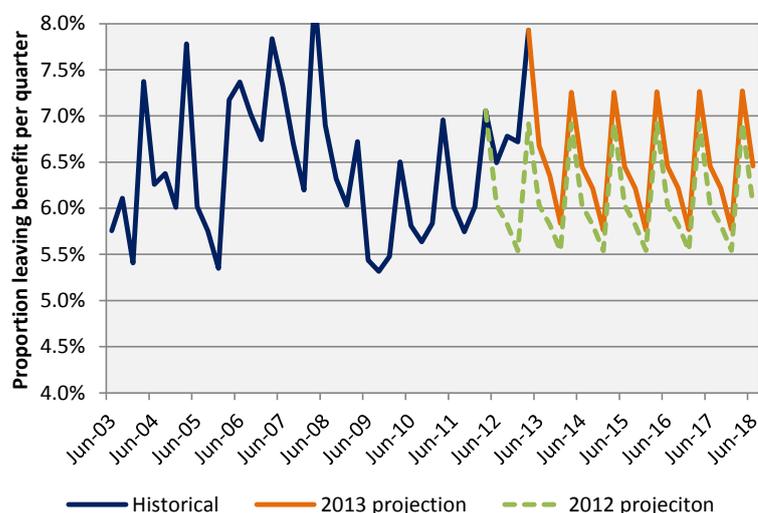
The potential impact of the transition rate uncertainty on the overall liability is discussed in Section 6.1.

5.4.4   Expense rate

The average expense rate has been increased from 10.1% to 11.3%. This is primarily due to two factors:

- Total welfare payments has fallen faster (in real terms) than expenses. This results in a higher resulting expense rate.
- We have improved the projection methodology to better reflect the continued decrease in total payments. This causes expenses (which are treated as fixed in real terms) to increase as a proportion of total payments. In the previous valuation this rate was projected to remain relatively constant.

This change adds about $0.5b to the current client liability, compared to adopting the 2012 rates.

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Figure 5.11 **Historical and projected expense rates**
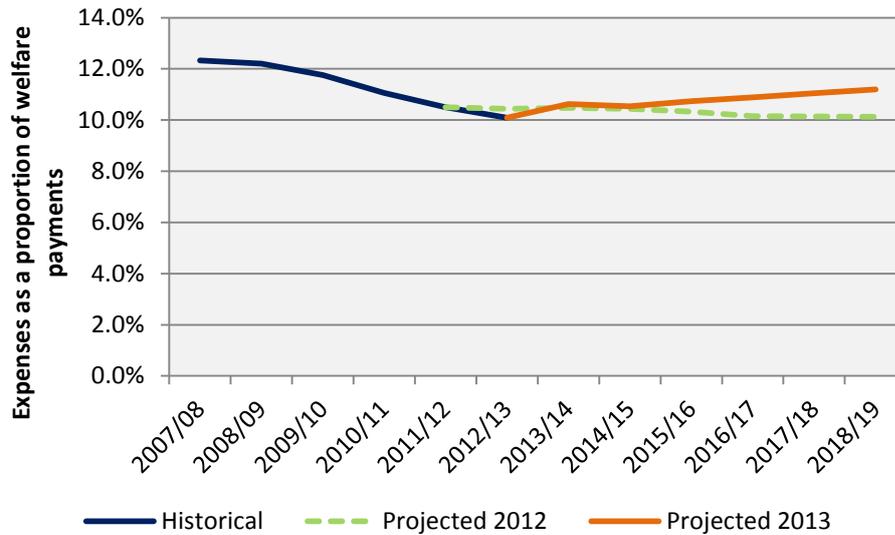
5.5 Impact of changes on cash flows to 2018

Thus far we have expressed the changes in the liability as lifetime cost. In reality this reduction is spread over a number of years, with the impact of cash flows over the next few years having particular relevance. The impact of the changes discussed in Sections 5.3 and 5.4 over the next five years are shown in the figure and table below.

Figure 5.12 **Decrease in forecast quarterly payments (excluding net loans and expense), due to client cohort and model changes**

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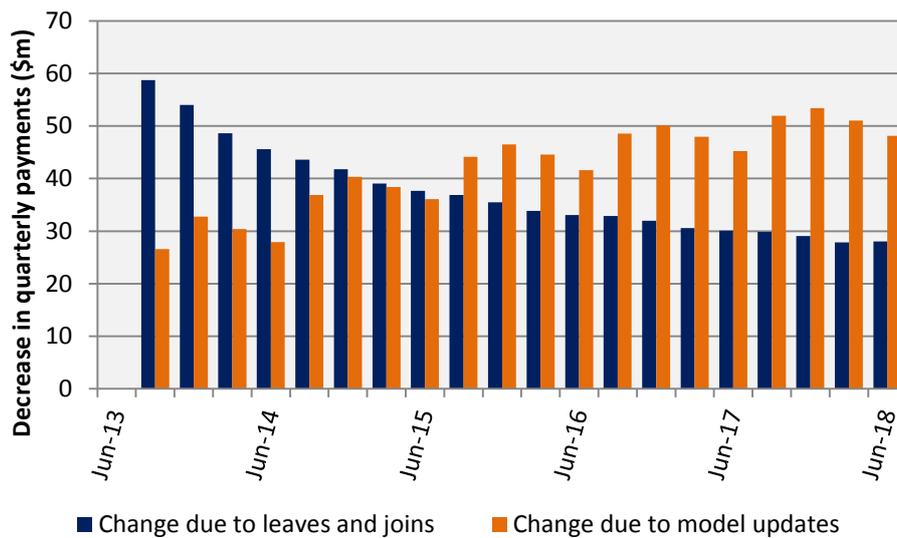
Table 5.4 Decrease in forecast annual benefit payments due to client cohort and model changes

Year	Change due to leaves and joins	Change due to model updates	Total
	$m	$m	$m
2013/14	207	118	325
2014/15	162	152	314
2015/16	139	177	316
2016/17	125	192	317
2017/18	115	205	319
Five year total	**749**	**842**	**1,591**

The results show that $0.75b of the reduction due to actual joins and leaves will occur in the next five years. Similarly $0.84b of the reduction due to model changes is projected to occur over in the next five years. This corresponds to $37m and $42m average reductions per quarter respectively, although the figure shows that the reductions are not spread evenly. In the case of changes due to actual joins and leaves the decrease is largest immediately and decays over time. Conversely, the impact due to model changes starts smaller and increases over time.

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6   UNCERTAINTY, KEY RISKS AND SENSITIVITY ANALYSIS

The estimation of the current client liability and future client liability is subject to influences whose effects cannot be determined with accuracy. Consequently, it is a virtual certainty that the ultimate liabilities will depart from any estimate, but the extent of this departure is subject to uncertainty. If potential outcomes and their relative likelihood were expressed as a probability distribution, we would consider our liability estimates to be the mean of that distribution. In particular, the estimates provided in this report contain no deliberate bias towards over or under estimation.

We may group the sources of uncertainty into two categories:

- **Independent (non-systemic) risk**: This represents those risks to the accuracy of estimates arising due to random variability in the number and amount of benefit payments

- **Systemic risk**: This includes risks that, potentially, are common across more than one benefit type.

These are discussed in more detail below.

Independent risk

Independent or non-systemic risk arises from two sources:

- **Parameter error**: Assuming that the model structure is correct, this is the extent to which the randomness associated with the benefit payment process causes the parameters to be estimated incorrectly.

- **Process error**: Assuming that the model structure is correct and the parameters correctly estimated, this is the risk that the future projections still deviate from our projected values due to the volatility in the benefit payments process. This also includes random error introduced by the simulation based approach we use for the projection.

Relative to systemic risk, independent risk is small and therefore we do not consider it further.

Systemic risk

Systemic risks may be divided into two groups:

- Risks which are internal to the valuation process, which may also be referred to as **model specification risk**. This risk derives from the uncertainty over to what extent the models and valuation process as a whole deviate from a perfect representation of the benefits payments process, which is a complex, real-life system.

- Risks external to the valuation process which include future changes in the environment. This uncertainty reflects the fact that, even if our valuation model was

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perfectly correct, future legislative, policy, behavioural, demographic or economic changes may result in actual experience differing from our projections.

Sources of internal and external systemic risks are discussed in more detail below.

6.1   Model specification risk

As indicated above, model specification risk is a source of uncertainty internal to the valuation process and represents the uncertainty from the fact that the models are an imperfect representation of a complex real-world process.

Model specification risk may be minimised by following good modelling practices which include:

- Developing a model structure that represents the major drivers of benefit payments in a robust manner

- Testing the models thoroughly including actual versus expected analyses and backtesting (taking historical cohorts, projecting them forward in time and comparing the results with actual experience)

However, even after following these steps, the resulting models will still be an imperfect reflection of reality. There is a real risk that future results may deviate materially from projections due to factors not captured in the models.

By its nature, model specification risk is difficult, if not impossible, to quantify. However, we have looked at the sensitivity of the valuation results to one component of the model – the change in the probabilities of changing benefit for those currently in receipt of a key Tier 1 benefit. Table 6.1 presents the results for a 5% change in each of these probabilities, as well as with the results for a similar change to the probability of moving onto benefit (either a key Tier 1 or other minor benefit) from a current position of being off benefit, for the current client liability. Changes in liability use inflated and discounted amounts throughout this section.

Table 6.1 **Sensitivity of current client liability valuation results to changes in the probability of moving off the current benefit**

| Probability changed | Change in probability of moving off/onto benefit | | | |
| | 5% decrease | | 5% increase | |
	Change ($B)	Change (%)	Change ($B)	Change (%)
All key tier 1	1.6	2.4%	-1.5	-2.3%
Off DPB	0.7	1.0%	-0.6	-0.9%
Off IB	0.4	0.5%	-0.3	-0.5%
Off SB	0.4	0.6%	-0.4	-0.5%
Off UB	0.3	0.4%	-0.2	-0.3%
Off SUP	-0.1	-0.1%	0.1	0.1%
Onto benefit (=off NOB)	-1.5	-2.1%	1.4	2.1%

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If the probabilities of moving off benefit for all Tier 1 benefits fall by 5%, then the key Tier 1 liability would increase by 2.4% since a lower probability of moving means fewer transitions to non-key Tier 1 benefits or going off benefit. Conversely, the key Tier 1 liability would decrease by 2.3% in the wake of a 5% increase in the probability of moving off benefits.

Changes in the probability of going onto benefit from a current position of being off benefit (NOB) also have a somewhat similar impact – a 5% increase in the likelihood of transitioning onto a benefit leads to a 2.1% increase in the key Tier 1 liability.

The effects on the estimate of total current client liability of changes to individual key Tier 1 probabilities are lower.

6.2 Policy Change

Policy change is an external risk to the estimates and represents the uncertainty arising either directly or indirectly from current and future government initiatives and actions. Some hypothetical examples would include:

- Changing rules around accessing benefits and rates paid
- Job creation initiatives
- Significant operational changes to the service and delivery model

Policy change extends to include the unknown impact of ongoing and planned reforms such as the Future Focus reforms and changes to work expectations and benefit categories through Welfare Reform. Welfare Reform changes were discussed in more detail in Section 2.4.

6.3 Economic Risks

Economic uncertainty is also an external risk. For this valuation, the uncertainty derives from future unemployment rates as well as future inflation and discount rates.

The unemployment rate is a driver for many benefits, in particular the Unemployment Benefit. Furthermore, all benefits are indexed annually in line with inflation as measured by the CPI index, so changes in the future rates of inflation relative to those assumed in the valuation will affect the results. Finally the results are discounted to the valuation date to recognise the time value of money; these results will change, perhaps materially, if actual discount rates vary sufficiently from those assumed.

We consider each of these in more detail below.

6.3.1 Unemployment Rate

Many of the projection models have a heavy dependence on the unemployment rate, the key indicator used by the valuation to measure the health of the labour market. We can test the sensitivity of the liability to the unemployment rate by inserting different scenarios and observing how the liability changes. Note that this represents the impact of

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a changed unemployment rate in the absence of any policy or other changes, including the reforms discussed above. We have considered four unemployment rate scenarios:

- Adopted (Treasury estimate): A long term trend of 4.5% is reached by June 2022
- A long term trend of 3.5% is reached by June 2022
- A long term trend of 5.5% is reached by June 2022
- A long term trend of 6.5% is reached by June 2022

These scenarios are illustrated in Figure 6.1.

Figure 6.1 **Unemployment rate scenarios tested**
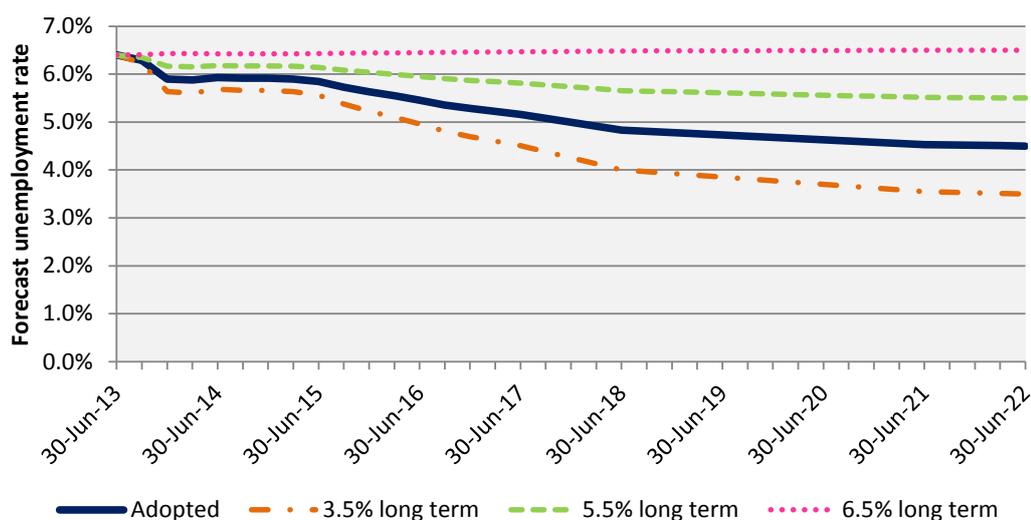
The impact of the different scenarios by benefit type is shown in Table 6.2.

Table 6.2 **Sensitivity of estimated current client liability, excluding loans and expenses, to future unemployment rates**

Change in unemploy-ment rate	Treasury estimate (4.5% long term rate)	3.5% long term unemployment rate		5.5% long term unemployment rate		6.5% long term unemployment rate	
	Liability ($b)	Liability ($b)	Change	Liability ($b)	Change	Liability ($b)	Change
DPB	15.1	14.6	-3.3%	15.6	3.5%	16.1	7.1%
IB	21.4	20.9	-2.4%	21.8	1.9%	22.0	3.1%
SB	8.0	7.4	-7.9%	8.7	8.5%	9.5	18.5%
UB	3.3	2.8	-15.1%	3.9	19.2%	4.6	41.6%
Other Tier 1	4.9	4.6	-6.0%	5.2	6.0%	5.6	12.6%
Tier 2	13.1	12.5	-4.1%	13.6	4.2%	14.2	8.9%
Tier 3	2.7	2.6	-4.7%	2.8	4.9%	3.0	10.1%
Total	**68.5**	**65.4**	**-4.5%**	**71.7**	**4.7%**	**75.1**	**9.7%**

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We make the following comments regarding the results:

- The overall sensitivity to the unemployment rate is moderately high. A 1% increase in the long term unemployment rate tends to increase the liability by 4.7%. In the 5.5% unemployment rate scenario this corresponds to a $3.2b increase to the liability.

- UB is the most heavily affected benefit. If the unemployment rate remained around current levels at 6.5%, the liability corresponding to UB payments would be expected to be more than 41% higher.

- SB is also heavily influenced by the unemployment rate, although not as much as UB. Its sensitivity is about twice the average of all benefits.

- Unsurprisingly, IB is the least sensitive to the unemployment rate of the large benefit types. However it still shows some difference – reflecting some people who do remain on the benefit longer due to an adverse labour market.

- The unemployment rate sensitivity reduced significantly since the last valuation. This mainly relates to a recalibration of how re-entries into the system respond to the unemployment rate. We have placed more weight on recent experience, which has shown less dependence on the unemployment rate. The changing relationship between the re-entry rate and the unemployment rate adds some uncertainty to the estimation of sensitivity but does not impact the main results presented in Section 4.

6.3.2   Inflation

Benefits are indexed annually on 1 April in line with the change in the CPI index in the preceding calendar year. Thus an increase in inflation relative to that assumed in this report will lead to higher cash flows, whereas a decrease will have the opposite effect. Table 6.3 gives the results for the sensitivity of the total current client liability to a 1% change in the inflation rate. We note that the impact is quite material.

Table 6.3 **Sensitivity of the total current client liability, excluding loans and expenses, to changes in the inflation rates**

Scenario	Liability ($B)	Change ($B)	Change (%)
Base	68.5		
Inflation + 1%	76.0	7.5	11.0%
Inflation - 1%	62.1	-6.3	-9.3%

This sensitivity is slightly lower than the equivalent changes estimated last year.

6.3.3   Interest Rates

A change in future interest rates does not affect the future cash flows; rather it affects the value of the liability discounted after allowing for future investment income. To value the discounted liability, we have used the rates provided by Treasury for use in the Crown accounts for valuations at 30 June 2013.

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If future discount rates fall by 1% relative to their 30 June 2013 values, the total liability would increase by nearly 12%.

Table 6.4 **Sensitivity of the total current client liability to changes in the discount rates**

Scenario	Liability ($B)	Change ($B)	Change (%)
Base	68.5		
Discount rate + 1%	62.1	-6.4	-9.3%
Discount rate - 1%	76.2	7.7	11.3%

This sensitivity is also slightly lower than the equivalent changes estimated last year.

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PART C
VALUATION BY COMPONENT

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PART C.1
RESULTS BY SEGMENT

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7 JOBSEEKER SUPPORT SEGMENTS

7.1 Introduction

The Jobseeker Support benefit, introduced in July 2013, is designed to cover all welfare recipients who have full-time work obligations or who are temporarily unable to seek full-time work. It represents an amalgamation of the following benefit types:

- Unemployment Benefit
- Sickness Benefit
- Domestic Purposes Benefit – Sole Parent, with youngest child aged 14 or more
- Widow's Benefit, with no child or youngest child aged 14 or more
- Domestic Purposes Benefit – Woman Alone Benefit
- Emergency Benefit

The specific benefit payment codes, and their relative contribution to 2012/13 payments, are shown in Table 7.1. Note that child age for WB/WA was unavailable, so we have allocated all WB/WA payments to jobseeker support segments.

Table 7.1 **Benefit types applicable to Jobseeker Support segments**

Benefit Type	Benefit Name	% 12/13 benefit
DPB (child ≥ 14)	Emergency Maintenance Allowance	0.2%
	Domestic Purposes Benefit	9.0%
EB	Emergency Benefit	2.2%
SB	Sickness Benefit	43.3%
	Sickness Benefit Hardship	0.5%
UB	Unemployment Benefit Hardship	0.3%
	Unemployment Benefit Hardship Training	0.1%
	Unemployment Benefit Training	3.6%
	Unemployment Benefit	34.6%
WA/WB	Widows Benefit	3.7%
	Woman Alone Benefit	2.4%

The historical modelling of UB also includes the Young Jobseekers Allowance and the 55+ Benefit, both discontinued in 2000.

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To reflect the importance of the new Jobseeker Support benefit, four of the segments are based around Jobseekers:

- Work-ready, duration less than one year
- Work-ready, duration more than one year
- HCID[23], duration less than one year
- HCID, duration more than one year

The work-ready segments include those clients with full-time work obligations – of the list of old benefits above it includes all but SB. The HCID segments are those clients who receive SB, and thus have temporarily deferred or part-time work obligations.

While the new benefit categories were not in force at the valuation date, we have been able to assign clients to segments based on our calculation of benefit state, duration and child age. Note that duration is defined as continuous duration (time since last off benefits for at least 14 days). The Jobseekers segments allow us to better measure changes once the benefit is formally introduced in July 2013.

7.2   Recent experience

Table 7.2 below shows the numbers of recipients and payment amounts for the Jobseeker support segments over the 2012/13 year. We have estimated these numbers by assigning the old benefit categories to what they would become under the new benefit structure. The table shows that although there are more clients in the work-ready segments, a higher proportion of those in the HCID segments have duration greater than one year.

Table 7.2 **Recent experience in Jobseeker Support segments, 2012/13 year**

Segment	Payments ($m)	Average number on benefit during quarter (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
Work ready, <1yr	606	70,900	2,136
Work ready, >1yr	678	44,300	3,825
HCID, <1yr	325	32,400	2,509
HCID, >1yr	703	48,200	3,647
Total	2,312	195,800	2,952

The trends in numbers of clients in the various segments each quarter, as well as their average benefit payments, are shown in Figure 7.1 and Figure 7.2.

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[23] Health Condition, Injury or Disability

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Figure 7.1 **Numbers of clients in Jobseeker Support segments each quarter**
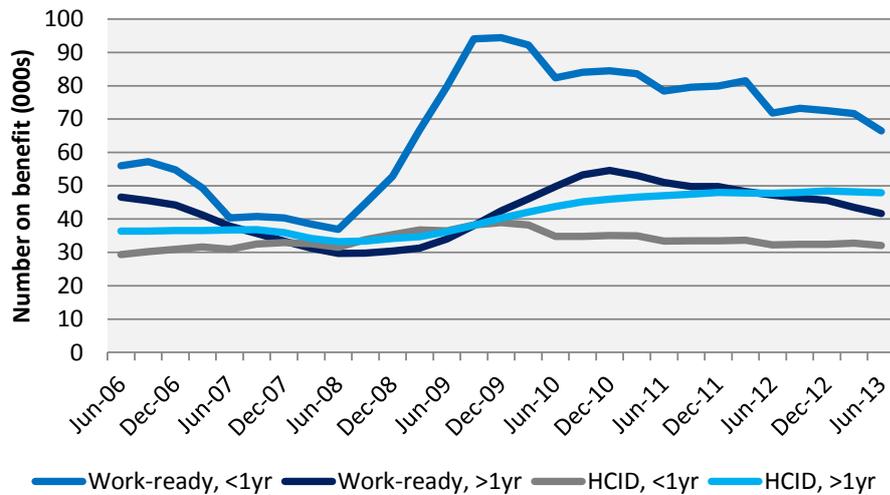
Numbers in the 'Work-ready <1yr' segment increased sharply during the GFC, as more clients began to receive unemployment benefits. This segment has decreased in numbers since late 2009 due to some clients exiting the welfare system and others remaining in and progressing to the 'Work-ready >1yr' segment. Numbers in both Work-ready segments have continued to gradually decrease in the past 12 months.

The 'Health Condition, Injury or Disability' segments also grew from late 2009. In contrast to the other segments, the 'HCID >1yr' group has continued to increase slightly in the 2012/13 year, continuing its trend over the past few years.

Figure 7.2 **Average quarterly payments to Jobseeker Support segments in June 2013 values**
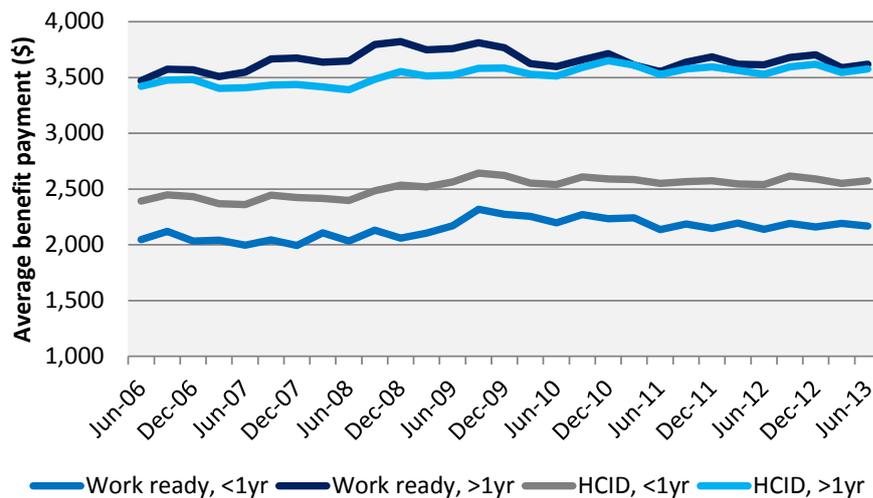
Average quarterly payments are lower for the low duration segments, as a greater proportion of clients exit the system before receiving a full quarter of benefits. Average benefit payments for the longer duration segments have been very similar over the past few years.

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Figure 7.3 shows the number of clients entering and leaving the Jobseeker Support benefit every quarter. A large proportion of the Jobseeker Support population transition each quarter and the majority enter from outside the system and leave by exiting the system. About 10% of entries and exits relate to movements to and from other benefit types.

The GFC period was characterised by both a lower number of clients leaving the segments and a significantly larger number entering. For the past three years, numbers entering and leaving have been very similar, except for a seasonal spike in exits occurring in the June quarter each year.

Figure 7.3 **Number of clients entering and leaving the Jobseeker Support segments.**
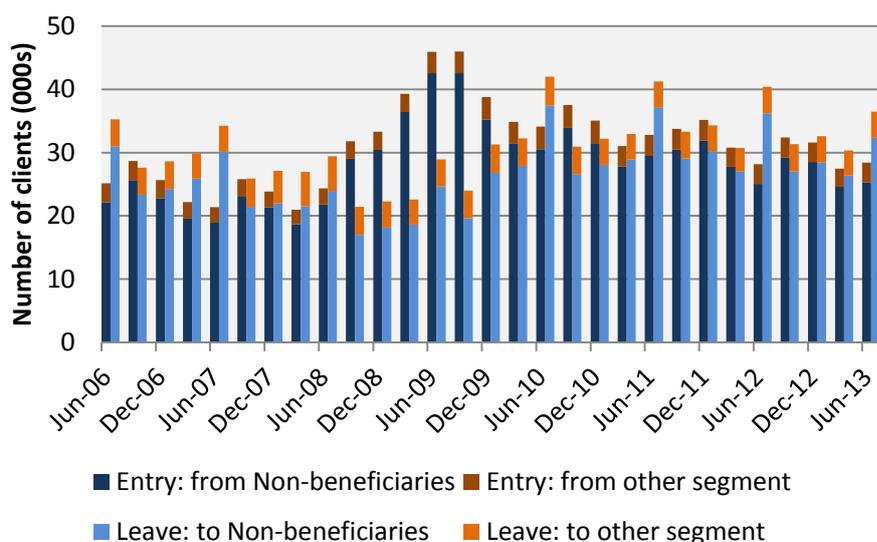
Note we do not count transitions from one Jobseeker segment to another in this figure.

The Jobseeker Support group represents a high transition group, with around 15% of clients entering or leaving in any given quarter. Furthermore, there is a large amount of movement between Jobseeker segments. The average number of people in each segment and the quarterly movements between them are shown in Figure 7.4. Of particular note are the approximately 5,400 (2.8% of the total number) clients who move between work-ready and HCID each quarter.

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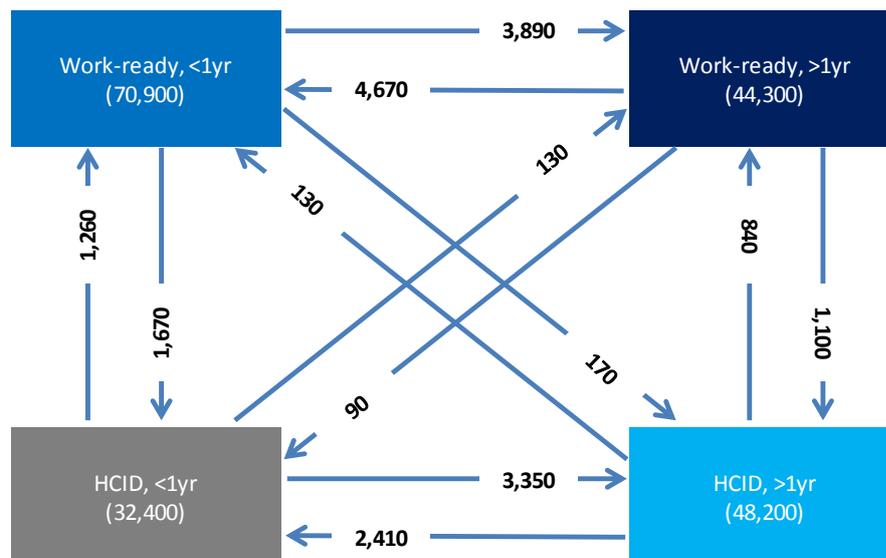
The clients moving from high duration to low duration segments are those clients that have a "break" in their benefit at some point in the quarter, which will reset their continuous duration calculation.

7.3   Modelling the Jobseeker Support Segments

Naturally, the numbers of clients in the Jobseeker support segments are strongly correlated to the unemployment rate. This connection is particularly significant for the Work-ready segments. Trends that can be observed in these segments are largely driven by models that are related to the Unemployment Benefit. Figure 7.5 shows the performance of the model that predicts the probability of a client remaining on Unemployment Benefit over the past few years. This model is one of the transition models used in the valuation, described in Section 16.3.1. It is clear that the deterioration in the economy led to a significant rise in this level in 2008/09. This is consistent with the observation of a higher number of clients on benefit during this period in Figure 7.1. However, over the last few years there has been a gradual downward trend from this high level despite the official unemployment rate remaining stable. The downward trend also means that recipients are less likely to receive benefit payments over the entire quarter. This trend is projected to continue in the future

- As the economy (and in particular the unemployment rate) improves and

- Due to the continuing impact of the Future Focus reforms

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Figure 7.5 **Probability client remains on Unemployment Benefit**
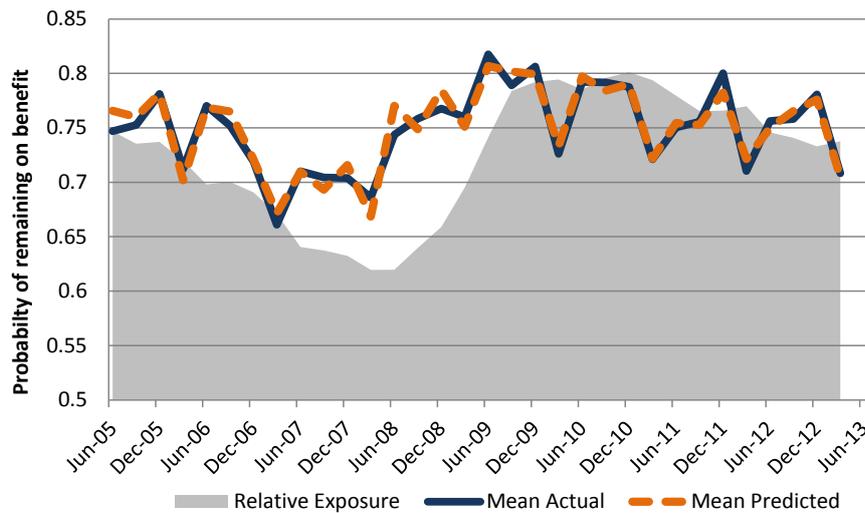
Similarly, trends that can be observed in the HCID segments are explained by models related to the Sickness Benefit. Unlike the Unemployment Benefit, it appears that the number of clients receiving Sickness Benefit has not started to decrease towards pre 2008/09 levels. Figure 7.6 shows that the probability of remaining on Sickness Benefit has increased slightly over the 2012/13 year. However, Treasury forecasts of gradual falls in the unemployment rate leads the model to project a slightly lower probability of remaining on benefit in the future.

Figure 7.6 **Probability client remains on Sickness Benefit**
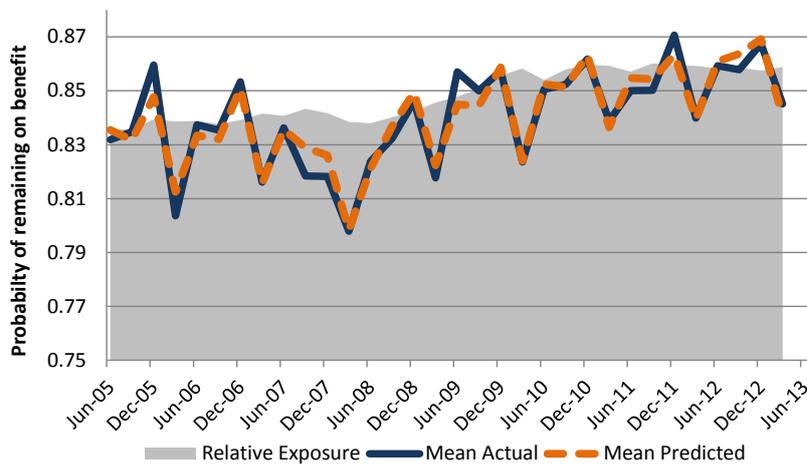
We have already discussed the fact that there are a large number of transitions between the Work Ready and Health Condition, Injury or Disability segments and vice versa. This is to some extent a recent phenomenon. Figure 7.7 shows the state (actual and modelled) that clients move to when they leave SB and do not exit the system, another one of the transition models described in Section 16.3.1. Over the past few years, about 40% of clients who move from SB transition into UB. This is significantly higher than the equivalent proportion prior to the GFC of about 25%. The IB peak corresponds to the changes related

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to the IB gateway rules and may also have impacted the increase in the proportion of clients moving into UB.

Figure 7.7 **Distribution of clients who move from Sickness Benefit to other benefits**
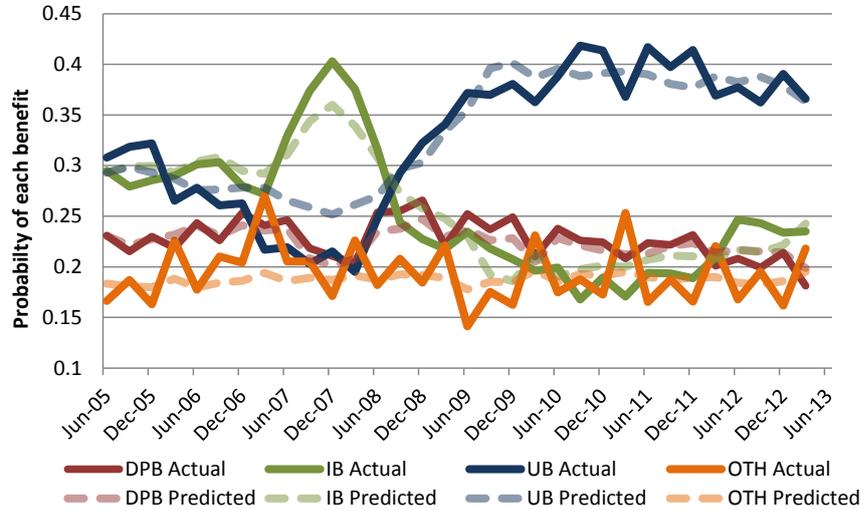
While the behaviours seen in the UB and SB represent the continuation of recent trends, significant changes are visible in the DPB portion of the Jobseekers cohort. Figure 7.8 below shows the probability that a Jobseeker client remains on DPB. It shows that the gradual decline seen from 2009 has accelerated in the past 12 months, reaching a record low (for the 20 years of available data) in the December 2012 quarter. This suggests a large number of exits related to the recent policy changes and greater uncertainty in the future rate.

Figure 7.8 **Probability client remains on Domestic Purposes Benefit (youngest child at least 14)**

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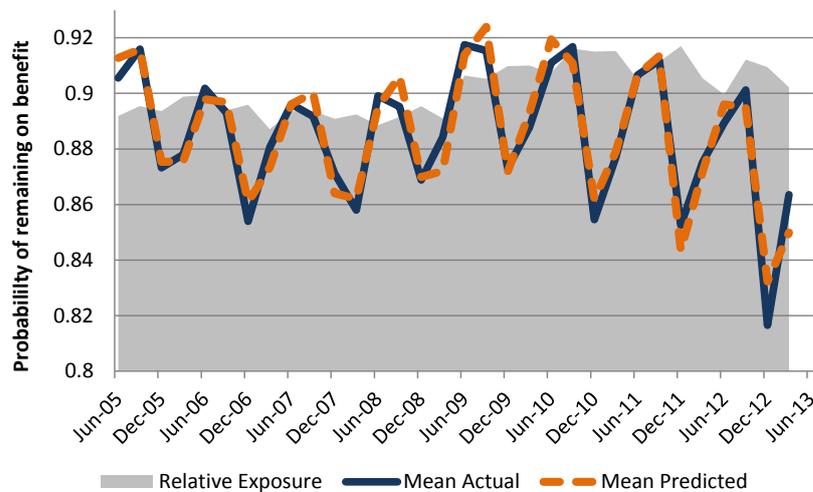
7.4 Forecasts

Table 7.3 shows:

- The number of clients in each segment at the valuation date
- The total lifetime cost for each segment, by future benefit type
- The average liability per client

The higher liability associated with both HCID segments and the longer duration segments is clear. Also of note is the different mix of benefits. Although most work-ready clients are receiving UB at the valuation date, further UB payments represent only 18% of future lifetime cost, with many moving into DPB, IB and SB. In contrast, the liabilities associated with the HCID segments are most heavily concentrated in IB and SB payments. This different composition can also be seen in the projected benefit state diagrams in Figure 7.9.

Table 7.3 **Current liabilities by benefit type for Jobseeker Support segments (payments in inflated values, discounted to June 2013 and excluding net loans and expenses)**

Jobseeker Support	Number	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average ($k)
Work-ready, <1 year	44,859	755	764	676	701	315	598	332	4,141	92k
Work-ready, >1 year	40,116	864	792	649	648	687	620	347	4,608	115k
HCID, <1 year	24,132	365	794	849	122	112	405	249	2,897	120k
HCID, >1year	46,729	433	1,914	2,283	192	238	868	531	6,458	138k
Total	155,836	2,417	4,265	4,457	1,662	1,352	2,490	1,460	18,104	116k

The projected benefit charts show the tendency for clients to be on benefits at a future point in time (either through remaining on benefit or having transitioned off and then back onto benefit). Of those not above the retirement age, 40% of the Work ready >1 year clients are projected to be on benefits in 20 years from the valuation date. The equivalent figure is 45% for the HCID segment.

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Figure 7.9 Projected benefit state for 'Work ready >1yr' and 'HCID >1yr' segments
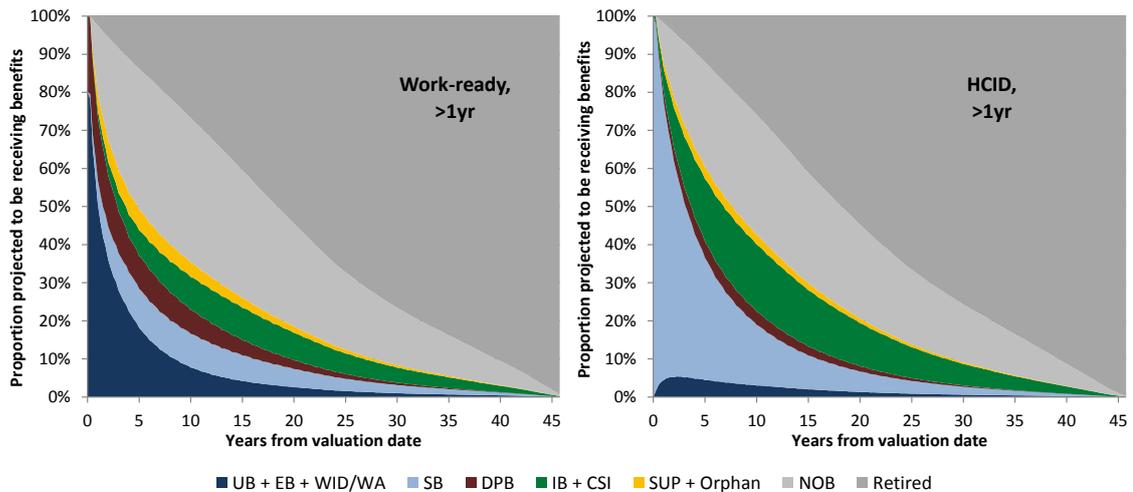
We can compare how the projected benefit state has changed from the previous valuation to gain insights into how the projected composition of the Jobseeker cohort has changed. We show this difference for the entire Jobseekers segment in Figure 7.10 below.

Figure 7.10 Difference in projected benefit state, Jobseeker segments, current minus previous valuation
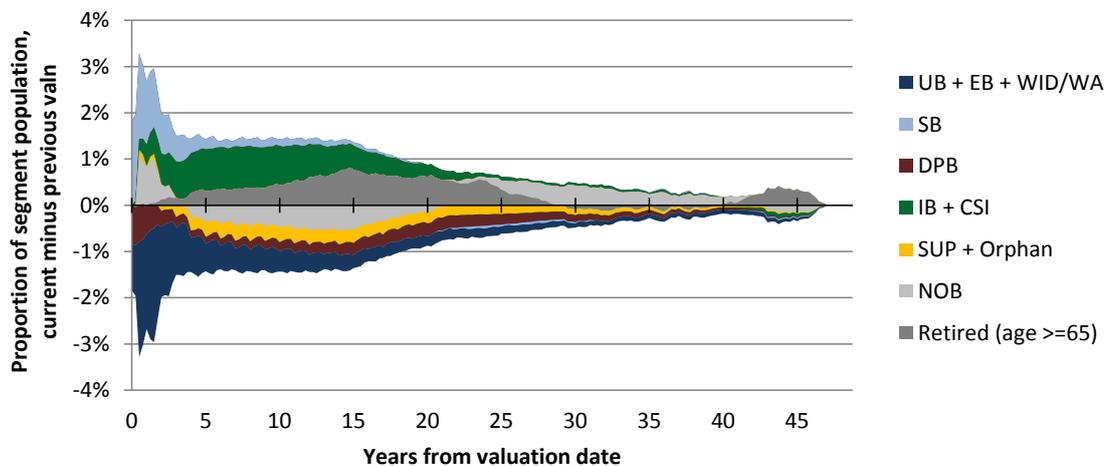
Although slightly difficult to interpret at first glance, we see from the figure that:

- At the start of the projection there is a greater proportion of clients in SB (light blue, in the upper half of the plot) and fewer in DPB and UB/EB/WB/WA (red and dark blue respectively, bottom half). This reflects the lower client numbers on DPB and UB seen at 30 June 2013.
- Over the first few years clients are projected to exit the system more quickly (the light grey above the axis)
- Between 5-15 years in the projection, we see compared to last year:
  - A lower proportion not on benefits
  - A lower proportion in SUP/OB

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- A lower proportion in DPB
- A lower proportion in Jobseeker-type benefits other than SB
- A higher proportion in IB/Carer's and retired.

These changes reflect the higher likelihood of clients from SB moving into IB. They also reflect a slightly older cohort than last year (see commentary in Section 5.3).

- Beyond 20 years into the projection, the differences are smaller, but we also see that more people are not on benefits and fewer are on Sup/OB and Jobseeker type benefits.

These changes highlight some of the ways the segment is evolving. The increased weight of older SB clients in the current cohort means the cost per client is likely to be higher over the next 20 years as more clients move into IB. However, this is more than compensated by the lower numbers of clients starting on UB, DPB and WA/WB benefits.

Projected numbers and average benefit payments for the combined Work-ready and HCID states are shown in Figure 7.11 and Figure 7.12 respectively. We have combined the different durations for the average benefit payments mainly for technical reasons; the average benefit payment models depend most heavily on a different duration measure so can appear slightly misleading when split by continuous duration.

As previously mentioned, the projections for the Work-ready segment are particularly sensitive to the future unemployment rate assumptions. Given Treasury's current forecast of a gradual reduction in this rate, the future numbers in the Work-ready group continue to decline over the next few years, slowly approaching the levels seen prior to the GFC. On the other hand, the numbers in the HCID segments are projected to remain stable for the next few years. The (downward) impact of lower future unemployment rates is almost exactly offset by the impact of increased propensity to remain on Sickness Benefit seen in the past couple of years.

Figure 7.11 **Forecast numbers of clients in Jobseeker Support segments each quarter**
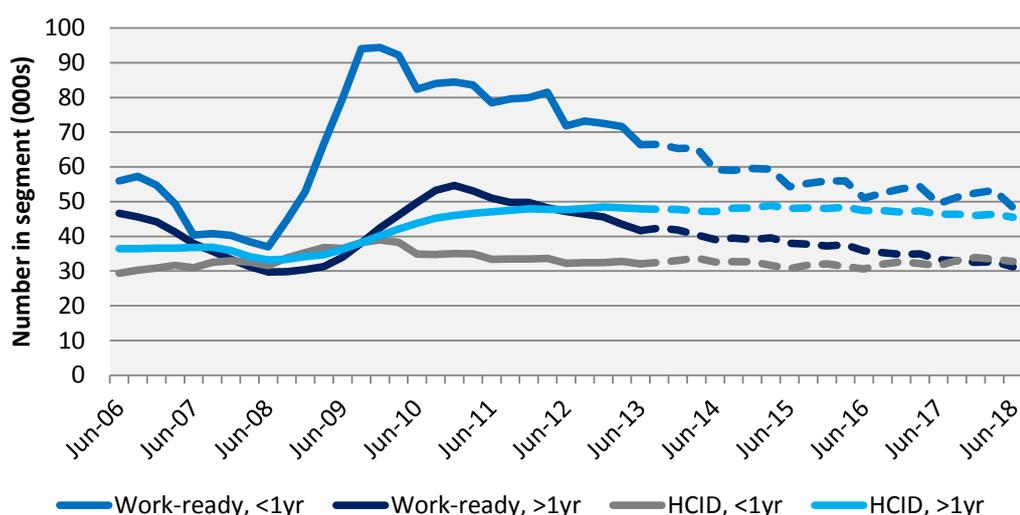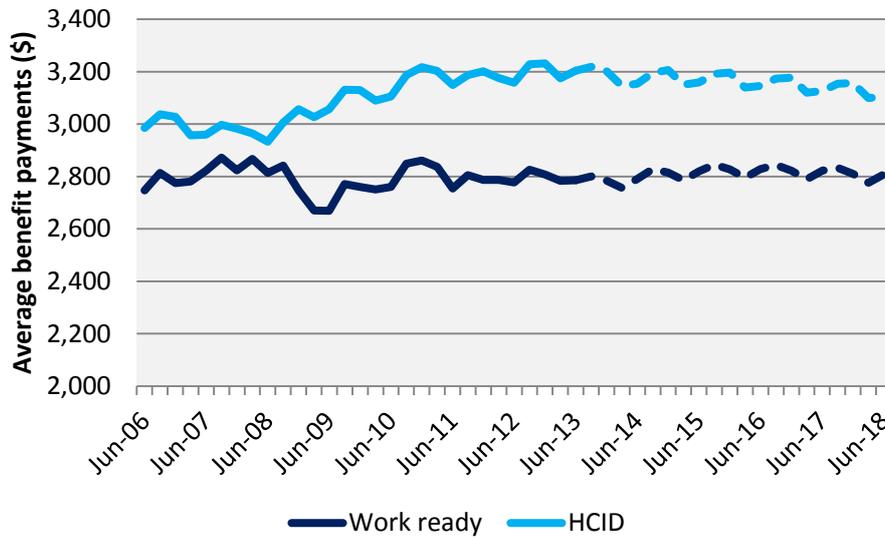
Average benefit payments are forecast to be fairly flat in real terms (i.e. June 2013 values) for both Work-ready and HCID clients. Seasonality is evident, due mainly to the effect of different numbers of days in each quarter. The slight upward trend in Work-ready benefits is partly attributable to the increasing average duration on benefits as a higher proportion of long duration clients remain in the system.

Figure 7.13 shows the projected cash flows associated with clients while they are in the Jobseeker Support segments (as opposed to those starting in Jobseeker Support segments). They are forecast to fall by about 17% in real terms over the next five years, primarily attributable to the fall in numbers in the Work-ready segments.

Figure 7.13 **Quarterly benefit payments for Jobseeker Support segments in June 2013 values**
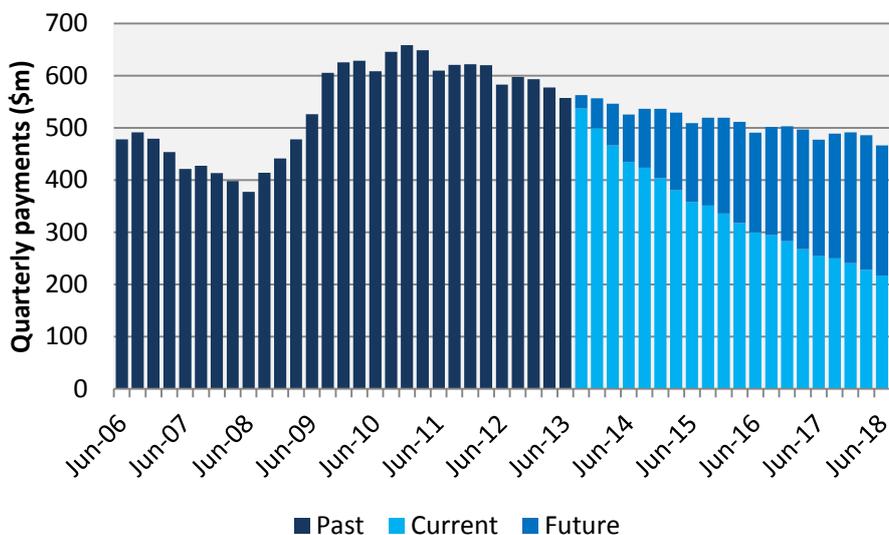
7.5   Key drivers

While a large number of different factors contribute to the lifetime cost estimates for clients in the Jobseeker Support segments, some variables have a much more significant impact. We have used a machine learning tool to assign the relative significance of these variables:

Figure 7.14 **Relative significance of variables in Jobseeker Support segments**
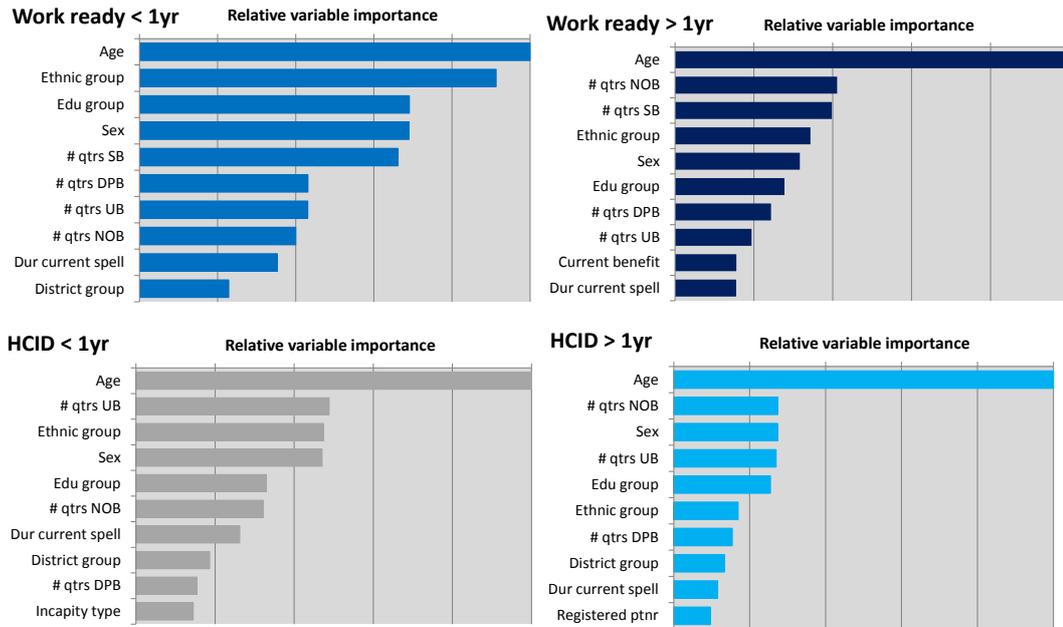
Partial dependence plots were introduced in Section 4.7 as a means of distinguishing the impacts of correlated variables, which they attempt to do by looking at the average impact of a single variable across the client base while holding everything else constant.

Figure 7.15 **Partial dependence of age for the Jobseeker Support segments**
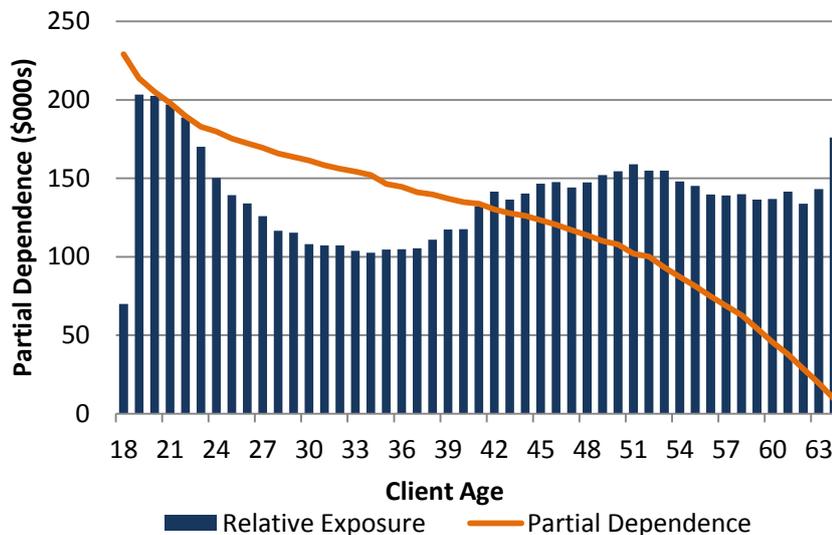
As seen in Figure 7.14, age is consistently the most important predictor in the Jobseeker Support segment. Figure 7.15 shows the partial dependence plot for age for the Jobseeker support segment, where the average liability is plotted for each age. The plot shows a large difference in average liability between the youngest and oldest ages – with the youngest being about $100k above the average. The shape of the plot also changes, with a steeper change at the youngest ages compared with that between ages 24 and 50 (the increasing slope for the oldest ages is due to the impacts of retirements). Thus the younger the cohort, the greater the average liability will be.

Another related feature is how the age distribution of clients varies across segments. For instance, if a segment has a disproportionately high level of young clients, this will tend to increase the average liability of the segment. We have attempted to illustrate this in Figure 7.16, which compares the age profile for various segments to the whole welfare population. For instance, the age distribution in the Work-ready <1 year segment is skewed quite young (tending to increase average liability, all other things being equal), while the long duration HCID segment has an older skew. The relative growth of the HCID >1yr segment partly explains the increase in the average age of the cohort.

Figure 7.16 **Relative distribution of client age compared to welfare system population for 'Work-ready <1yr' and 'HCID >1yr' segments**
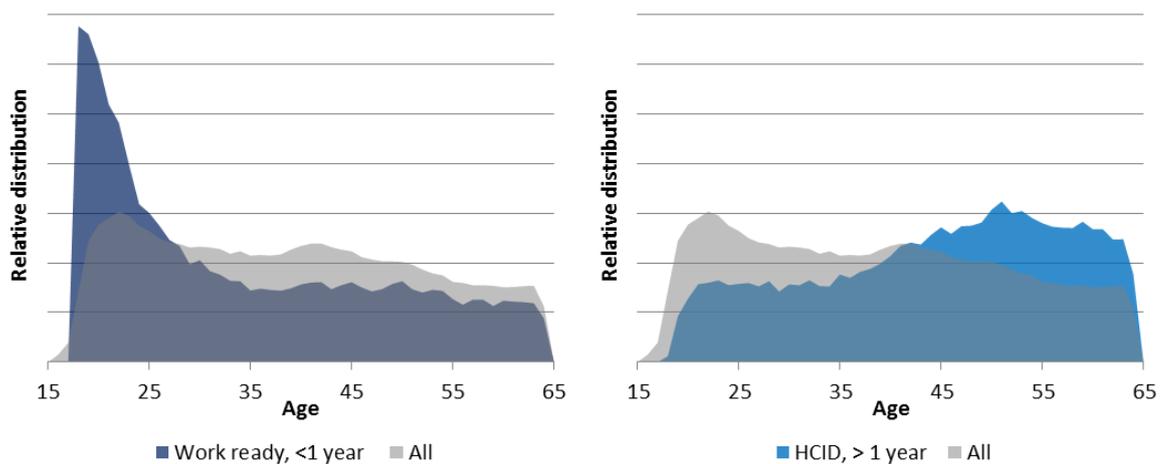
Figure 7.17 **Partial dependence plot of ethnicity for 'Work-ready < 1yr' segment**
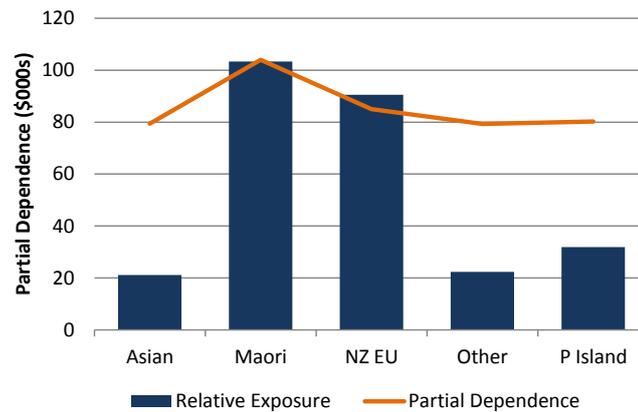

Figure 7.14 shows that ethnic group is the second most important driver of lifetime cost in the low duration Work-ready segment. The average partial dependence for Maori is about $100k, compared with about $80k for each of the other ethnicities. Maori represent 38% of the segment, compared with about 13% of the general population (Census 2006).

The partial dependence for education for the 'Work-ready < 1yr' is also revealing. Although results are qualified by the limitations discussed in Section 16.3.4, higher educational achievement produces up to a 40% reduction in average liability, with Degree level clients having a partial dependence nearly $40k lower than a client with a NCEA less than Level 1.

Figure 7.18 **Partial dependence of education level for 'Work-ready < 1yr' segment**
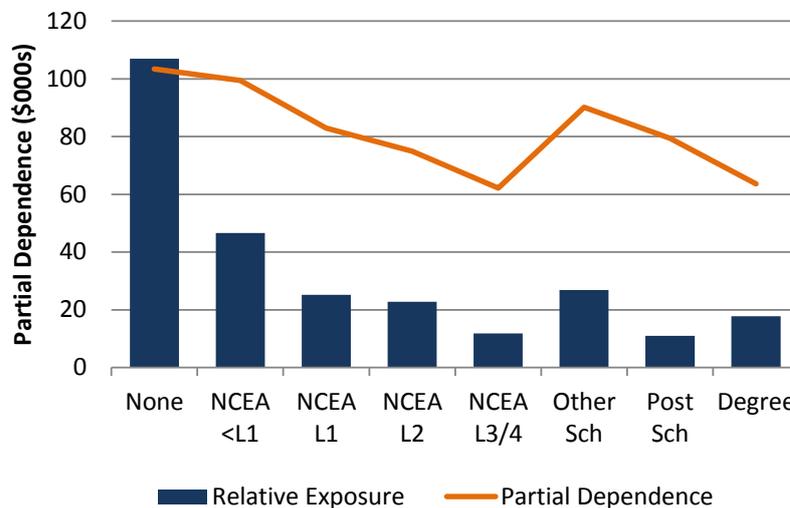
Figure 7.14 also shows that many of the benefit history variables also have a significant impact on lifetime cost. Figure 7.19 shows the partial dependence for the number of quarters receiving SB across all Jobseeker Support recipients. Spending 20 quarters on SB can increase future cost by about $40k. This highlights the cumulative impact of spells on SB in influencing long-term welfare dependence.
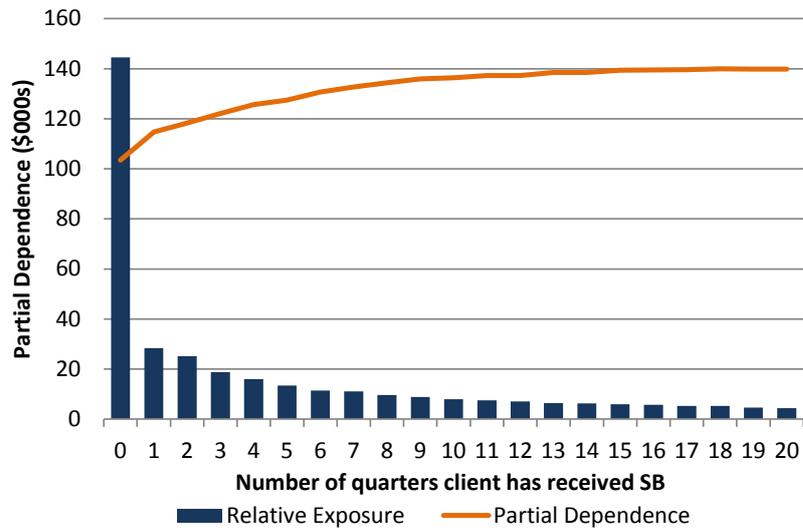
The partial dependence for gender (not shown graphically) suggests that females have a liability $25k higher than males across the various Jobseeker segments. This is largely due to the increased likelihood that females will enter the Sole Parent segments at some point in the future, and is most significant for younger females.

8   SOLE PARENT SEGMENTS

8.1   Introduction

The Sole Parent Support benefit, introduced in July 2013, includes all single parents with children under 14. It represents an amalgamation of the following benefit types:

- Domestic Purposes Benefit – Sole Parent, with youngest child aged less than 14
- Widow's Benefit, with youngest child aged less than 14
- Emergency Maintenance Allowance, with youngest child aged less than 14

In the data to June 2013, the child age for WB/WA was not available. For this reason we have approximated this segment by only considering Domestic Purposes Benefit – Sole Parent (which we continue to refer to as DPB) clients with children under 14. The specific benefit payment codes, and their relative contribution to 2012/13 payments, are shown in Table 8.1.

Table 8.1 **Payment codes applicable to Sole Parent segments**

Benefit Type	Benefit Name	% 12/13 benefit
DPB (child < 14)	Emergency Maintenance Allowance	2.6%
	Domestic Purposes Benefit	97.4%

Four segments have been defined based on the new sole parent benefit. Those with:

- Youngest child aged 0 to 2
- Youngest child aged 3 to 4
- Youngest child aged 5 to 13, duration less than one year
- Youngest child aged 5 to 13, duration more than one year

Duration is defined as continuous duration (time since last off benefits for at least 14 days). We understand that duration based splits are also of interest for both the segments with younger age children (0 to 2 and 3 to 4), this section of the report also presents some results using these additional splits.

While the new benefit categories were not in force at the valuation date, we have been able to assign DPB clients to segments based on our calculation of benefit state, duration and child age (but excluding those that might be eligible from WB/WA).

8.2   Recent experience

Table 8.2 below shows the numbers of recipients and payment amounts for the Sole Parent Support segments over the 2012/13 year. We have estimated these numbers by assigning the payments and client numbers based on child age and duration.

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Table 8.2 **Recent experience in Sole Parent segments, 2012/13 year**

Segment	Payments ($m)	Average number on benefit during quarter (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
Youngest 0-2	676	32,300	5,233
Youngest 3-4	389	18,600	5,234
Youngest 5-13, <1yr	92	5,900	3,879
Youngest 5-13, >1yr	769	35,700	5,385
Total	1,926	92,500	5,206

The trends in numbers of clients in the various segments each quarter, as well as their average benefit payments, are shown in Figure 8.1 and Figure 8.2 respectively.

Figure 8.1 **Numbers of clients in Sole Parent segments each quarter**
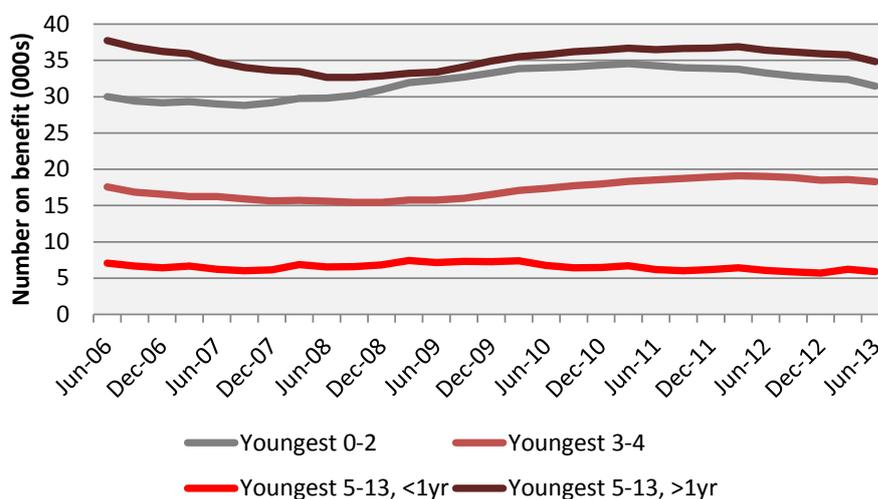
While the numbers in all segments increased during the GFC, the trend is most noticeable for the 'Youngest 0-2' segment. This suggests that the event had the greatest impact on single parents of newborns. The numbers in the 'Youngest 0-2' segment have started to decrease in recent years and decreases are now flowing through to the older child age segments due to the progression of clients through the segments as their youngest child ages. The decrease in client numbers in the past 12 months (see Section 3 for further background) are particularly pronounced for the two largest segments – The high duration 'Youngest 5-13' segment, and the 'Youngest 0-2' segment.

Figure 8.2 **Average quarterly payments to Sole Parent segments in June 2013 values**
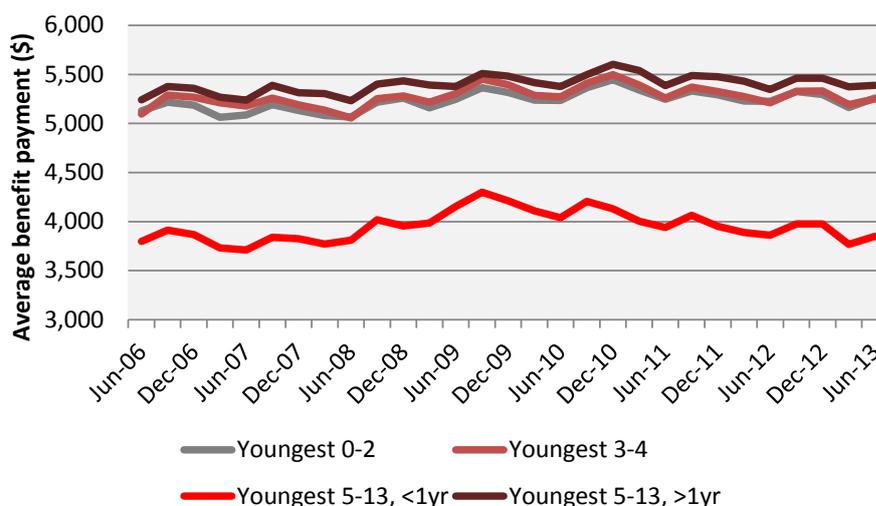

Figure 8.2 suggests that average benefit size increases with age of youngest child although the difference is subtle compared to the difference in payment size between high and low duration segments. This latter difference is almost entirely attributable to the part-payment that clients receive in the quarter of joining the benefit.

Figure 8.3 **Number of clients entering and leaving the Sole Parent segments**
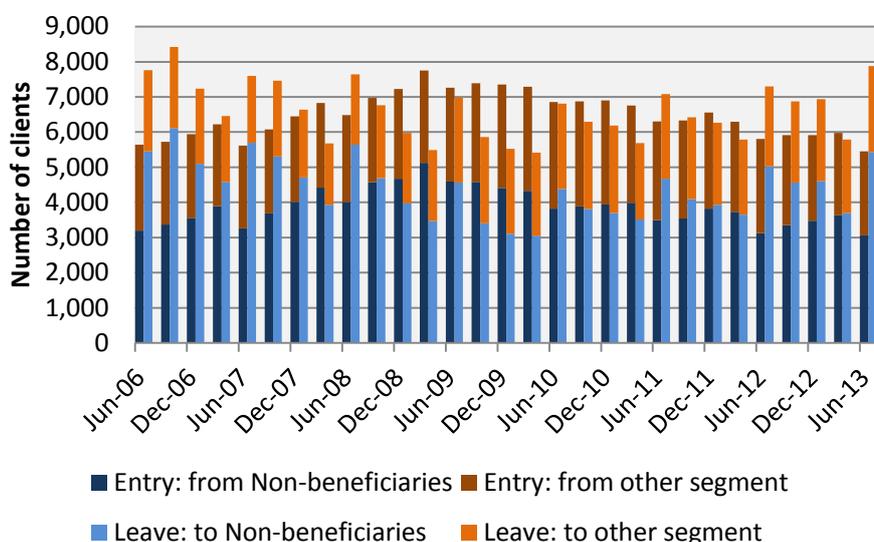
Note we do not count transitions from one Sole Parent segment to another in this figure.

Figure 8.3 shows the numbers of clients entering and leaving the Sole Parent segments every quarter. It is clear that the large increase in numbers during the GFC is attributable to both an increase in numbers entering the segments as well as a decrease in numbers leaving the segments – particularly so for entry from and exit to non-beneficiaries. In recent years and the last five quarters in particular, the difference between numbers of entrants and exits has increased which in turn leads to the lower than expected total numbers receiving benefit seen in Figure 8.1. As discussed in Section 5.4, we are currently

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projecting exit rates to stabilise at their pre-reform levels over the course of 2013/14, meaning that the number of exits will be closer to the number of entries.

Finally, a strong seasonal effect may be seen in the numbers departing the welfare scheme with larger numbers moving off benefit in most June quarters. This is particularly true of the June 2013 quarter, but this may be a one-off event due to the Welfare Reform programme.

Figure 8.4 **Average quarterly movements between Sole Parent segments, 2012/13**
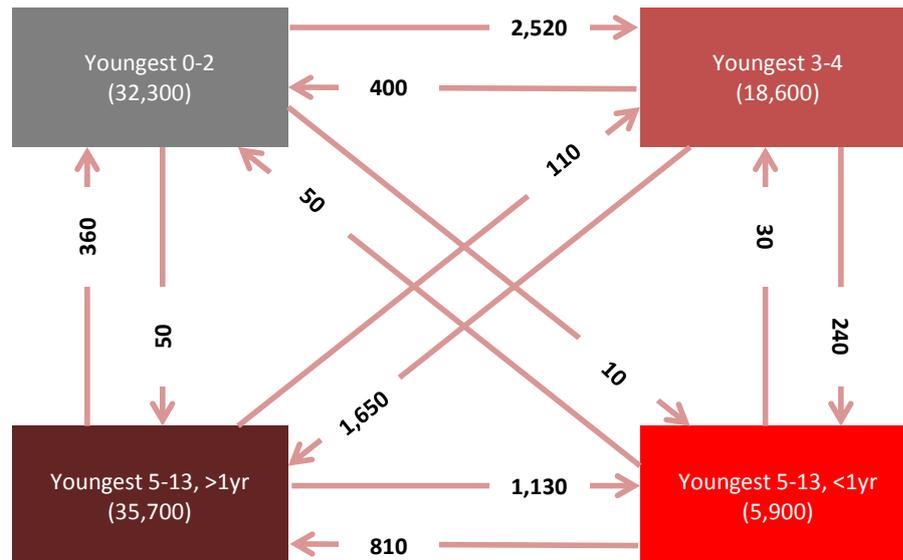
It is also worth considering how clients transition within the different Sole Parent segments. Figure 8.4 shows the average number of people in each Sole Parent segment and the quarterly movements between them in the 2012/13 year. The progression of clients into older child age segments (as their youngest child ages) explains the most significant movements. In addition, clients can also revert back to the 'youngest 0-2' segment in the event that a new child is born.

8.3   Modelling the Sole Parent Segments

Trends that can be observed in the Sole Parent Support segments can be understood by the models relating to clients on Domestic Purposes Benefit – Sole Parent (DPB).

Section 16 describes how we model clients on DPB. Key components are the likelihood of remaining on benefit, the likelihood of leaving the system versus moving to a different benefit, and the average payment levels while on benefit. We discuss aspects of each of these components below.

Figure 8.5 shows the performance of the probability model that tracks people remaining on DPB over the past few years. The probability is generally high (clients tend to remain on benefits) and has varied between about 0.92 and 0.95 over the last seven years. This is consistent with the observation that the Sole Parent segments have a relatively low churn rate. However, the rate of clients exiting DPB has increased markedly over the past year, from 6.2% per quarter in 2011/12 to 7.0% per quarter in 2012/13. This can be seen in

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Figure 8.5 as a reduction in the probability of remaining on DPB. Much of this increase is probably attributable to the October 2012 policy and operational changes. As discussed in Section 5.4, projection of this rate is difficult and carries significant uncertainty:

- Some reforms might cause a temporary "boost" to rates as the sub-population most heavily affected by the reforms exit quickly. Once this has taken place over the first year or so, rates may return to their historical level, or even higher.

- Other reforms and operational changes might systematically alter client behaviour of the long term. This would correspond to exit rates remaining high for an extended period of time.

It is too early to determine to which category the current reforms most closely correspond. We have elected to project transition rates returning quickly to their pre-reform historical levels which are slightly higher than what was projected in 2012. The projection levels of this particular model should be evaluated carefully in the next valuation, when more data is available.

Figure 8.5 **Probability client remains on Domestic Purposes Benefit**
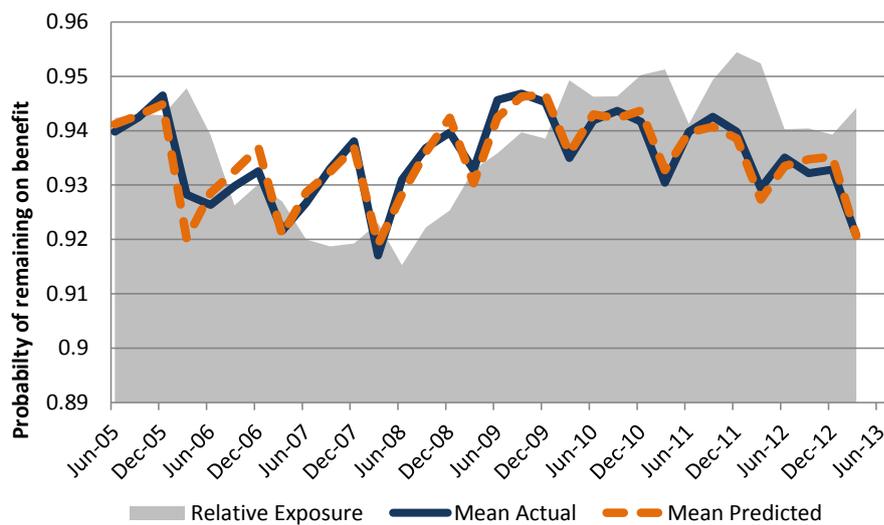
Figure 8.6 shows the probability of a client who leaves DPB (for reasons other than retirement) exiting the welfare system entirely (as opposed to moving to a different benefit). From this we see that approximately 40%-50% of beneficiaries leave the system while the remainder transition to a different benefit type. The chart also indicates that this proportion fell with the increasing unemployment rate from 2007 to 2009, suggesting that one key reason why more people would have stayed on DPB during that time was due to difficulty in finding employment. Over the past three years, there has been an increasing trend in the probability of moving off benefits amongst the recipients that leave DPB, returning to levels seen before the GFC. One implication is that the extra DPB exits seen over the last year due to reform change have not just moved elsewhere in the system – many of these clients have exited the welfare system entirely.

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Figure 8.6 **Probability clients who leave Domestic Purposes Benefit exit the welfare system**
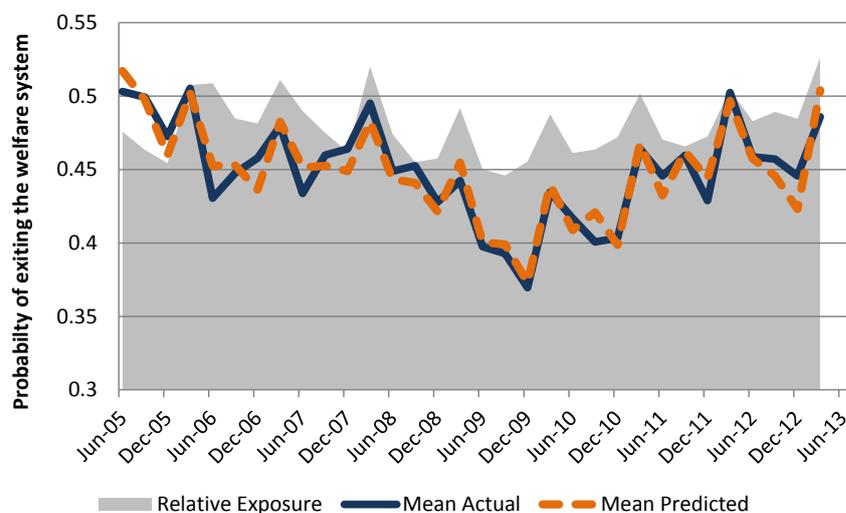
The DPB average benefit payment size has stabilised over the last couple of years; prior to that there had been a trend, about 1% above CPI per year across all durations and child age brackets. We have therefore removed an increasing trend from the payment model projection – see Section 5.4 for further discussion.

Figure 8.7 **Actual and modelled quarterly DPB payments by calendar quarter in June 2013 values**
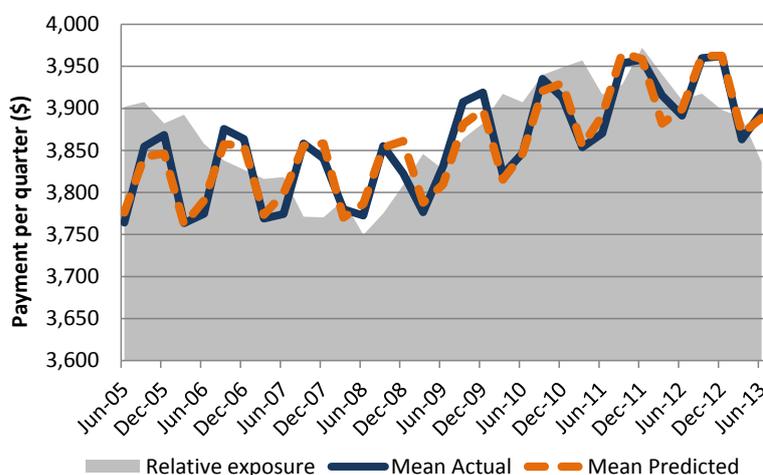
8.4   Forecasts

Table 8.3 shows, separately for the each of the combinations of age of youngest child (0-2 years, 2-3 years and 5-13 years) and duration on benefits (<1 year, >1 year):

- The number of clients in each segment at the valuation date
- The future total lifetime cost for each segment, by future benefit type

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- The average liability per client

Since the Sole Parent group has a low churn rate and relatively large average payment sizes, the average future lifetime costs for these segments are large and generally concentrated in DPB – 70% of future Tier 1 benefits are projected to be DPB. Furthermore, high duration segments have higher average liabilities (about $46k per client, on average) than their low duration equivalents due to an even lower churn rate for these segments.

The estimated lifetime costs are larger for the younger child age segments – this reflects the higher expected number of years on Sole Parent benefits in particular.

Table 8.3 **Current liabilities by benefit type for Sole Parent segments (payments in inflated values, discounted to June 2013 and excluding net loans and expenses)**

Sole parents	Number	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average
Youngest child 0-2, <1 year	5,942	636	78	53	26	59	192	124	1,166	196k
Youngest child 0-2, >1 year	23,560	3,108	441	282	117	327	930	578	5,783	245k
Child 0-2, all dur	29,502	3,743	519	334	143	386	1,122	702	6,949	236k
Youngest child 3-4, <1 year	2,435	222	36	26	12	24	71	42	434	178k
Youngest child 3-4, >1 year	15,234	1,797	282	180	74	211	549	324	3,416	224k
Child 3-4, all dur	17,669	2,020	318	206	86	235	620	366	3,850	218k
Youngest child 5-13, <1 year	4,041	289	64	45	20	46	97	53	614	152k
Youngest child 5-13, >1 year	33,685	3,183	681	450	180	515	1,017	567	6,591	196k
Child 5-13, all dur	37,726	3,472	744	495	199	561	1,115	619	7,205	191k
Total	84,897	9,235	1,581	1,035	428	1,182	2,857	1,687	18,005	212k

We introduced the difference in projected benefit state chart in Section 7.4. It shows how the average benefit state over the course of the projection has changed since the previous valuation, and combines effects from the updated starting cohort and the changes to the transition models. Figure 8.8 shows this plot for the Sole Parent segments.

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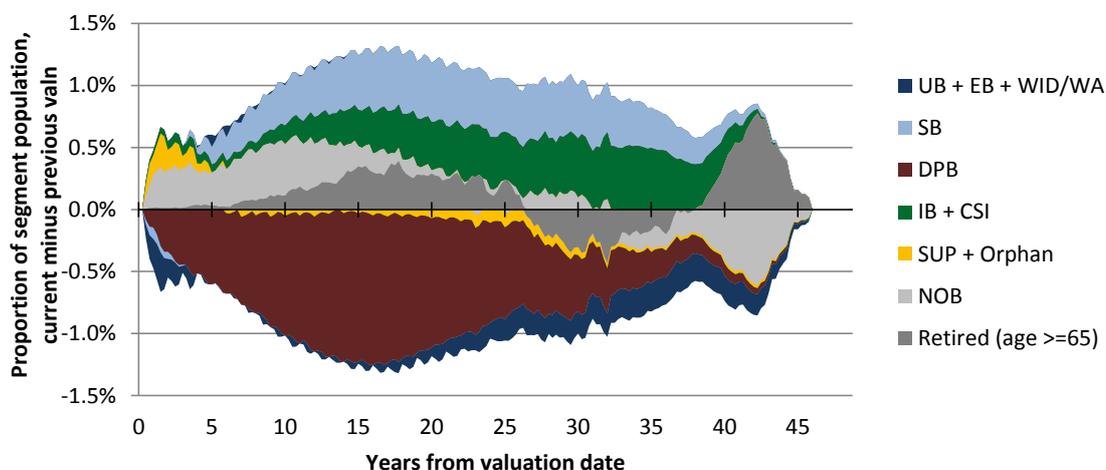
The figure shows that:

- Overall the benefit states projections have been very stable, with differences of the order of 1% or less of the Sole Parent client base.

- Over the first 10 years of projection clients are expected to exit DPB faster than they had previously. About half of these exits correspond to leaving the benefit system, while the remainder move to SB and IB.

- Around years 15 to 20 in the projection the proportion in DPB is lower than the previous valuation, primarily in SB, IB, CSI and retired instead. The extra retirements reflect a slightly higher proportion of clients over 45. The 1% level on the chart corresponds to about 850 people that have changed benefit state.

- For years 25 onwards the lower proportion of clients in DPB and UB/EB/WA/WB is offset by a larger proportion in SB and IB/CSI.

These results are consistent with the faster transition rate out of DPB, and slower rates out of SB and IB that have been observed in recent years.

**Figure 8.9 Forecast numbers of clients in Sole Parent segments each quarter**
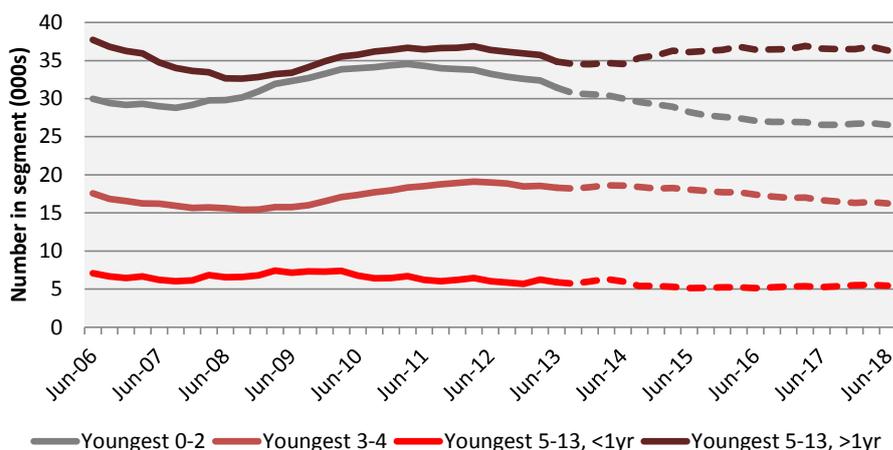
Figure 8.9 shows the forecast numbers over the next five years, split across youngest child age and duration. The trends are reflective of lower numbers of clients entering the system, but existing clients exiting relatively slowly. As entries tend to be at the younger child ages, this segment decreases most significantly. The age 3-4 segment remains stable for a few years and then begins to fall. However, an increasing trend is still present in the 'youngest 5-13' segment due to clients that entered during the GFC with younger children progressing into this segment. In aggregate, the projection shows a slight decreasing trend for the Sole Parent group.

Figure 8.10 Forecast average quarterly payments to Sole Parent segments in June 2013 values
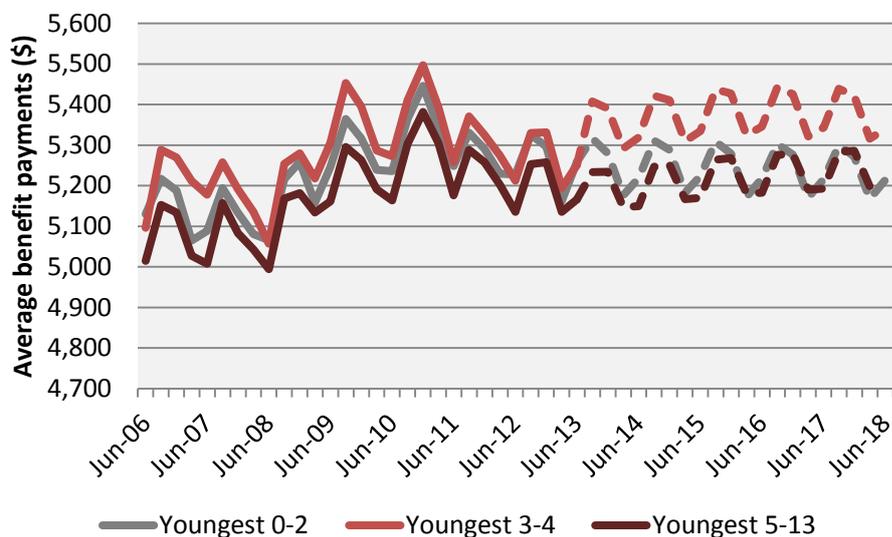

Projected quarterly payments to clients in Sole Parent segments are shown in Figure 8.10. Of note:

- Payment levels are projected to remain stable, consistent with recent experience. This represents a change in our projection models since the previous review; see Section 5.4 for further details regarding the rationale behind the change.

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- Payments to the segment with youngest child aged 3-4 are forecast to be higher than other age groups. This is consistent with historical trends (and the tendency for clients in this segment to have very low rates of leaving the benefit), although we have forecast a slight growth in the difference.

The forecast slight decrease in numbers drives the decreasing trend in future cash flows to Sole Parents, as shown in Figure 8.11. By 2017/18 cash flows related to future liability are expected to be 35% of total payments.

Figure 8.11 **Quarterly benefit payments for Sole Parent segments in June 2013 values**
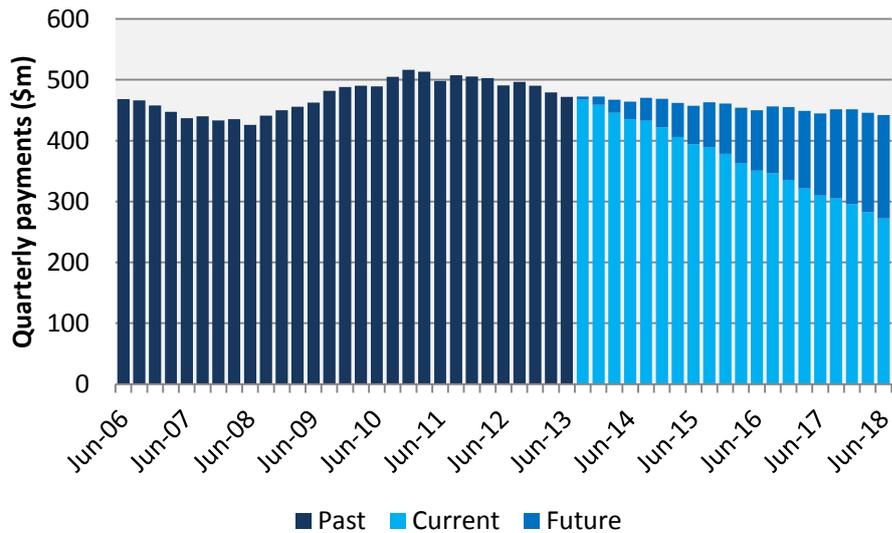
8.5 Key drivers

Figure 8.12 shows the overall relative variable importance across the Sole Parent segments. These relativities are fairly consistent across the four underlying segments.

Figure 8.12 **Relative variable importance for Sole Parent segments**

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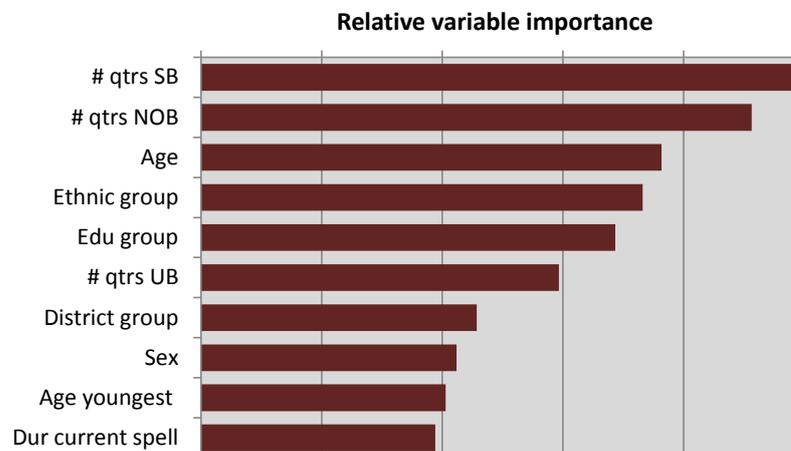
There are a number of partial dependence relationships that give additional insight into the Sole Parents segments.

Figure 8.13 **Partial dependence of age for the Sole Parent segments**
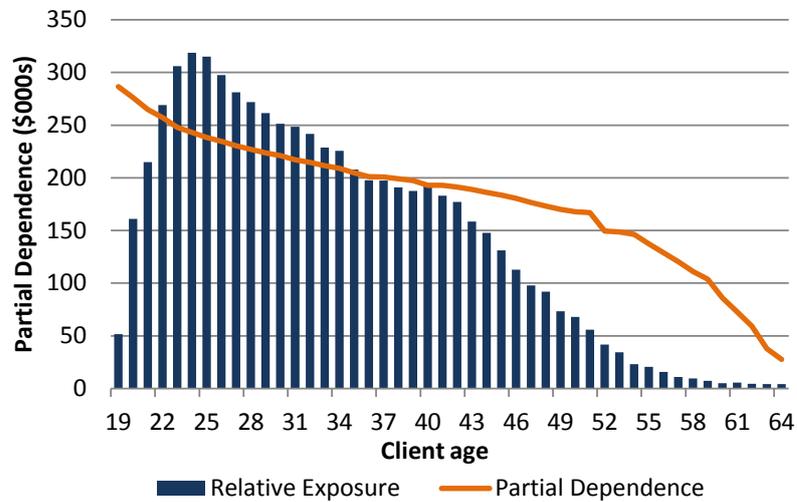
Figure 8.13 shows the partial dependence plot for client age for the Sole Parent group. The plot shows how average future liability decreases with age. The exposure bars also indicate that the Sole Parent segments are most heavily distributed in the 22-35 age range, corresponding to some of the high lifetime liabilities. The figure shows that young adults are the most common recipients of the benefit and, all else being equal, their future liability is also relatively high compared to older age clients.

Figure 8.14 **Partial dependence of 'number of quarters on Unemployment Benefit' for the Sole Parent segments**
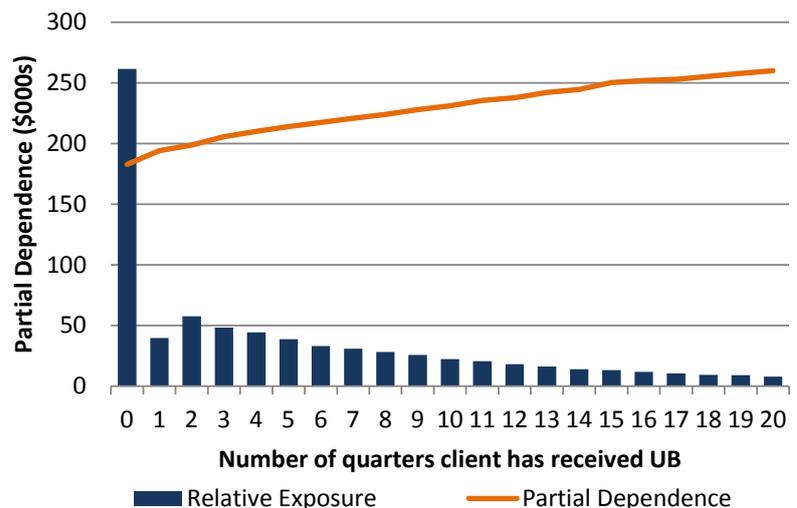
Apart from age, the benefit history of the client also has a significant impact on their predicted future liability. Time in UB and SB, as well as time between benefit spells, are all highly predictive of future periods on benefits. Figure 8.14 shows the partial dependence plot of the number of past quarters on UB for clients in the Sole Parent segments. It can be

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seen that predicted future cost increases almost linearly, with the cost being 40% higher if the client has received Unemployment Benefit for 5 years in the past compared to a client that has never received Unemployment Benefit. A similar trend is present for past quarters on SB, although the trend begins to level off after 10 quarters.

Figure 8.15 **Partial dependence of ethnicity for the Sole Parent segments**
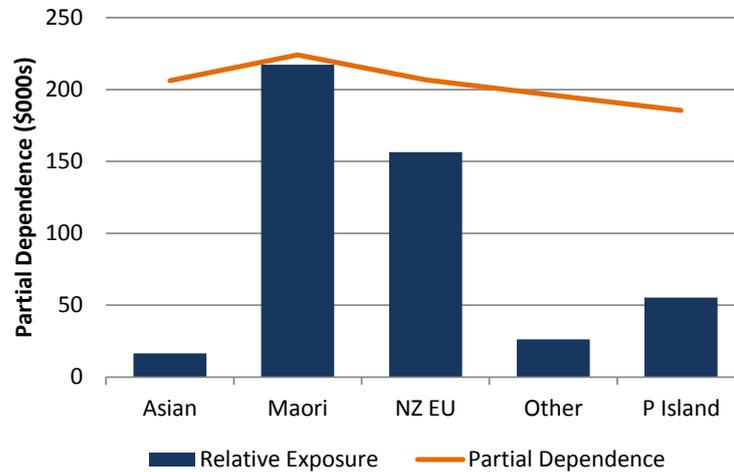
Figure 8.15 shows that the projected liabilities are similar for most ethnicities but about $25k higher for Maori. Additionally this ethnic group is the largest in the DPB population, significantly higher than the proportion in the overall NZ population. Figure 8.16 shows the partial dependence impact of education. The difference in education level can have up to a $45k impact on lifetime cost.

Figure 8.16 **Partial dependence of education for the Sole Parent segments**

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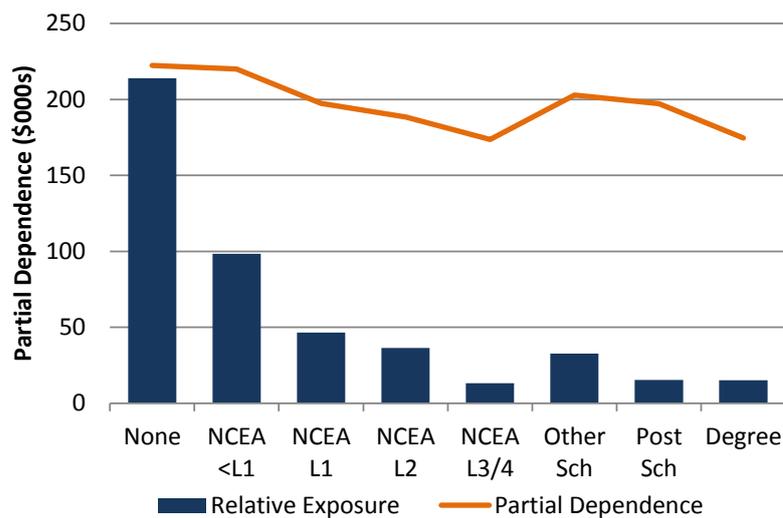
Figure 8.17 **Partial dependence of youngest child age for the Sole Parent segments**
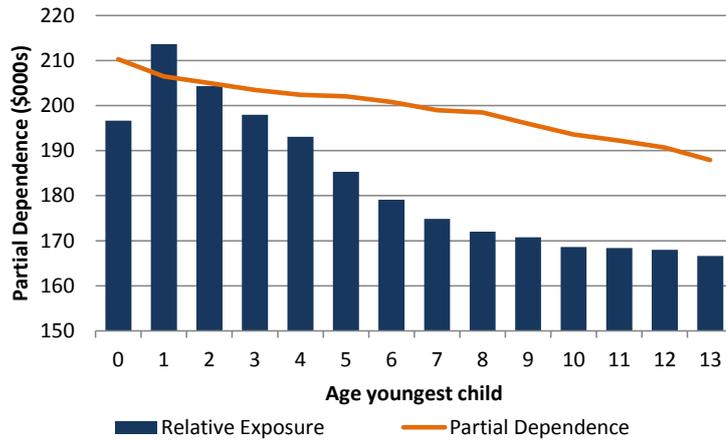
It is not surprising that the age of the youngest child has an impact on predicted liability for the Sole Parent group. Figure 8.17 shows that the partial dependence is relatively stable until the youngest child is aged five, after which it begins to decrease. A client with a child aged 13 has a $22k lower liability, all other things being equal. The plot also shows that exposure decreases as the age of the youngest child increases. We contrast the distribution of youngest child ages with the (relatively flat) distribution of children in the NZ population in Figure 8.18. The younger child skew shows the degree to which clients tend to exit the benefit system as their child ages.

Figure 8.18 **Comparison of age distribution of child on Sole Parent segments and NZ population (Stats NZ, as at June 2013)**
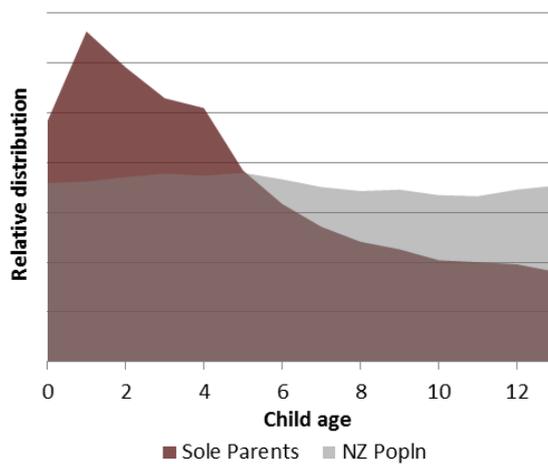
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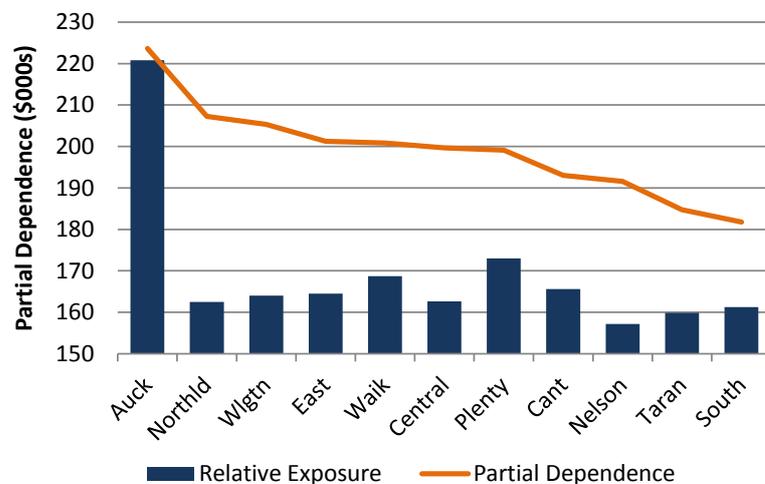
Accommodation Supplement is a substantial component of payments to Sole Parents (see Table 8.3). For this reason there are significant differences in partial dependence by region, largely owing to the differing accommodation supplement amounts (but also partly due to different client behaviours). The Auckland region, easily the biggest in terms of Sole Parent recipients, has a partial dependence $20,000 to $40,000 higher than most of the other regions.

9   SUPPORTED LIVING SEGMENTS

9.1   Introduction

The Supported Living segment, introduced in July 2013, is for people who are not able to work because they are permanently and severely restricted in their capacity for work because of a health condition, injury, or disability or totally blind or because they are caring for a person who requires full-time care and attention at home. It represents an amalgamation of the following benefit types:

- Domestic Purposes Benefit – Care of Sick or Infirm
- Invalid's Benefit

The specific benefit payment codes, and their relative contribution to 2012/13 payments, are shown in Table 9.1.

Table 9.1 **Payment codes applicable to Supported Living segments**

Benefit Type	Benefit Name	% 12/13 benefit
DPB-CSI	Caring for Sick and Infirm Benefit	8.7%
IB	Invalids Benefit	91.3%

The Supported Living group has been broken down into three segments:

- Carer: those receiving DPB-CSI
- Partner: Invalid's Benefit recipients due to incapacity of partner
- HCID: Invalid's Benefit recipients due to their own incapacity

While the new benefit categories were not in force at the valuation date, we have been able to assign clients to segments based on our calculation of their benefit state at 30 June 2013.

9.2   Recent experience

Table 9.2 below shows the numbers of recipients and payment amounts for (our interpretation of) the Supported Living segments over the 2012/13 year.

Table 9.2 Recent experience in Supported Living segments, 2012/13

Segment	Payments ($m)	Average number on benefit during quarter (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
Carer	153	8,400	4,543
Partner	124	9,000	3,439
HCID	1,453	86,800	4,186
Total	1,730	104,200	4,150

Average numbers at the end of the quarter are very close to the average number during the quarter – this is in contrast to high churn segments such as the Jobseeker segments shown in Table 7.2.

The quarterly trends in numbers of clients in the various segments, as well as their average benefit payments, are shown in Figure 9.1 and Figure 9.2 respectively. It should be noted that the Supported Living segments are relatively stable and independent to the state of the economy in comparison to other segments. However the numbers in the Carers segment has grown quickly over the past few years and is currently approximately double the level in 2006. This increase is partly due to the larger number of carers for elderly parents in an aging population (evidenced by the strong growth in numbers of carers in the 40-65 age group) as well as increased awareness of the benefit. Numbers in the Partners segment has decreased by over 15% over the past three years.

Figure 9.1 Relative numbers of clients in Supported Living segments each quarter, June 2006 = 100
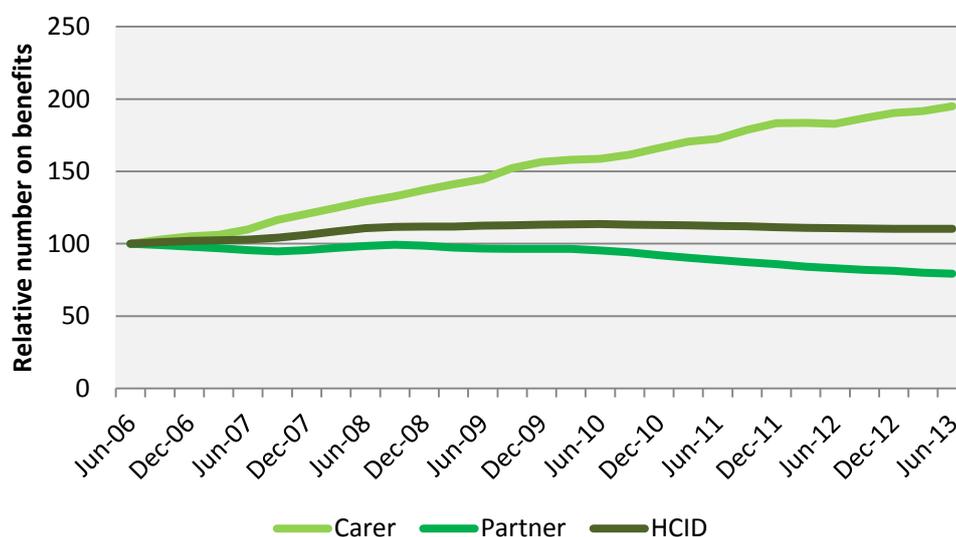
Numbers in the HCID segment (by far the largest of Supported Living) increased up until about December 2009, thereafter levelling and reducing somewhat in the last couple of years. We believe much of the increase seen in 2007/08 is attributable to the policy changes at the time concerning the IB gateway, which led to a spike in numbers moving into IB, particularly from NOB and SB.

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The average benefit payments for the HCID segment has remained relatively stable through time. Average payments to the Carer segment have tended to increase in the past but have been relatively stable for the last three years. Average payments to the Partner segment are considerably lower than those of the other two segments. The plot of the Partner segment is almost a parallel shift of the corresponding HCID segment plot due to the fact that the underlying benefit in both segments is IB.

Figure 9.2 **Average quarterly payments to Supported Living segments in June 2013 values**
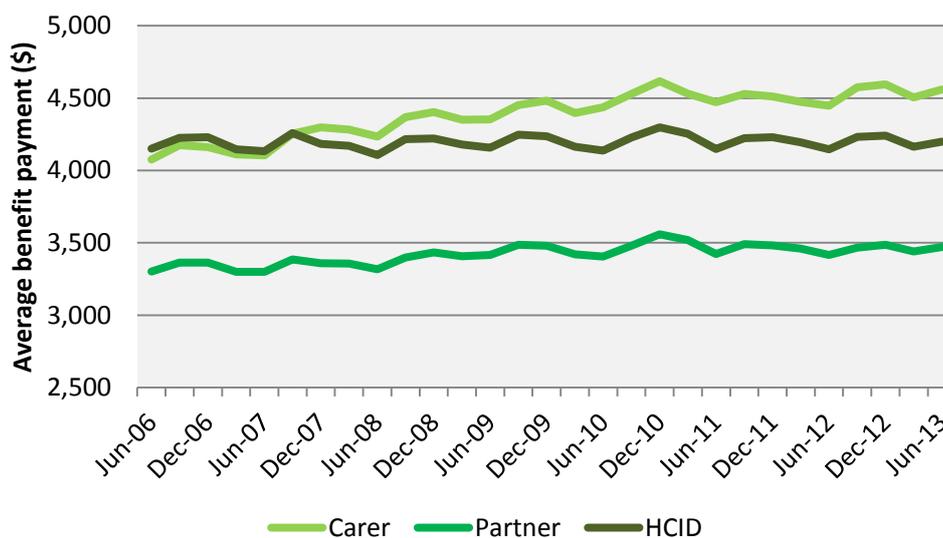
Figure 9.3 **Number of clients entering and leaving the Supported Living segments.**
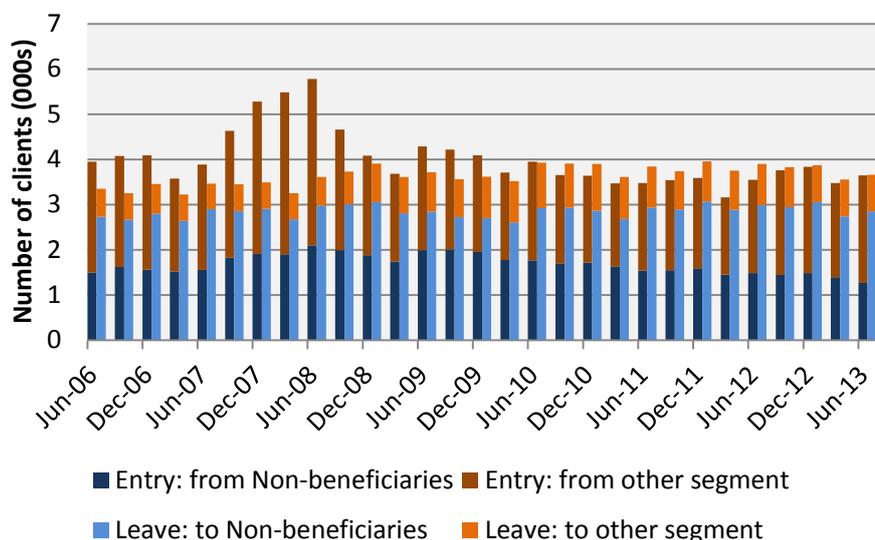
Note we do not count transitions from one Supported Living segment to another in this figure.

Figure 9.3 shows the number of people entering and leaving the Supported Living segment each quarter. The spike in the 2007/08 year is largely driven by the increased number of clients in the HCID segment due to changes to the IB gateway at the time, although there may be a small economy related contribution too. Entries have now stabilised with the

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number of people entering the Supported Living segments being slightly lower than the number exiting for the past few years. Of those leaving the system, almost 80% leave the welfare system rather than move to a different benefit, which is consistent with the long-term nature of this client group – clients generally stay on benefit until the incapacitated person reaches the age of 65 or dies. In contrast, a large number of people enter these segments from some other benefit – primarily moving from SB to IB.

9.3 Modelling the Supported Living segments

Section 16 describes how we model clients receiving IB and CSI benefits. Key components of the model are the likelihood of remaining on that benefit, the relative likelihood of moving to the various benefits when they do leave IB or CSI, and the average payment levels while on benefit. We discuss aspects of each of these components below.

Figure 9.4 **Probability client remains on Invalid's Benefit**
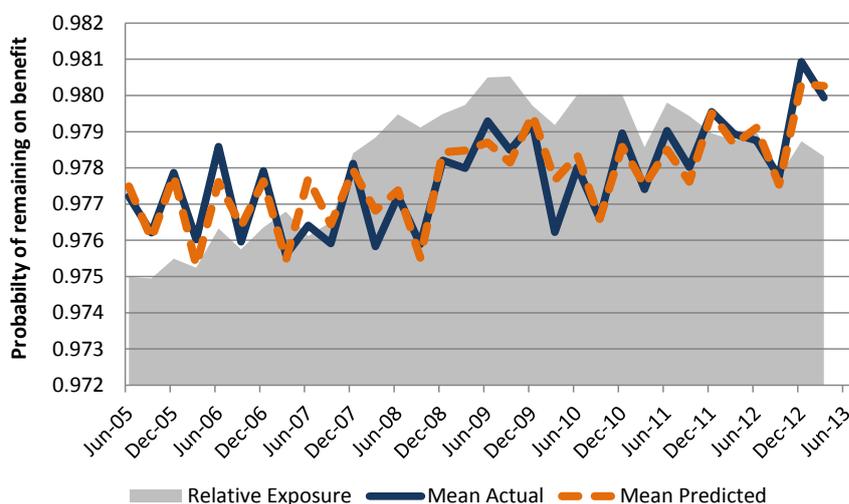
Figure 9.4 shows the actual and modelled probabilities for remaining on Invalid's Benefit. As expected this probability is high and fairly stable – recently about 98% remaining each quarter – and is again consistent with the long term nature of this benefit type. There is a slight increase in the probability of remaining on benefit in the most recent two quarters – at this stage we do not know if this represents a genuine change in behaviour.

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Figure 9.5 Distribution of clients who move from Invalid's Benefit to other benefits
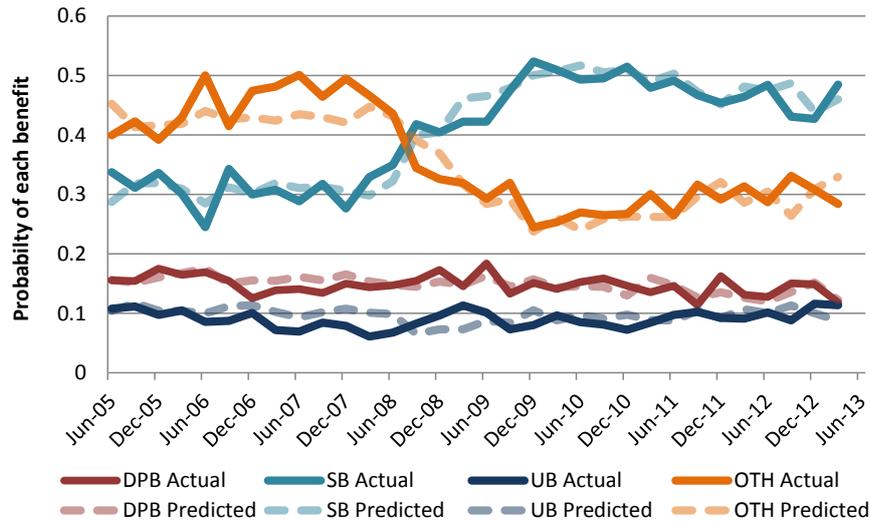
Figure 9.5 shows the destinations of those few who leave Invalid's Benefit and move to another benefit type. The most common destinations are SB or Other benefits (primarily SUP and WA/WB).

Figure 9.6 Actual and modelled quarterly IB payments by calendar quarter in June 2013 values
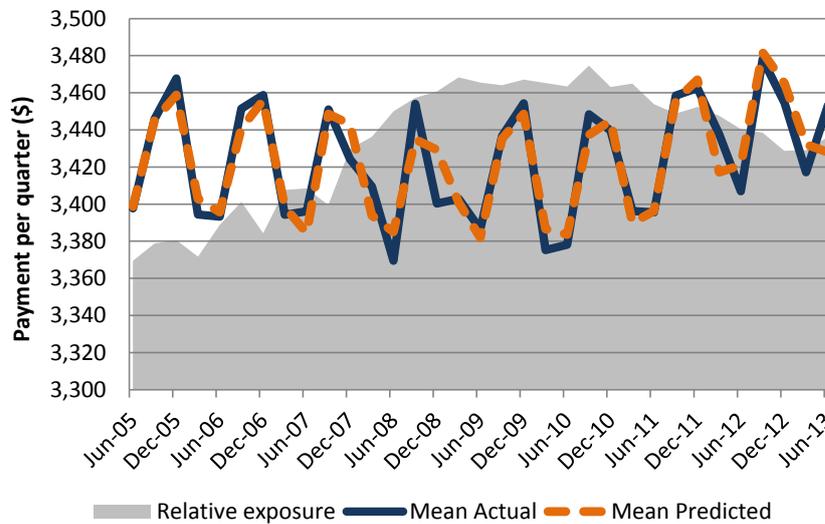
The actual and modelled quarterly payments are shown in Figure 9.6. The small increase in (real) average payment costs has continued in 2012/13, mostly reflecting the slightly higher tendency for clients to remain on benefits for an entire benefit quarter.

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9.4   Forecasts

Table 9.3 shows:

- The number of clients in each segment at the valuation date
- The future lifetime cost for each segment, by future benefit type
- The average liability per client

As expected, IB payments dominate the future projected liabilities for current members of the HCID segment given the extremely low churn rate. The average liability per individual is also highest for this segment, due to the long-term nature of IB.

Table 9.3 **Current liabilities by benefit type for Supported Living segments (payments in inflated values, discounted to June 2013 and excluding net loans and expenses)**

Supported living	Number	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average
Carer	8,203	115	124	87	34	602	129	93	1,184	144k
Partner	8,353	41	602	49	12	56	82	85	928	111k
HCID	84,888	97	12,110	264	70	157	1,158	1,187	15,043	177k
Total	101,444	254	12,836	400	116	815	1,369	1,365	17,155	169k

Figure 9.7 **Projected benefit state for HCID (left) and Carers (right) segments**
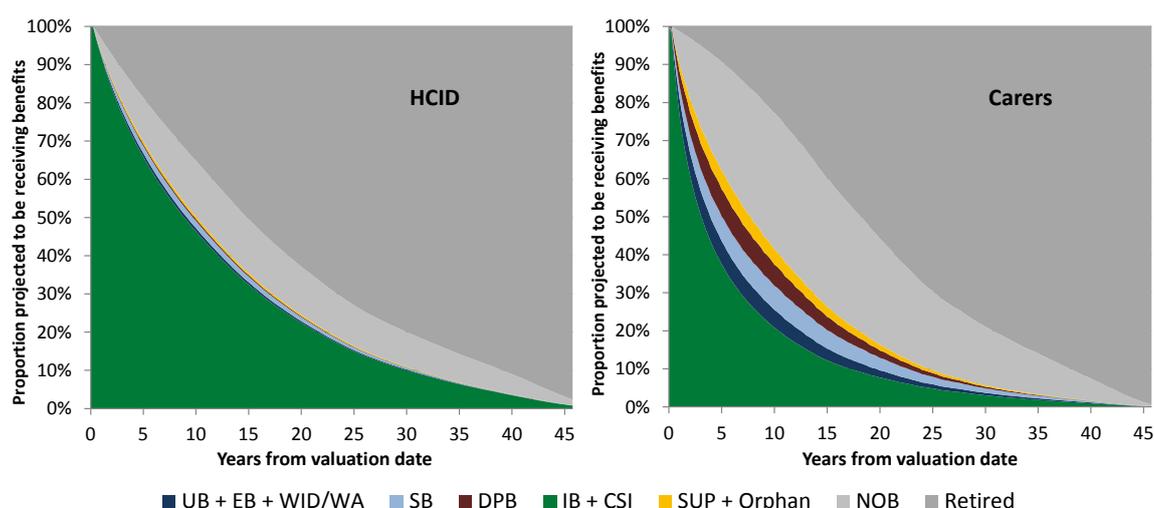
The reason for the high lifetime cost of HCID in particular can be seen in Figure 9.7. Virtually all the clients remain in the IB benefit state over time, with over 60% of the non-retired population still on benefits 20 years into the projection. The outcomes for carers

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are more varied, with a higher proportion moving off benefits and a more significant contribution of other benefit types.

We introduced the difference in projected benefit state chart in Section 7.4. It shows how the average benefit state over the course of the projection has changed since the previous valuation, and combines effects from the updated starting cohort and the changes to the transition models. Figure 9.8 shows this plot for the Supported Living HCID segment.

Figure 9.8 **Difference in projected benefit state, Supported Living HCID segment, current minus previous valuation**
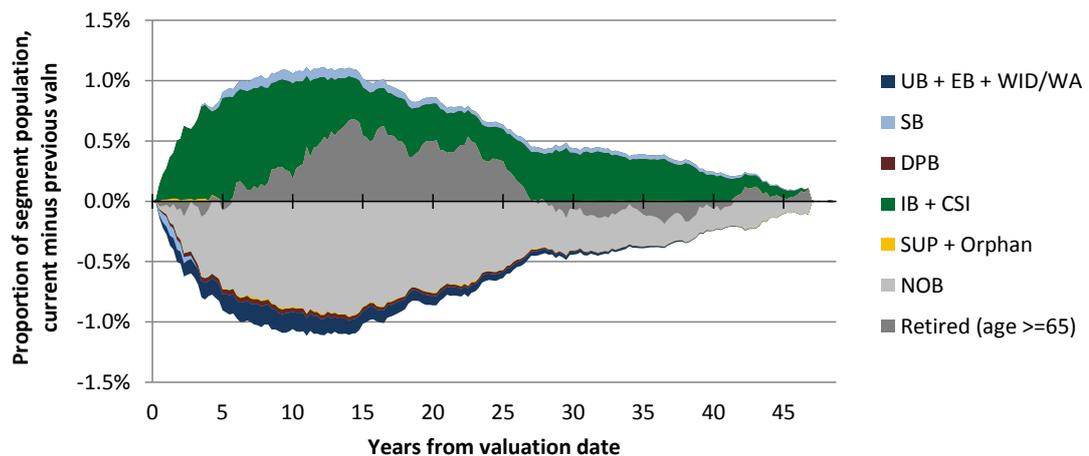
The figure shows that there has been a slight strengthening in the projection, with a greater proportion of clients remaining on IB/CSI over the duration of the projection. At the five year mark this represents an extra 0.8%, or about 650 clients. This has been at the expense of the "Not on Benefits" state, meaning that an extra group of clients are no longer exiting the benefit system. The 15-25 year projection range also shows a higher proportion of retirements, which reflects a higher proportion of clients aged over 40 in the segment at the valuation date.

Figure 9.9 **Forecast numbers of clients in HCID and Partner segments (combined)**

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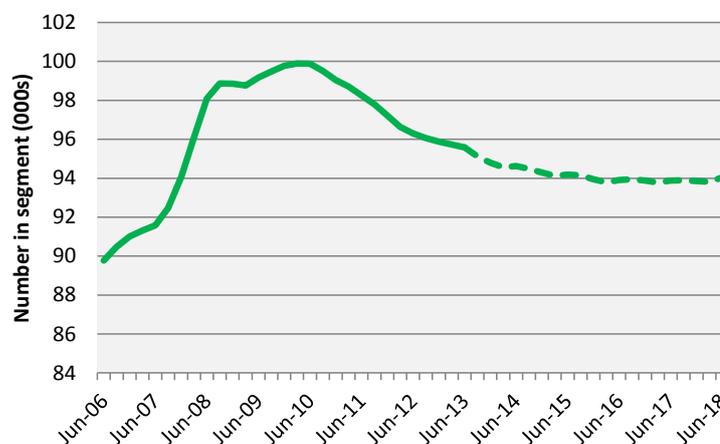
Figure 9.9 and Figure 9.10 show the projections for the future numbers of clients in the Supported Living segments. The numbers of those in the HCID and partner segments are forecast to decrease slightly for two years and then stabilise. The decrease is mostly attributable to the Partners segment, for which we have projected further reductions in numbers. The Carers segment is expected to grow over the next few years, reflecting its recent upward trend. However the rate of growth is projected to slow relative to the recent trend. This is partly due to the stabilisation of new client entries into CSI – see Figure 12.3.

Figure 9.10 **Forecast numbers of clients in Carers segment**
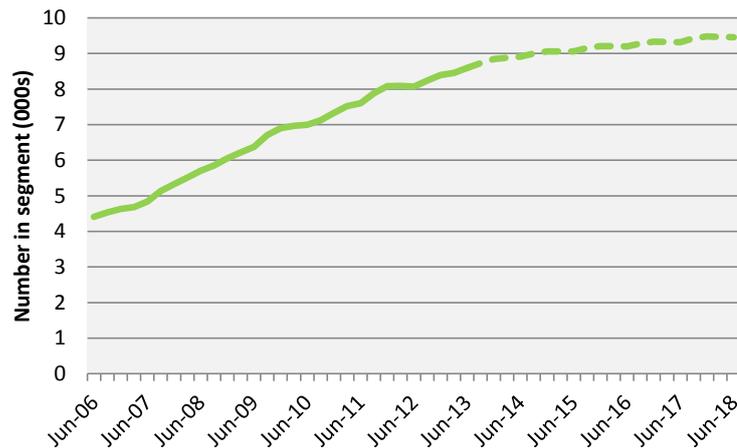
Figure 9.11 **Forecast average quarterly payments to Supported Living segments in June 2013 values**
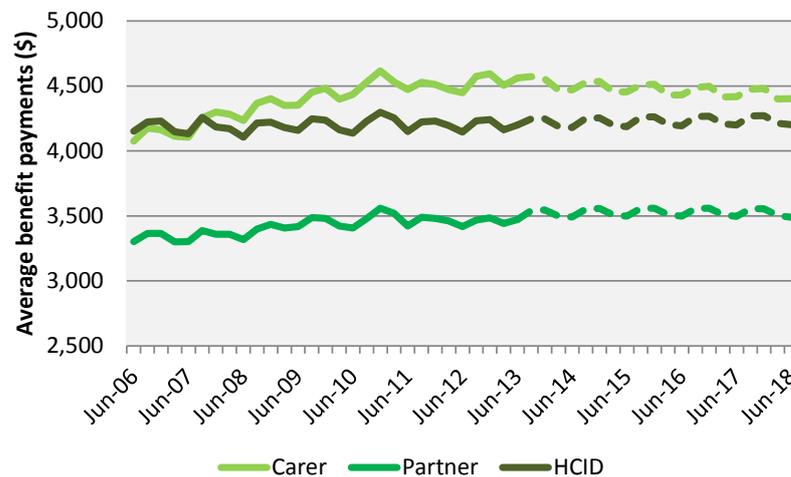
The average benefit payments for the HCID and Partner segments are forecast to remain relatively stable over the next five years (Figure 9.11) which is consistent with the long-term nature of these benefits. The average benefit payment for the Carer segment is forecast to decrease slightly, narrowing the gap between the average amount paid to a Carer and that paid to a client in the HCID segment.

Figure 9.12 **Quarterly benefit payments to Supported Living segments in June 2013 values**
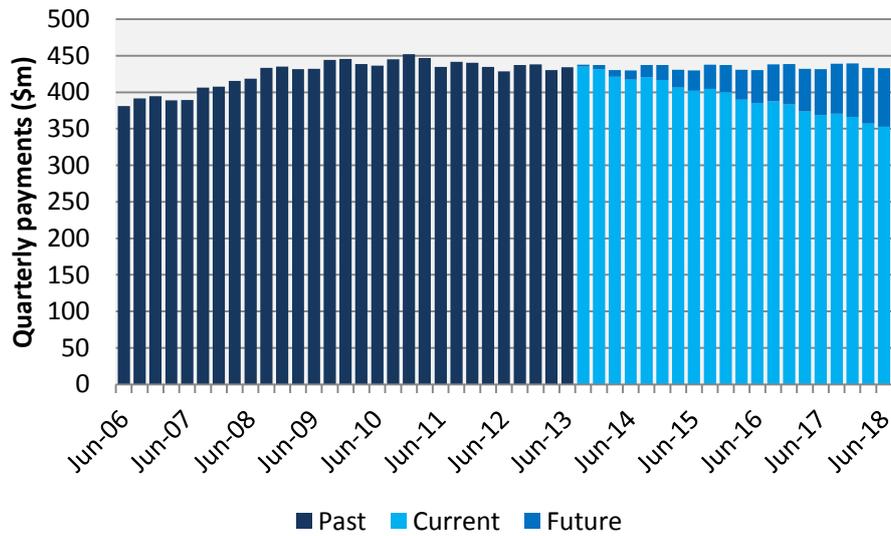
As may be seen in Figure 9.12, future quarterly benefit payments in the Supported Living Segments are projected to remain stable over the next few years.

9.5   Key drivers

Figure 9.13 **Partial dependence of age for the Supported Living segments**
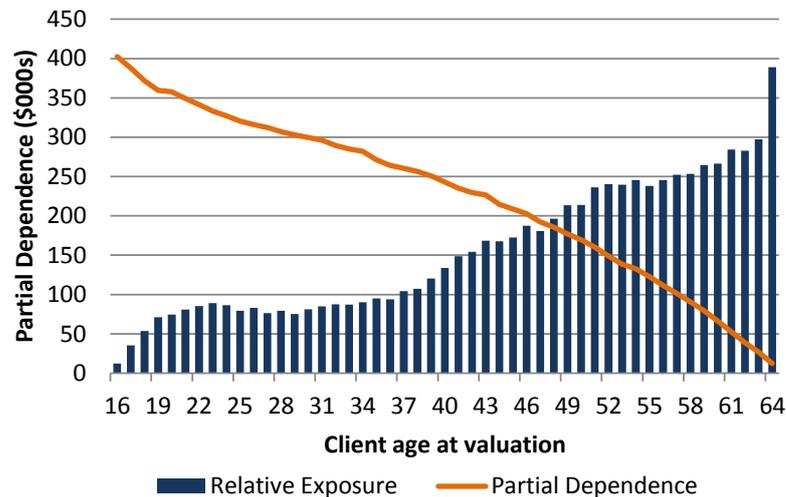
More than any other group of clients, the Supported Living segments have a heavy dependence on age, reflecting the high proportion of clients who remain on benefits till retirement age. For this reason the relative variable importance plot is less revealing for these segments. The partial dependence plot of age for the Supported Living top tier segment (Figure 9.13 above) shows a strong relationship between age and average liability with the average liability of someone aged 16 being nearly $340k higher than that of someone aged 60.

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Figure 9.14 **Partial dependence of number of quarters on Domestic Purposes Benefit for the Carer segment**
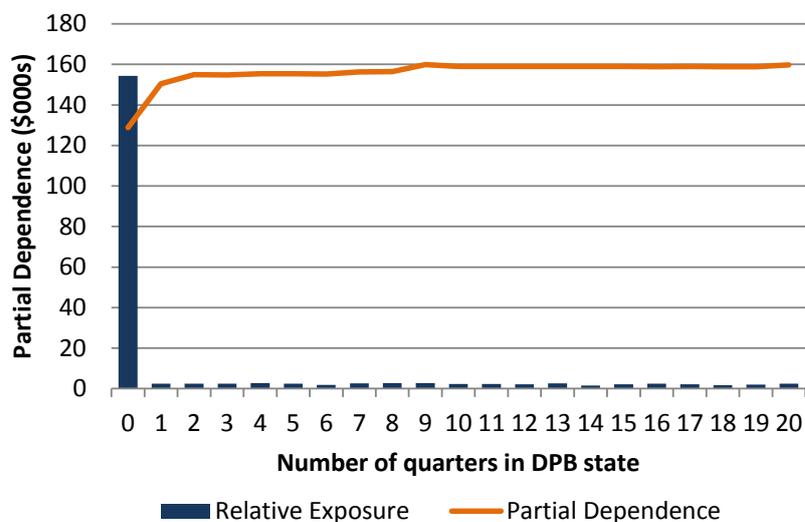
Figure 9.14 shows that there is approximately a $30k difference in average liability between Carers who have never received DPB and those who have received it at some point in the past. This may reflect a higher lifetime cost for clients caring for sick or disabled children.

Figure 9.15 **Partial dependence of number of years on current (IB) benefit for the HCID segment**
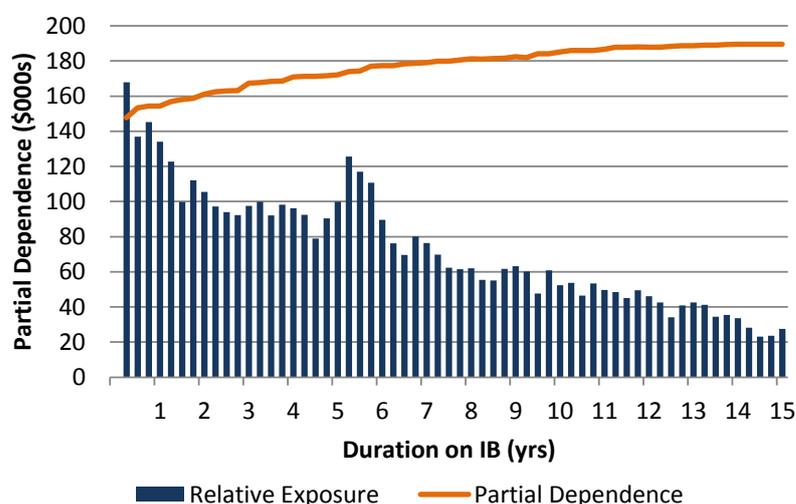
From Figure 9.15 we see that the average liability in the HCID segment is greater the longer a client has been in receipt of IB, up to a $40k difference. Recall that the partial dependence plots keep all other factors constant. This includes client age, meaning that years until retirement does not affect the calculation of the partial dependence at any of the durations in the graph. Therefore, this figure shows that the longer a client has been on IB the less likely they are to be rehabilitated before retirement (or death) and thus they are increasingly likely to remain on IB until they leave the welfare system.

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The figure also shows the distribution of recipients at different durations (where duration is defined as the number of quarters on IB). There are more IB clients on high durations than any other benefit.

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10 YOUTH SEGMENTS

10.1 Introduction

The Youth Segments are designed to capture young people receiving welfare payments. Under the benefit structure prior to August 2012, it represents an amalgamation of the following benefit types:

- Youth Payment segment: Those aged 16 or 17 receiving UB, IYB, SB, EB or DPB-CSI (for new applicants)
- Young Parent Payment segment: Those aged 16 to 18 with dependent children receiving EMA, DPB, WB, UB, SB

The new Youth Service was introduced August 2012 and now has explicit benefits (YP and YPP) for these segments. For our analysis we use ad hoc rules based on benefit type and age to extract payments prior to August, while the new benefits are used thereafter. Note that the youth segments do not include young people receiving IB; they remain in the Supported Living segments.

There were some issues in the allocation of payments between YP and YPP. These are discussed in Section 15.4.3 and mean there might be a small amount of misallocation of clients between the two segments.

10.2 Recent experience

Table 10.1 below shows the numbers of recipients and payment amounts for Youth segments over the 2012/13 year.

Table 10.1 **Recent experience in Youth segments, 2012/13**

Segment	Payments ($m)	Average number on benefit during quarter (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
Youth payt	14	1,600	2,199
Young parent payt	24	1,500	3,996
Total	38	3,100	3,068

The trends in numbers of clients in the various segments each quarter, as well as their average benefit payments, are shown in Figure 10.1 and Figure 10.2 respectively.

Figure 10.1 Numbers of clients in Youth segments each quarter
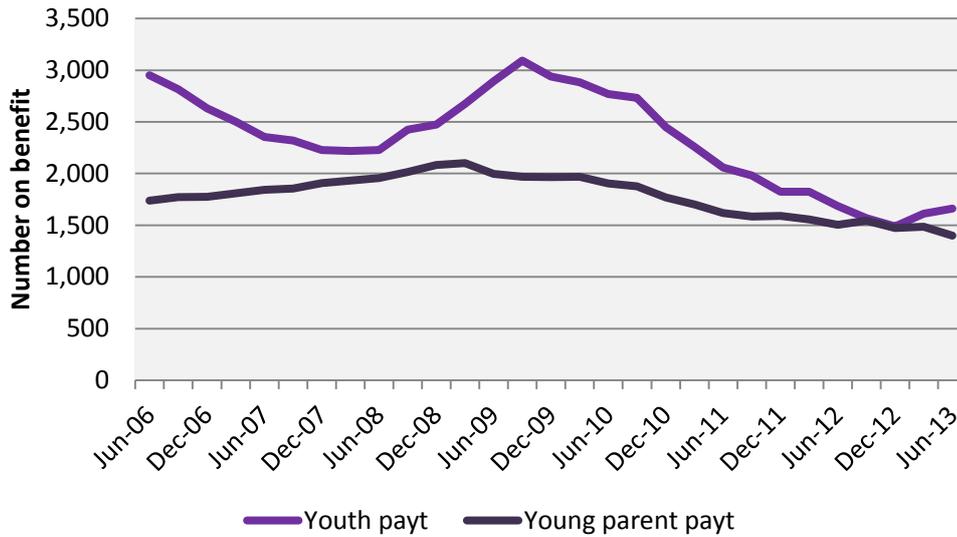
Figure 10.1 shows that the numbers receiving the Youth payment have decreased sharply over the past few years, and are now below the levels seen prior to the GFC. Average numbers in 2012/13 were 13% lower than in 2011/12. The numbers receiving the Young Parent payment have also been decreasing since the GFC, down about 5% in the past year.

Figure 10.2 Average quarterly payments to Youth segments in June 2013 values
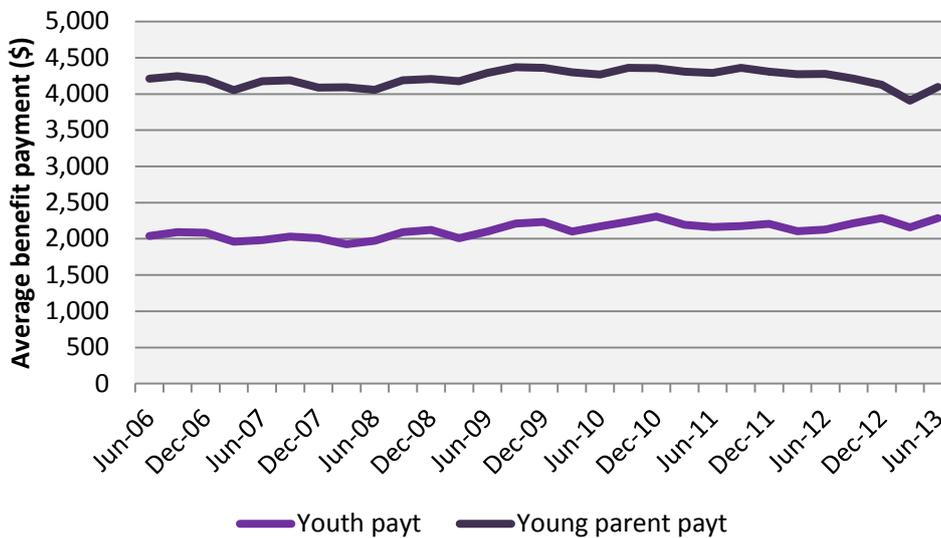
The average payments to the two Youth segments have been relatively stable over time, though there were some modest increases in 2008 and 2009.

Figure 10.3 **Number of clients entering and leaving the Youth segments.**
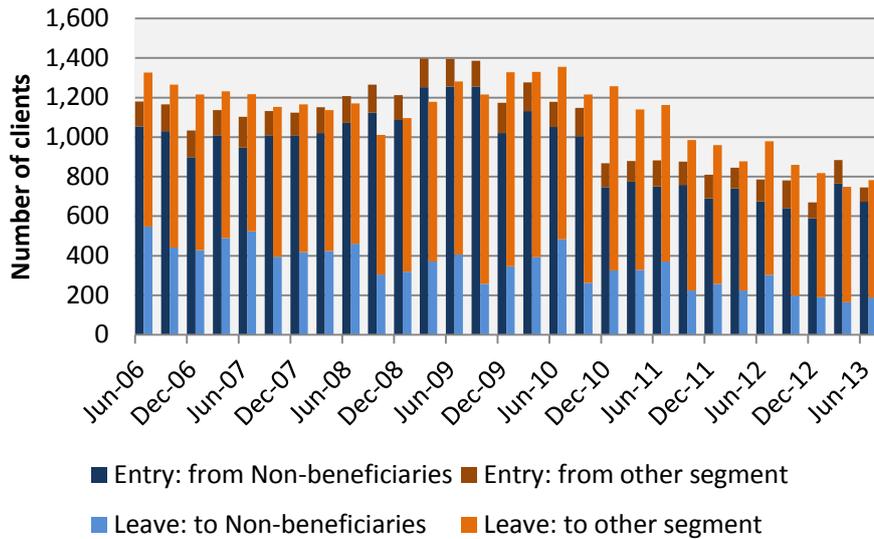
Note we do not count transitions from one Youth segment to another in this figure.

The source and destination of clients entering and leaving the Youth segments are shown in Figure 10.3. Given the age of the recipients, the vast majority of new entrants are entering the welfare system for the first time. For those departing the Youth segment, most depart to other benefits (typically DPB for Young Parent and UB or SB for Youth Payment) indicating a high likelihood of a long duration on benefits for those who receive benefits first at a young age. The proportion of clients who leave Youth segments by exiting the welfare system in 2012/13 was slightly lower than in 2011/12. We reproduce Figure 4.14 below, which illustrates the high proportion of liability attributable to clients who start in a youth segment.

Figure 10.4 **Current client liability split by current client age and status when first entering the welfare system, excluding net loans and expenses**

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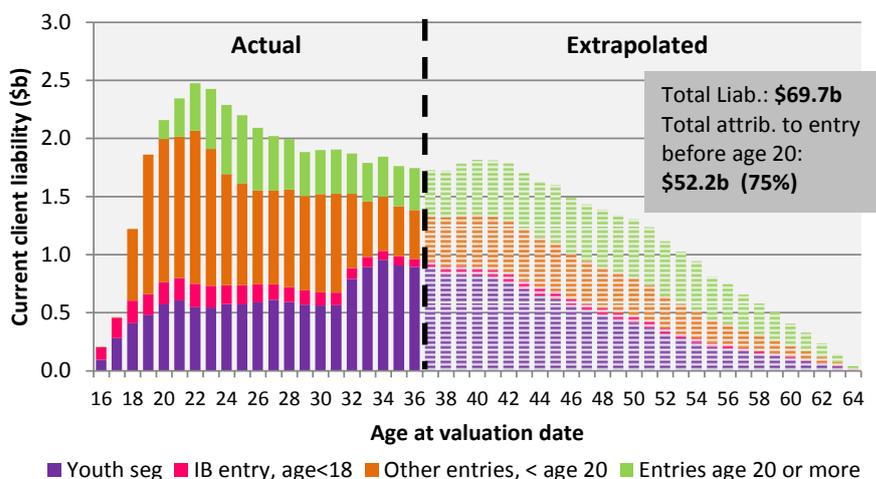
10.3   Modelling the Youth segments

Unlike the other segments which capture distinct types of welfare payment, The Youth segments and their related benefit types have been created to allow closer monitoring and better management of the liabilities for young recipients of welfare as it is known that such clients are at particularly high risk of being long-term users of the welfare system. The transition and payment behaviour of clients in these segments are modelled along with their equivalent non-youth benefits:

- Youth Payment is modelled as part of UB
- Young Parents Payment is modelled as part of DPB.

Thus the discussions on modelling in Sections 7.3 and 8.3 are also relevant for the Youth segments.

10.4   Forecasts

Table 10.2 shows:

- The number of clients in each segment at the valuation date
- The future lifetime cost for each segment, by future benefit type
- The average liability per client

DPB (which includes future YPP cash flows) is the main contributor to the future cost of a client in the Young Parent segment. This is consistent with the low churn rate of DPB and the fact that Young Parents are at high risk of transitioning into the Sole Parent segments and receiving DPB for a considerable period of time. Of some interest is the fact that the average projected liability for a client in the Young Parent payment segment is larger than that of a client in any of the Sole Parent payments, extending the trend seen in Figure 8.13.

DPB is also the major contributor to the projected liability of a client in the Youth Payment segment. This suggests that clients in this segment have a significant risk of moving into Sole Parent segments in the future.

Table 10.2 **Current liabilities by benefit type for Youth segments (payments in inflated values, discounted to June 2013 and excluding net loans and expenses)**

Youth	Number	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average
Youth payment (<18)	1,496	77	28	22	29	9	34	20	219	146k
Young parent payment (<19)	1,361	205	15	10	6	13	51	34	335	246k
Total	2,857	282	43	32	35	23	85	54	553	194k

Figure 10.5 **Projected benefit state for Youth payment (left) and Young parent (right) segments**
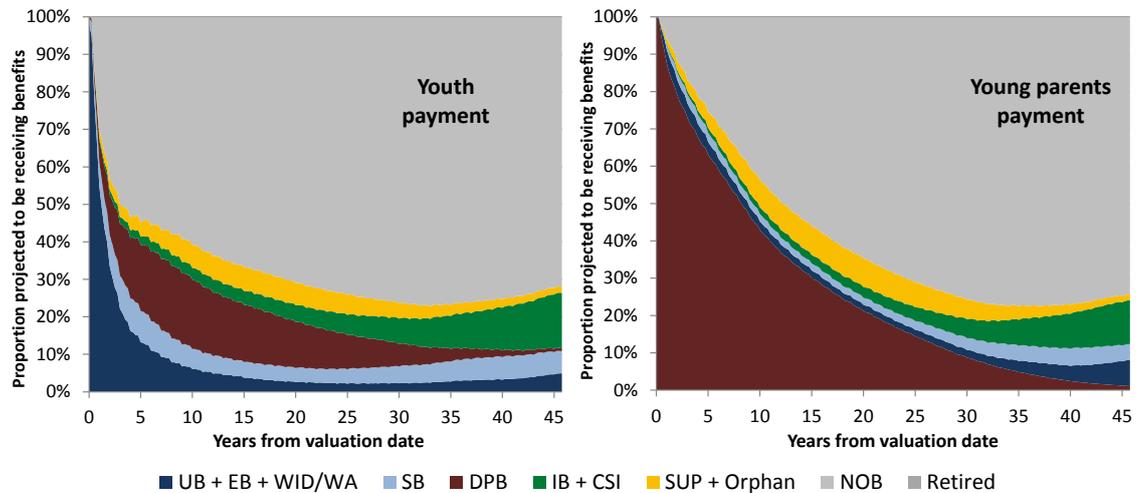
The projected benefit state charts are shown in Figure 10.5. One clear difference to other segments is the lack of retirements for the obvious reason. However the high rates of remaining on benefits across the next 45 years is marked and contributes to the high lifetime cost. The high amount of DPB payments going to clients currently in the Youth parent payment segment is particularly evident.

We introduced the difference in projected benefit state chart in Section 7.4. It shows how the average benefit state over the course of the projection has changed since the previous valuation, and combines effects from the updated starting cohort and the changes to the projection models. Figure 10.6 shows this plot for the Youth Payment segment, and Figure 10.7 for the Young Parent Payment.

Figure 10.6 **Difference in projected benefit state, Youth Payment segment, current minus previous valuation**
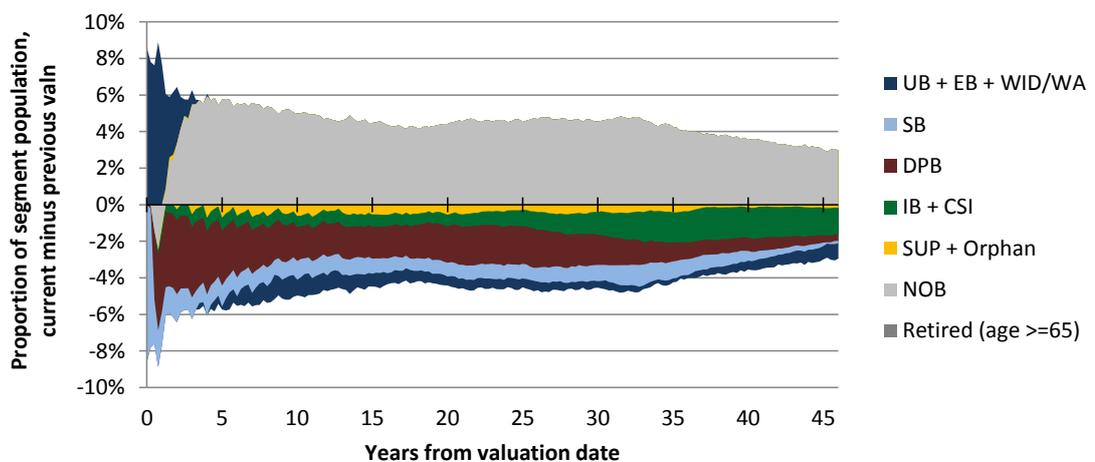
The figure above shows a large movement from benefits to not on benefits – about 5% of the cohort across most of the projection period. This decrease was observed in Section

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4.1.2, associated with the significant decrease in expected years on benefit. The main driver for this change is the higher transition rate out of YP/UB at younger client ages.

Figure 10.7 Difference in projected benefit state, Young Parent Payment segment, current minus previous valuation
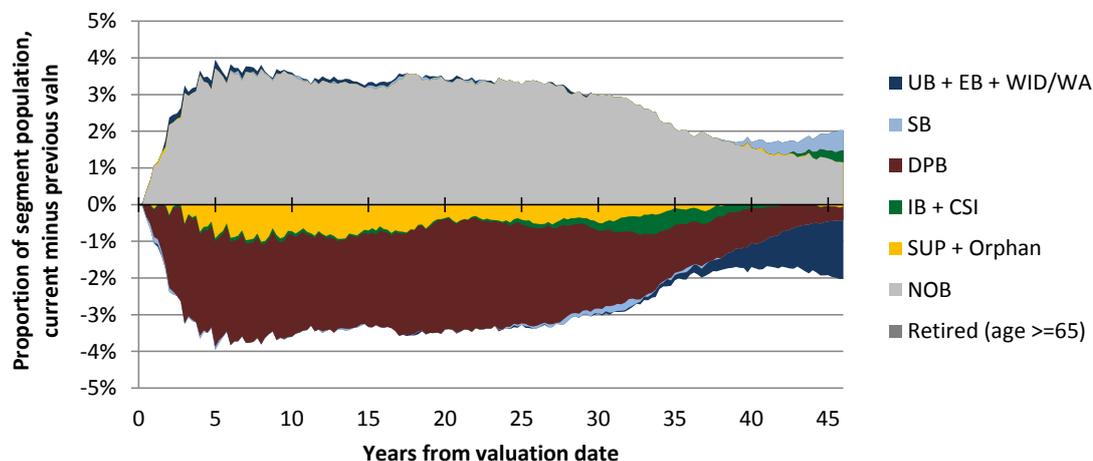
Figure 10.7 shows a similar story for the YPP segment, with about 3% extra of the cohort expected to have exited the welfare system compared with last year. This change is driven by higher transition rates out of DPB/YPP at younger client ages.

Although the improvements in lifetime cost seen in the two figures above look significant, we qualify them in three important ways:

- Numbers in these segments are much smaller than other segments. This increases the noise associated with estimating trends and changes in behaviour.

- There are some additional data quality issues associated with the Youth segments (Section 15.4.3). It is difficult to determine whether this has had a material impact on the results.

- These segments have been subject to reform in the past year. This in itself adds a large degree of uncertainty in modelling the future benefit usage of these clients.

Due caution is therefore recommended when interpreting these results.

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Figure 10.8 **Forecast numbers of clients in Youth segments each quarter**
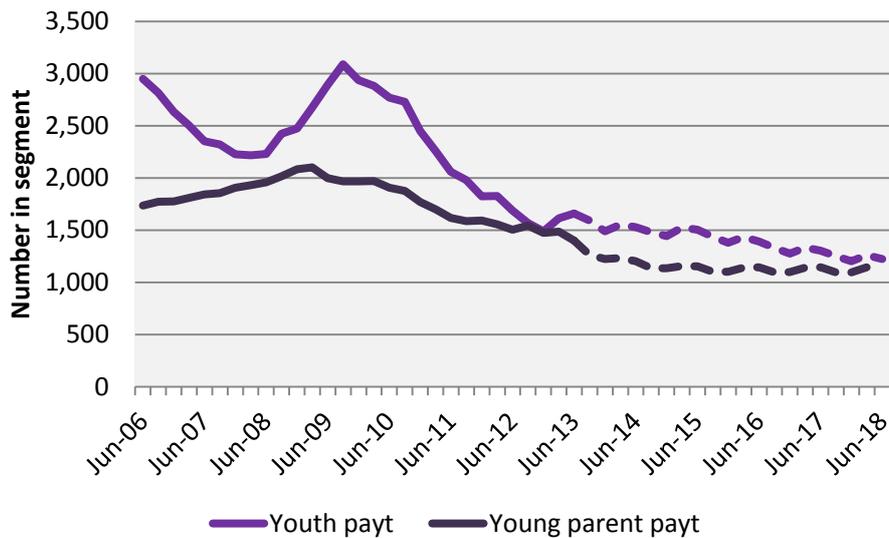
The number of clients in the Youth Payment segment is forecast to continue decreasing over the next few years while the numbers in the Young Parent segment are projected to decrease for the next two years before stabilising beyond that (Figure 10.8). This is mainly driven by Treasury's forecast of falling unemployment rates over that period, but also reflects the low number of entries into the youth segments in the past year. We note that the low numbers of clients in these segments, plus the particular dynamics of how these clients tend to interact with the welfare system, make these projections particularly uncertain.

Figure 10.9 **Forecast average quarterly payments to Youth segments in June 2013 values**
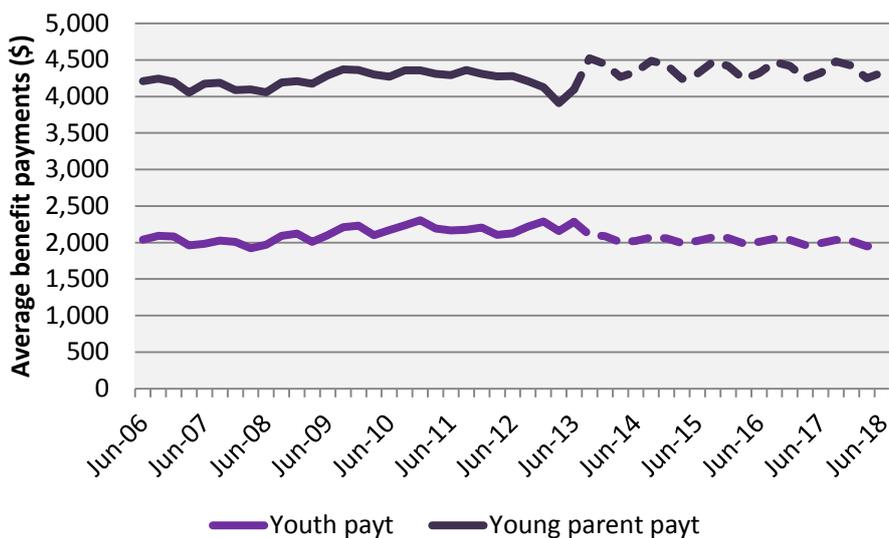
Figure 10.9 displays the forecast average benefit payments in each of the Youth segments for the next five years. These forecasts only show small changes from current levels. The Young Parent average payment is forecast to be fairly stable, at levels similar to those seen in 2010 and 2011. The Youth payment shows a very gradual decrease, which may be due

to the falling forecast unemployment rate leading to slightly shorter durations on benefit each quarter.

Figure 10.10 **Quarterly benefit payments for Youth segments in June 2013 values**
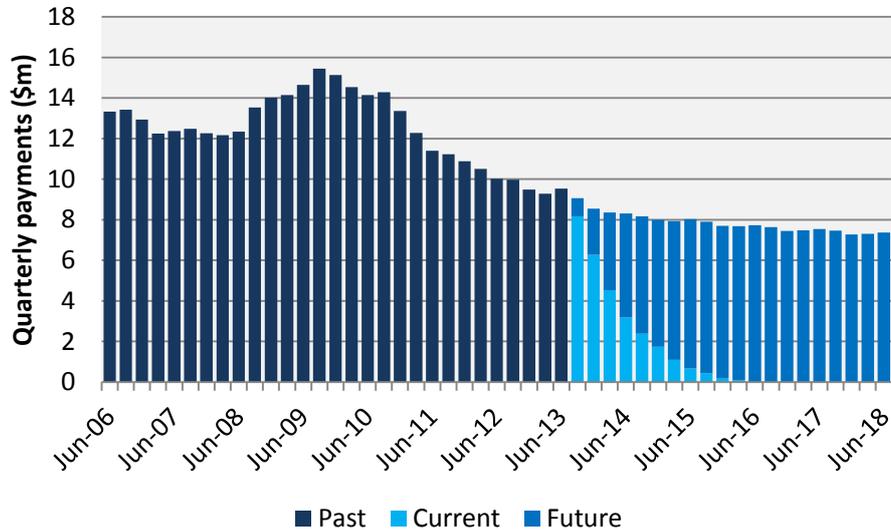
Figure 10.10 shows that total benefit payments for the Youth segments are projected to decrease gradually over the next five years. This is mainly driven by the forecast reduction in the number of clients in these segments in the future; changes in the average benefit payment are marginal. Note that current liability is projected to decrease rapidly since clients leave the segment once they are 18 (Youth payment) or 19 (Young Parent payment). **Care must be taken to not interpret the decline as evidence that clients in youth segments have a short term dependency on the benefit system.**

10.5   Key drivers

Figure 10.11 **Partial dependence of gender for the Youth segments**

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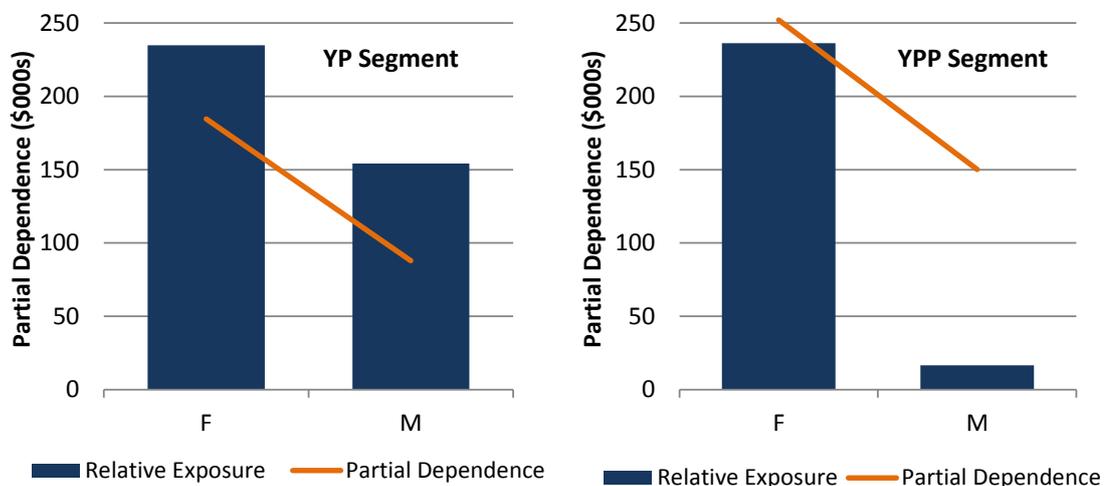
Figure 10.11 shows the partial dependence plot of gender for the two Youth segments. It is clear the females form the majority of both segments and also have significantly higher predicted costs. This can be partly explained by the fact that recipients of DPB (and therefore in the Young Parent segment) tend to be female. Additionally, females in the Youth Payment segment are more at risk of transitioning into DPB at some point in the future and once there, accrue high expected liabilities – we note that the gap in lifetime cost is similar for both segments at about $100k..

Figure 10.12 **Partial dependence of ultimate education group for the Youth segments**
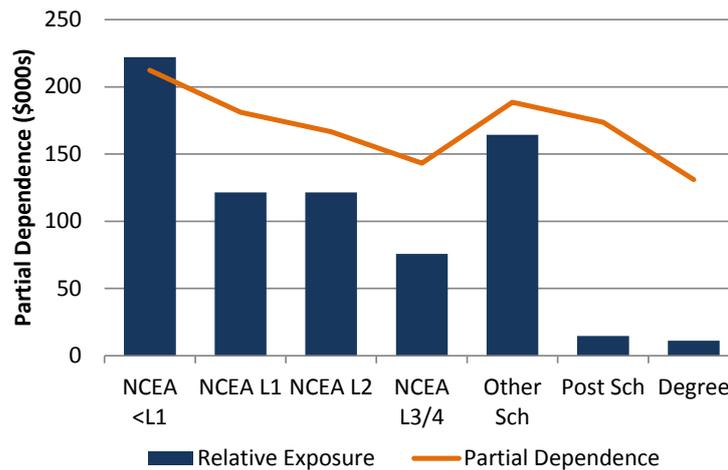
Figure 10.12 gives an ordering of the partial dependence on the education group. Note that the interpolation we apply to missing education level means that the level represents a client's ultimate achievement level, rather than their 30 June 2013 level. As expected, NCEA less than Level 1 has the highest average liability, with a difference of $80k between a client with education level NCEA less than Level 1 and one with a degree. The relationship between higher school achievement and lower lifetime liability is evident.

Figure 10.13 **Partial dependence of duration (number of quarters) since first benefit for the Youth Payment segment**

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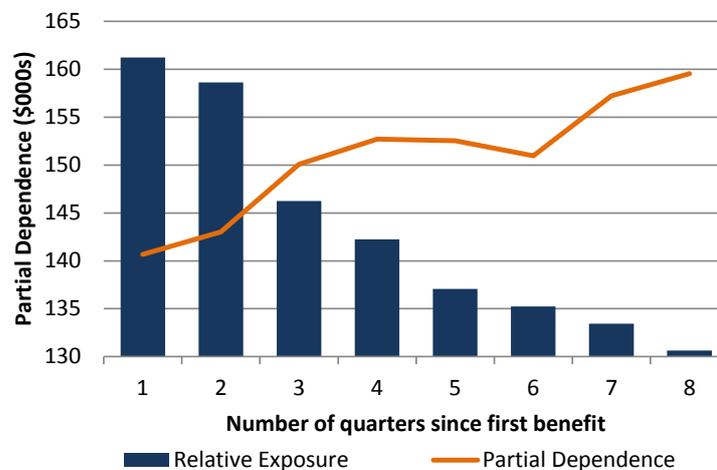
From Figure 10.13 we see that the average liability tends to increase as the number of quarters since first receiving a benefit increases (a difference of almost $20k between 1 and 8 quarters since first benefit). Again, given that those in the youth segments are at risk of being long-term benefit-recipients, we see that this risk gradually increases as duration in the welfare system increases.

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11 NON-BENEFICIARIES SEGMENTS

11.1 Introduction

The Non-beneficiaries segment includes those who have recently exited the welfare system as well as those receiving supplementary benefits only. This group includes recent beneficiaries (NOB), those receiving 2nd or 3rd tier benefits (SUP) and those on Orphan Benefit (OB). Four segments have been defined relating to these clients:

- Those receiving supplementary benefits only, for less than a year (SUP <1 year)
- Those receiving supplementary benefits only, for more than a year (SUP >1 year)
- Those receiving Orphan or Unsupported Child Benefit (OB), but not receiving any other Tier 1 benefit ('Orphan only')
- Recent exits (i.e. < 1 year) from the welfare system (NOB)

In Section 15.5 we describe the exact requirements for qualifying for the supplementary state – i.e. if a client receives AS, DA or CDA in the quarter but no Tier 1 benefit. The reasons for not including those receiving only CCS, HS or EI in the supplementary state definition were partly practical and partly theoretical and are discussed in Section 16.2.2. Clients on supplementary only benefits primarily receive Accommodation Support, which represents two thirds of payments to these segments – see Figure 11.1. CDA and CCS benefits account for a further 15% and 13% respectively, with the other Tier 2 and 3 benefits making smaller relative contributions.

Figure 11.1 **Benefit payments in supplementary only segments by benefit type during 2012/13**
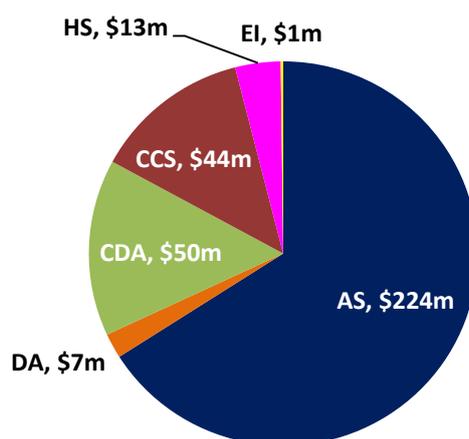
For the Orphan only segment, the specific benefit types, and their relative contribution to 2012/13 payments, are shown in Table 11.1.

Table 11.1 **Payment codes applicable to the Orphans only segment**

Benefit Type	Benefit Name	% 12/13 benefit
OB	Orphans Benefit	3.5%
	Unsupported Child Benefit	96.5%

11.2 Recent experience

Table 11.2 shows the numbers of recipients and payment amounts for (our interpretation of) the Non-beneficiaries segments over the 2012/13 year. Note that the definition of Supplementary only clients means that a small amount of payments are associated with the Recent Exits segment since they can receive some Tier 2 and 3 payments (CCS, HS and EI).

Table 11.2 **Recent experience in Non-beneficiaries segments, 2012/13**

Segment	Payments ($m)	Average number on benefit during quarter (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
Sup only, <1yr	113	45,000	628
Sup only, >1yr	224	60,000	935
Orphan only	66	5,000	3,278
Recent exits, <1yr[24]	20	109,700	46
Total	423	219,700	482

The trends in numbers of clients in the various segments are shown in Figure 11.2. The impact of the GFC on numbers of clients leaving the system (recent exits) can be seen in Figure 11.2 with a significant fall in exits during 2007 and 2008 (prior to the GFC). The number of exits increased from 2010 to 2011 and has been stable at a relatively high level since then.

The numbers receiving Supplementary benefits only for low durations have shown a modest decrease over the last couple of years. Numbers for SUP >1 year increased from 2005 but appear more stable in recent years though there has been a very modest decrease over the last year.

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[24] Client numbers shown for recent exits are number of clients who receive no benefits during the quarter, and the number not on benefit at the end of the quarter

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Figure 11.2 **Numbers of clients in Non-beneficiaries segments each quarter**
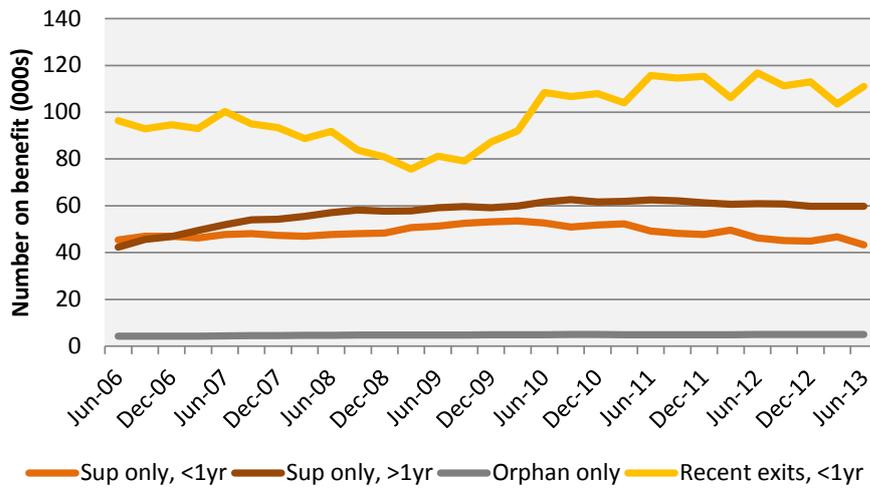
The percentages of clients in the Supplementary segments receiving the various Tier 2 and 3 assistance payments are displayed in Figure 11.3 and Figure 11.4 while Figure 11.1 shows the total amount paid for each of the supplemental benefit categories in 2012/13. Note that the percentages don't sum to 100% in the figures below since a client can potentially receive payments from multiple benefit categories.

Figure 11.3 **Proportion of clients in Supplementary only segments receiving AS benefits**

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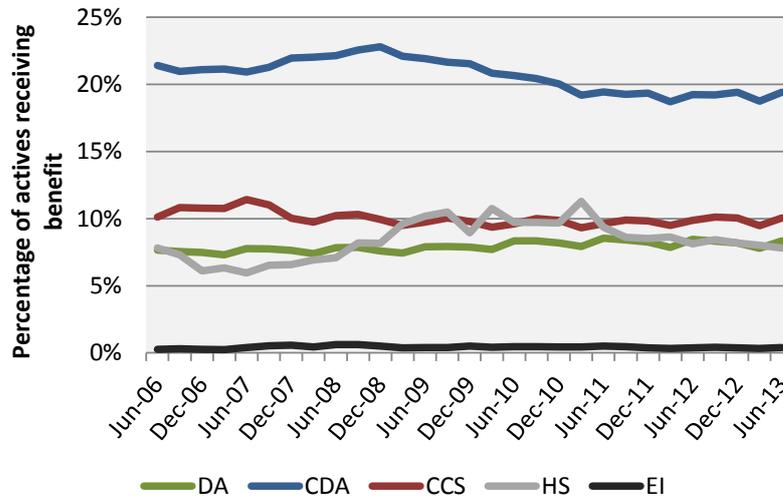
The proportions of clients receiving the various supplemental payments have not changed dramatically over time, though some changes are apparent. For example, there was a slight increase in the proportion receiving AS and HS during the GFC and the proportion receiving CDA has fallen in both relative and absolute terms.

Figure 11.5 **Number of clients entering and leaving Supplementary only segments each quarter**
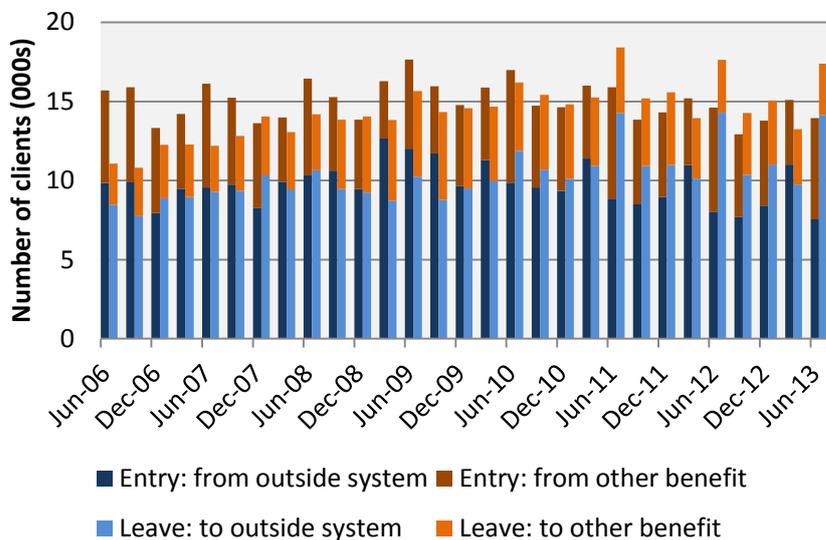
Figure 11.5 shows entrants to and exits from the Supplementary segments (>1 year and <1 year combined). The majority of entrants are new to the system rather than transitioning from other benefits and similarly exits are more likely to leave the welfare system. Of those moving to Supplementary only from other benefits, about 40% enter from UB, 35% DPB and 15% from SB, with the remainder from the other benefit types. During the GFC, entrants from other benefits fell relative to other entrants suggesting that there was less movement off main benefits to the Supplementary segments. In a similar manner, exits to

other benefits also tended to be higher from 2008 to 2010. As with other benefits, there is strong seasonality in exits.

Figure 11.6 **Number of clients entering and leaving Orphan segment each quarter**
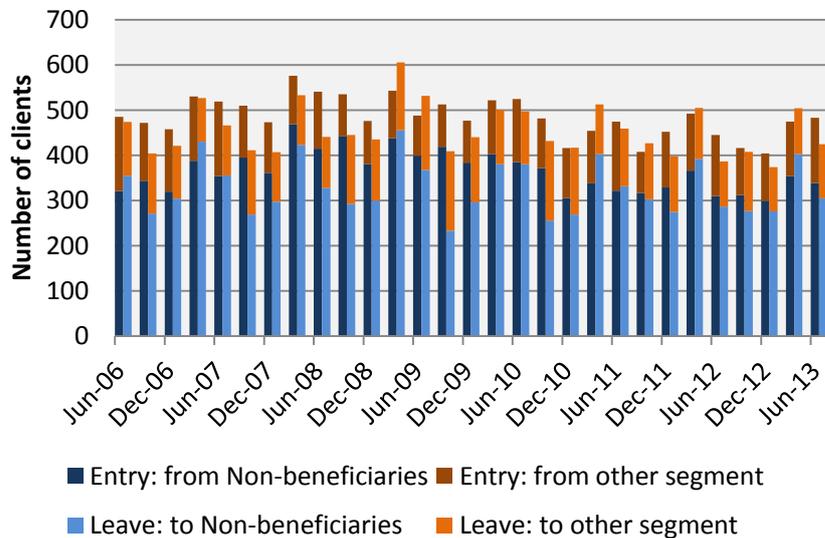
Figure 11.6 shows a similar graph, this time for the Orphan segment. Numbers of entrants and exits for this segment are low – of the order of 400 or less. Entrants are more likely to come from those outside the welfare system and similarly those leaving are more likely to move off benefits.

Figure 11.7 **Distribution of transitions of clients currently in the Recent Exits segment each quarter**
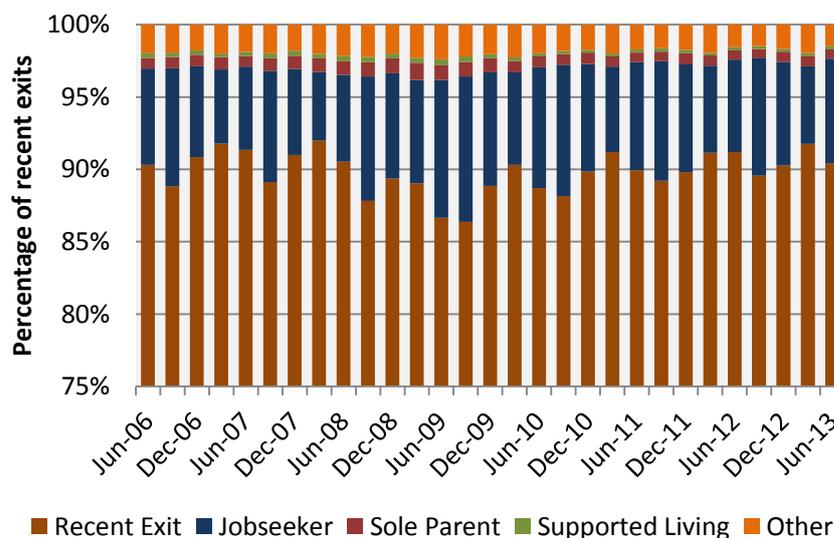
Figure 11.7 shows the proportion of recent exits that transition into the various other segments each quarter (note that transitions here include those remaining in the Recent Exits segment). Prior to the GFC, about 92% of recent exits remained off welfare from quarter to quarter, with the remainder re-entering the system (primarily to benefit types

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associated with the Jobseeker segments). It is clear that during the GFC a larger percentage of recent exits returned to benefits, with an increased proportion transitioning to the Jobseeker Support segments. The recent experience is similar to that pre-dating the GFC.

One other important aspect of the Recent Exits segment is that clients are typically at higher risk of re-entry immediately after exit, with the risk falling with time out of the system. This is shown in Figure 11.8, where the proportion of re-entries in the last two years is heavily skewed towards people who have been off benefits for one or two years only. This observation is reflected in the definition of the current client liability (see Section 16.2.2). Since most lifetime projections of clients typically contain a number of exits and re-entries into the system, the rate at which recent exits return to benefits is one of the key drivers of overall lifetime client cost.

Figure 11.8 **Duration off benefits of former clients returning to Tier 1 and Tier 2 benefits in the 2011/12 and 2012/13 years**
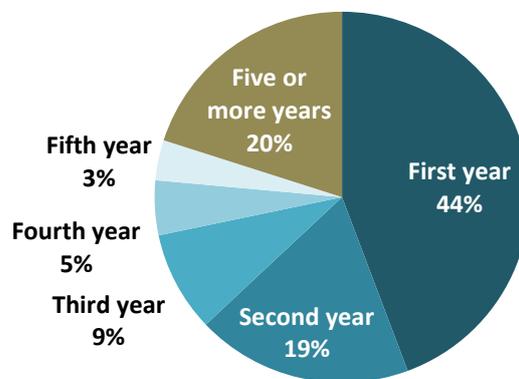
11.3   Modelling the Non-beneficiaries segments

Section 16 describes how we model clients in non-beneficiary segments, which relate to the "SUP", "OB" and "Not on benefit" (NOB) states in the transition models (see Section 16.3.1). Key components of the model are the likelihood of remaining in that benefit state, the relative likelihood of moving to other benefit states and the average payment levels while on benefit. We discuss aspects of each of these components below.

Clients in the Supplementary Only segments are modelled in the "SUP" benefit state. Figure 11.9 shows the actual and modelled probability for remaining on Supplementary benefits. The probability has declined only marginally in the four years to the valuation date, dropping from 0.87 to approximately 0.86. However, the seasonality has increased markedly over the past few years, adding to the uncertainty of projection.

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Figure 11.9 **Probability client remains in the SUP benefit state**
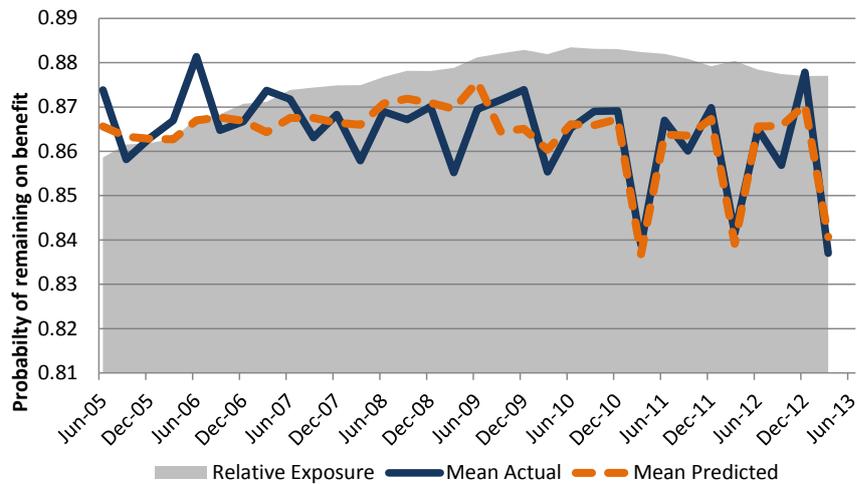
The probability of remaining off benefit for recent exits is displayed in Figure 11.10. As might be expected, this probability fell during the GFC as greater numbers accessed benefits, but has been improving since 2010 and is currently at similar levels to those seen pre-GFC. Somewhat unusually, the higher rate of remaining off benefits (to levels similar to before the GFC) has not been matched by a fall in the unemployment rate. This has led to some uncertainty as to the likely rates of remaining off benefit as the unemployment rate improves (as it is projected to). The projected rate of remaining off benefits has been increased slightly, which has a significant impact on the overall liability (as discussed in Section 5.4).

Figure 11.10 **Probability client remains off benefit for clients within one year of welfare system exit**
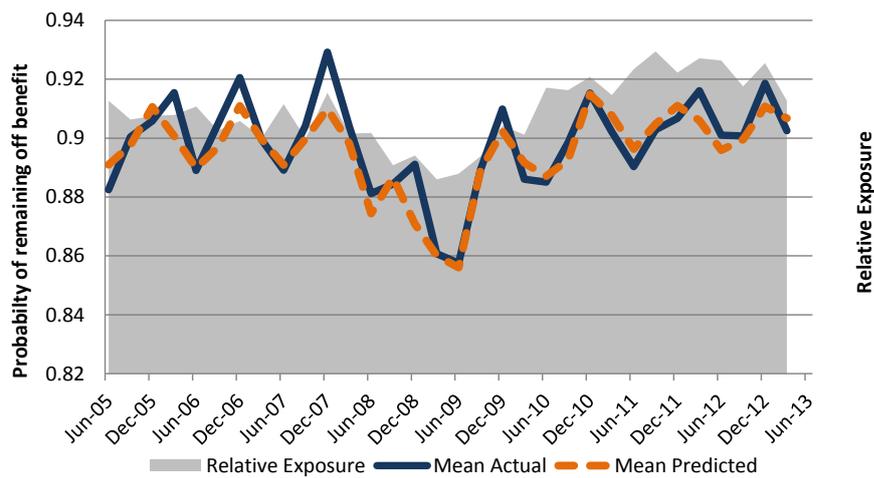
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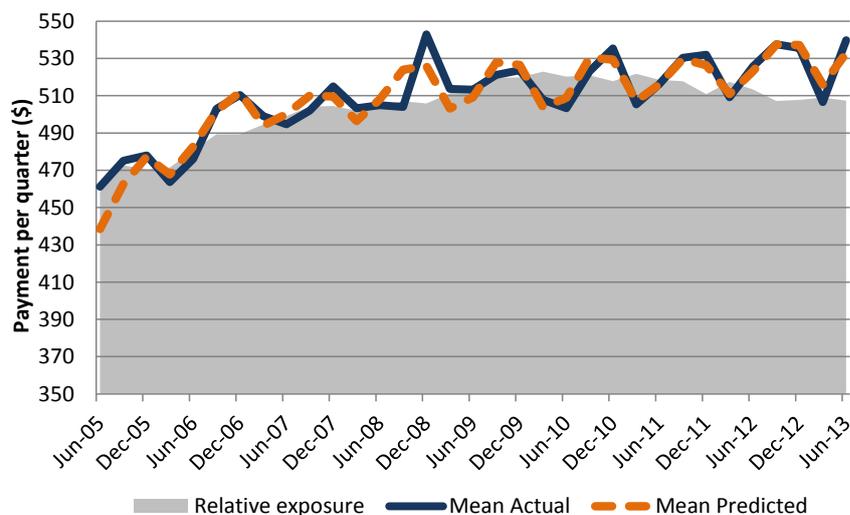
It was observed in Figure 11.1 that Accommodation Supplement (AS) formed the bulk of all payments in the Non-beneficiaries segments. Thus, the AS model for the Supplementary only segments is the ABP model of greatest interest. The average quarterly AS payments for those in the Supplementary segments are displayed in Figure 11.11. Payments increased up to the GFC, perhaps due to increasing accommodation costs during the economic boom. Rates have been increasing slightly faster than CPI over the past two years.

11.4   Forecasts

Table 11.3 shows:

- The number of clients in each segment at the valuation date
- The future lifetime costs for each segment, by future benefit type
- The average liability per client

Clients in the Orphan only segment have an average lifetime liability of $96k, of which just over half is attributable to future OB payments. The lifetime liability amounts for clients in the other Non-beneficiary segments are in the vicinity of $50-60k. Interestingly, the average future cost of a client in the recent exits segment is higher than that of a client currently in the low duration supplementary only segment (but slightly lower than the high duration segment). This effect is partly attributable to the type of future benefits Recent Exits are likely to receive – a higher proportion of IB payments, for example. Despite its low average lifetime liability figure, the large number of former clients in the Recent Exit segment means that it accounts for about 13% of the entire current client liability.

Table 11.3 Current liabilities by benefit type for Non-beneficiaries segments (payments in inflated values, discounted to June 2013 and excluding net loans and expenses)

Non-beneficiaries	Number	DPB ($m)	IB ($m)	SB ($m)	UB ($m)	Other T1 ($m)	AS ($m)	Other T2/3 ($m)	Total ($m)	Average
Sup only, <1 year	34,604	343	265	217	98	162	422	255	1,762	51k
Sup only, >1 year	63,210	690	558	409	157	401	818	623	3,655	58k
Orphan only	4,928	32	37	24	9	313	26	31	474	96k
Recent exits, <1 year	154,704	1,811	1,789	1,470	771	693	1,338	890	8,762	57k
Total	257,446	2,876	2,650	2,120	1,036	1,569	2,604	1,799	14,653	57k

The proportion receiving Supplementary benefits initially declines rapidly (Figure 11.12, left) before slowing down approximately four years after the valuation date. The majority of clients transition off benefit, though small numbers transition into other segments. Those that transition into other benefit segments tend to be long-term recipients of these benefits.

Figure 11.12 Projected benefit state for Supplementary and Recent Exit segments
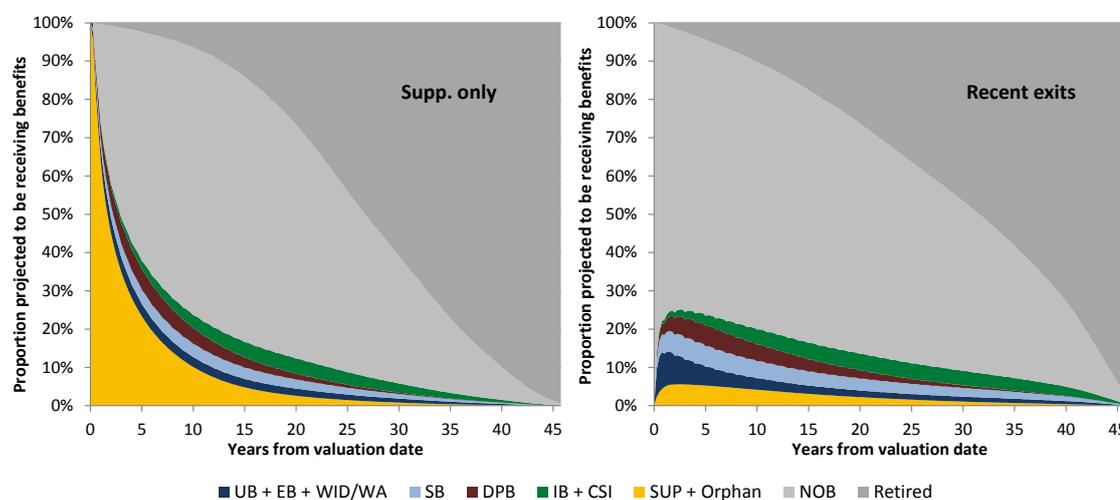
Note that 'Sup only, <1yr' and 'Sup only, >1yr' has been combined in the LHS graph.

Figure 11.12 (right) shows that just under 25% of clients currently in the Recent Exits segment are projected to return to benefits within two years from the valuation date. Of those that return, many will have relatively long spells, particularly if they re-enter to Supported Living or Sole Parent segments.

We introduced the difference in projected benefit state chart in Section 7.4. It shows how the average benefit state over the course of the projection has changed since the previous

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valuation, and combines effects from the updated starting cohort and the changes to the projection models. Figure 11.13 shows this plot for the Supplementary only segments.

Figure 11.13 **Difference in projected benefit state, Supplementary only segments, current minus previous valuation**
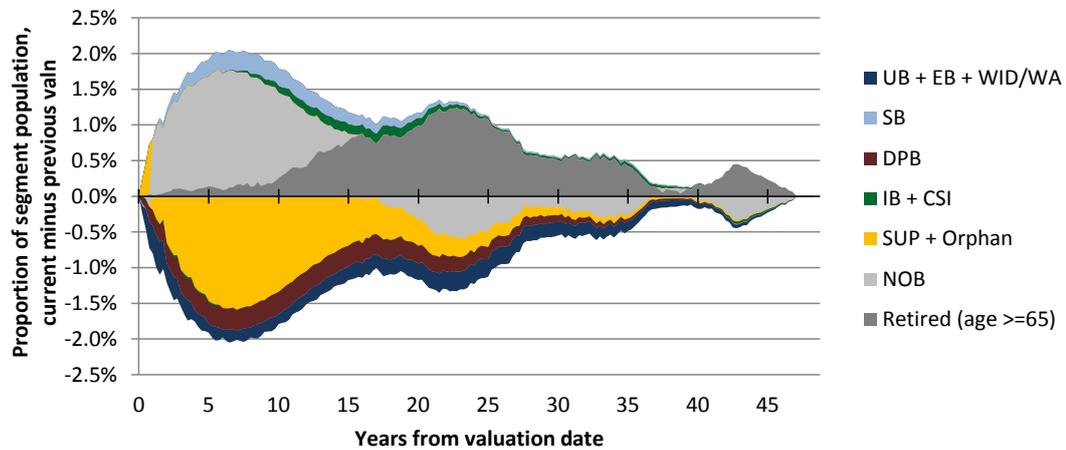
It shows that over the next five years about 1.6% additional clients in the Supplementary only segments (about 1,600 people) are expected to exit the system compared to last year. The main decreases relate to fewer people in Supplementary only benefits, DPB and work-ready jobseeker benefits. Over the projection years 15 to 35 there is a larger group of retirements too – this indicates a slightly older projection cohort compared to last year.

Figure 11.14 and Figure 11.15 show past and projected numbers and payment levels for the Supplementary only and Orphan only segments.

Figure 11.14 **Forecast numbers of clients in Non-beneficiaries segments each quarter**
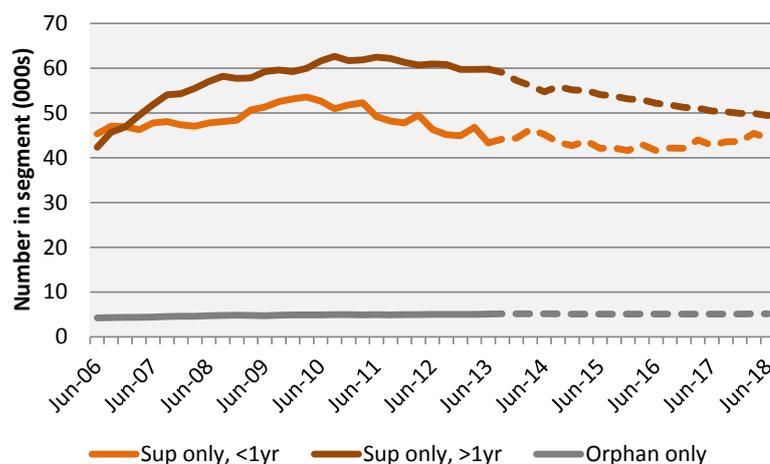
Figure 11.14 shows that the number of clients in both the low duration Supplementary only segment and the Orphan only segment are projected to be reasonably stable. The number of clients in the high duration Supplementary segment is forecast to decrease

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gradually over the next five years. This is consistent with much of the recent experience seen in Figure 11.2 for the Supplementary only segments.

Figure 11.15 **Forecast average quarterly payments to Non-beneficiaries segments in June 2013 values**
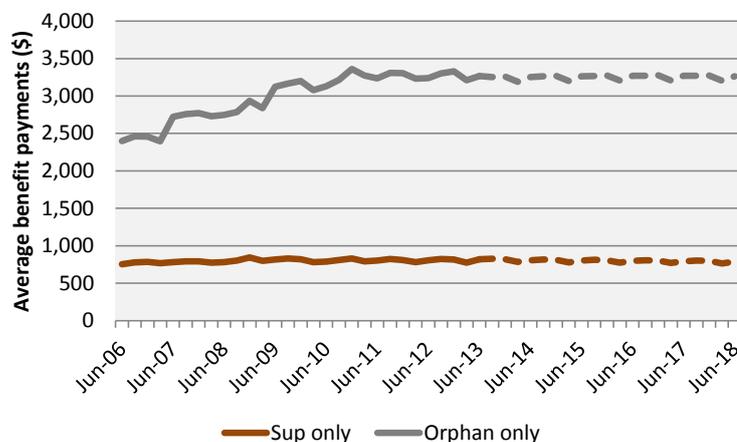
Figure 11.15 shows that average quarterly payments in both Supplementary (high and low duration combined) and Orphan segments are projected to be stable. Although the number of clients in the Orphan only segment is small in comparison to other Non-beneficiaries segments, projected payment sizes are larger. This, together with the long durations for Orphans benefit, helps to explain the observation of a high projected future cost for the segment (Table 11.3).

The forecast quarterly payments for those clients that have (or will) exit the welfare system are shown in Figure 11.16. Childcare Subsidy (CCS) accounts for most of the payments with small contributions from Hardship benefit and Employment Intervention. Payments are forecast to increase as a higher proportion of clients from the current client liability cohort move off benefits. These payment levels are small relative to those payments going to other clients in the welfare system.

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Figure 11.16 **Projected quarterly payments for clients in the current client liability and not in a Tier 1 or Supplementary benefit state**
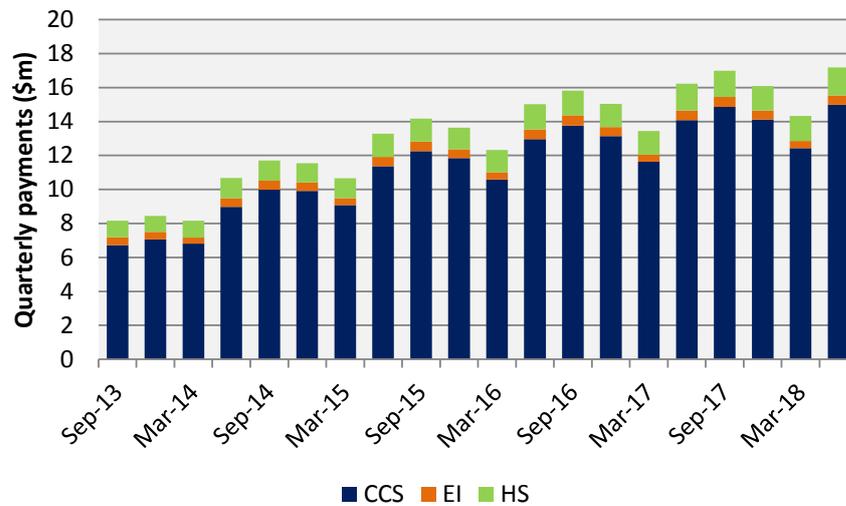
11.5   Key drivers

There are a number of important drivers for lifetime costs for clients in the Non-beneficiaries segment. The most important ones are shown in Figure 11.17. We have used a machine learning tool to assign this relative significance.

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Figure 11.17 **Relative variable importance plots, Non-beneficiaries segments**

Sup <1yr

qtrs DPB
Age
Ethnic group
qtrs SB
qtrs UB
Sex
Edu group
qtrs NOB
District...
Current...

Sup >1yr

qtrs DPB
Age
qtrs SB
qtrs UB
Edu group
qtrs SUP
Ethnic group
qtrs NOB
Sex
District...

OB

Age
qtrs SB
qtrs NOB
Ethnic group
qtrs UB
Sex
Edu group
District...
Dur...

Recent exits

Age
Ethnic group
qtrs SB
qtrs UB
Edu group
qtrs DPB
Sex
Current...
qtrs NOB
qtrs SUP...
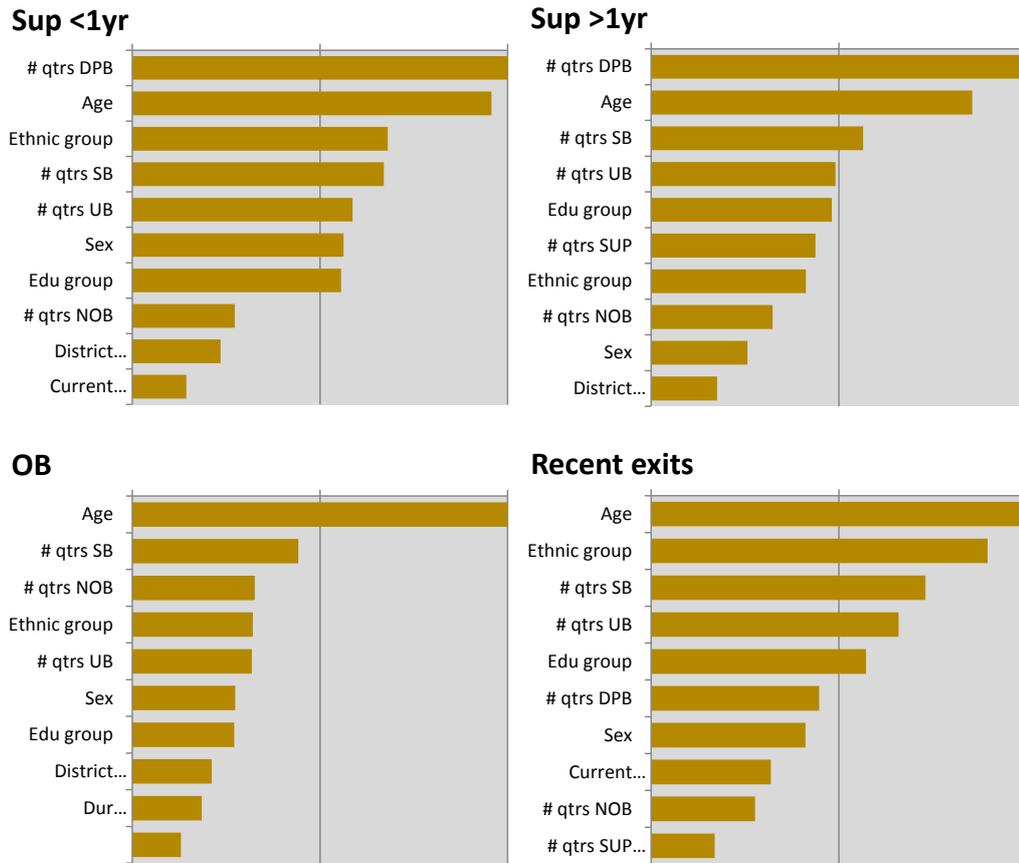
Age is a consistently strong driver of lifetime cost. Figure 11.18 shows the partial dependence of age for the high duration Supplementary only segment. There is a steep decreasing trend from age 17 to about 22 suggesting that young clients who have received supplementary benefits early in their lifetime are at risk of becoming long term welfare clients. In fact, a client aged 20 in this segment has a projected cost that is about twice as large as a client aged 45, although part of the difference is explained by their difference in the number of years until retirement.

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Figure 11.18 **Partial dependence of age for the Sup only, >1yr segment**
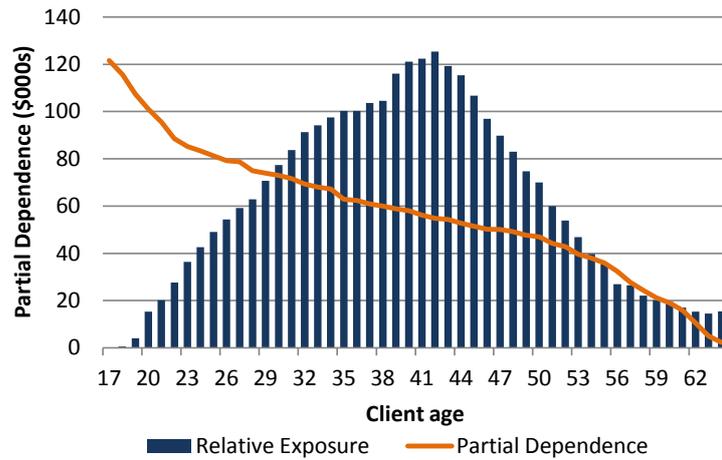
Figure 11.19 **Partial dependence of number of quarters on Domestic Purposes Benefit for the Sup only, >1yr segment**
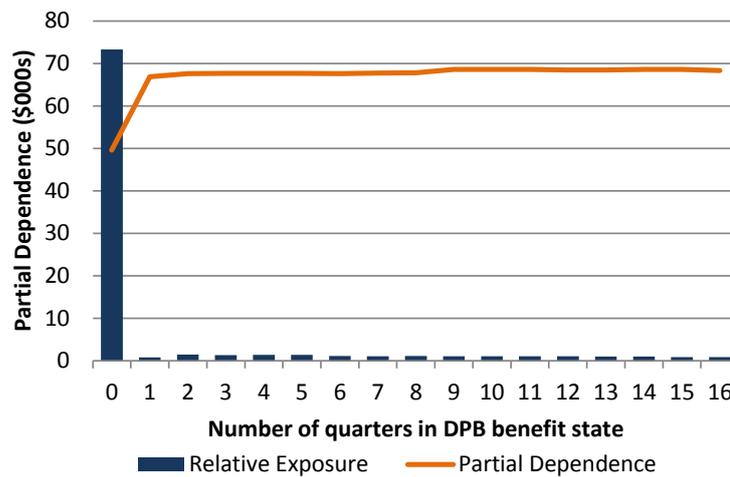
Both Supplementary segments have DPB history variables as the most important driver of liability. This is generally because past DPB receipts increase the likelihood of future entry into a long spell on DPB, leading to a higher lifetime cost (about 20% of future lifetime cost is DPB for these segments). Figure 11.19 shows the partial dependence on a history of receiving Domestic Purposes Benefit for the high duration supplementary only segment. It shows that having a history of receiving DPB for any length of spell has a significant impact on projected future cost.

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Figure 11.20 **Partial dependence of ethnicity for the Orphan segment**
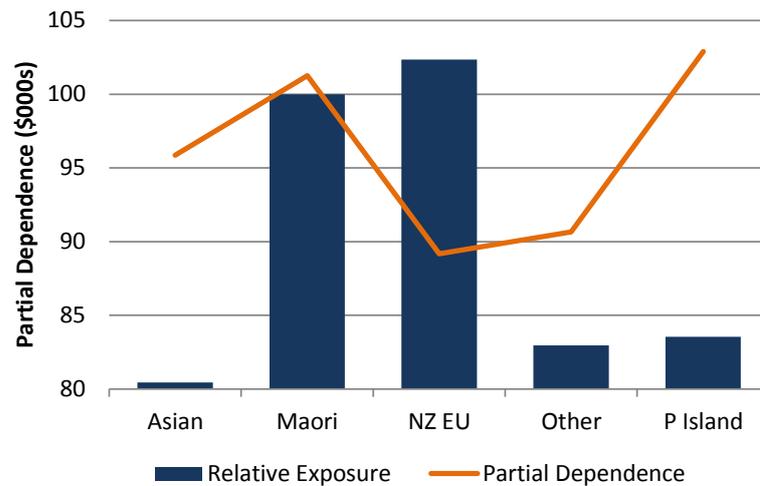
Figure 11.20 shows the partial dependence of ethnicity for the Orphan segment. The plot shows that Pacific Islanders and Maori are more likely to return to benefit after exiting the welfare system.

Figure 11.21 **Partial dependence of number of quarters on Unemployment Benefit for the Recent Exits segment**
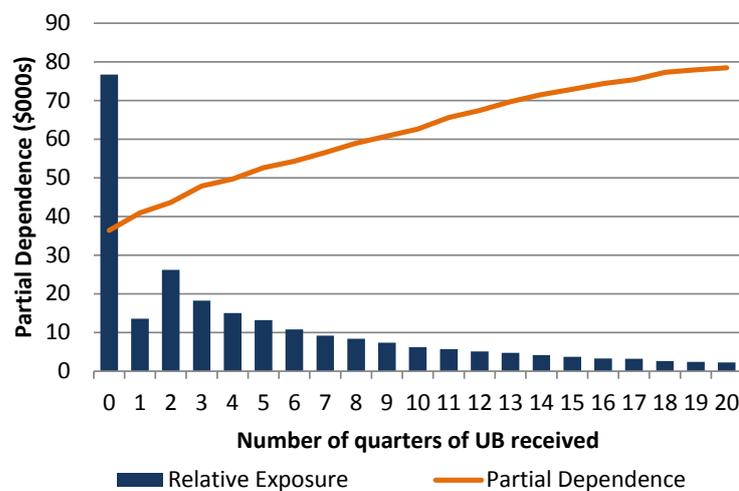
Figure 11.21 shows the partial dependence on the number of quarters receiving UB for the Recent Exits segment. There is a near linear increasing trend that spans across the entire plot. A client that has received UB for 12 quarters in the past (not necessarily consecutive) has a projected cost that is almost twice as high as a client that has never received UB. Although future UB payments is one of the smaller projected future costs for the Recent Exits segment, it may be the case that a history of receiving UB identifies those more at risk of re-entering the system and accessing other welfare benefit types.

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PART C.2
MODELS FOR CALCULATING THE LIABILITY ASSOCIATED WITH FUTURE CLIENTS

12 MODELS FOR CALCULATING THE LIABILITY ASSOCIATED WITH FUTURE CLIENTS

12.1 Numbers of future clients

As discussed in Section 2.6.1, in addition to the current client liability we also estimate five years of future client liability. This relates to clients who have not received a benefit in the 12 months prior to the previous 30 June, but are expected to receive a benefit payment at some point in the following year. This section gives some further detail regarding how we estimate the number of clients entering over this five year period.

We have built a model that estimates the number of clients entering the welfare system which takes into account:

- The unemployment rate
- The benefit type at entry
- The length of time from the valuation date to the entry date
- Other time related trends as needed

The approach used for modelling the future liability is discussed in Section 16.4.3. Figure 12.1, Figure 12.2 and Figure 12.3 show the historic numbers of entries as well as what has been projected for future years.

Figure 12.1 **Past (solid line) and projected (dashed line) numbers coming onto benefit each quarter for SB, SUP and UB benefit states**
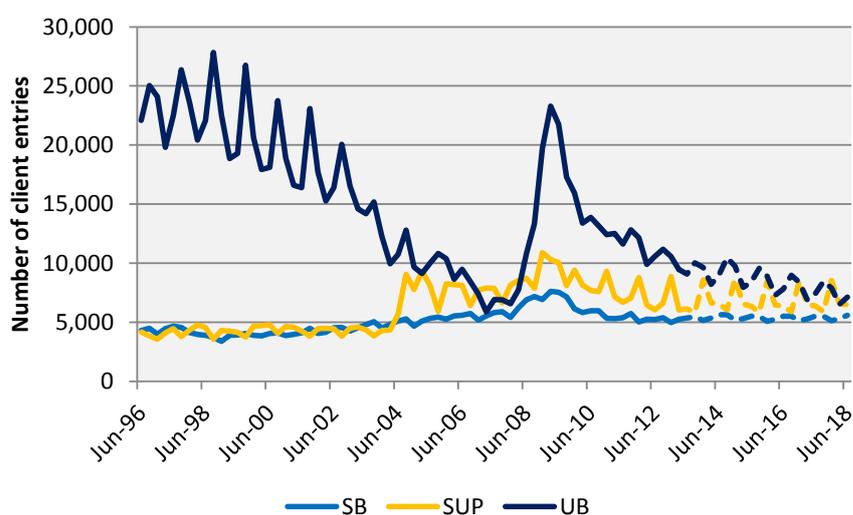
Figure 12.2 **Past (solid line) and modelled (dashed line) numbers coming onto benefit each quarter for DPB, EB, IB benefit states**
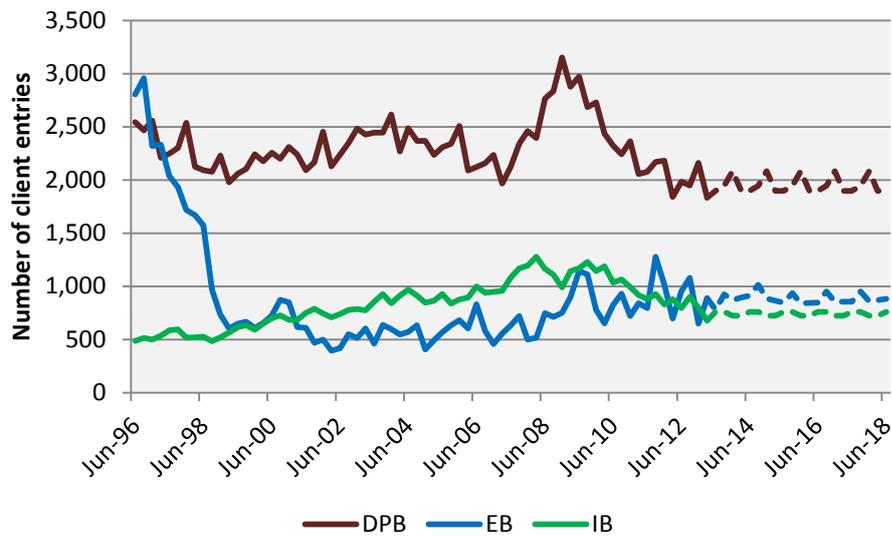
Figure 12.3 **Past (solid line) and modelled (dashed line) numbers coming onto benefit each quarter for CSI, OB and WA/WB benefit states**
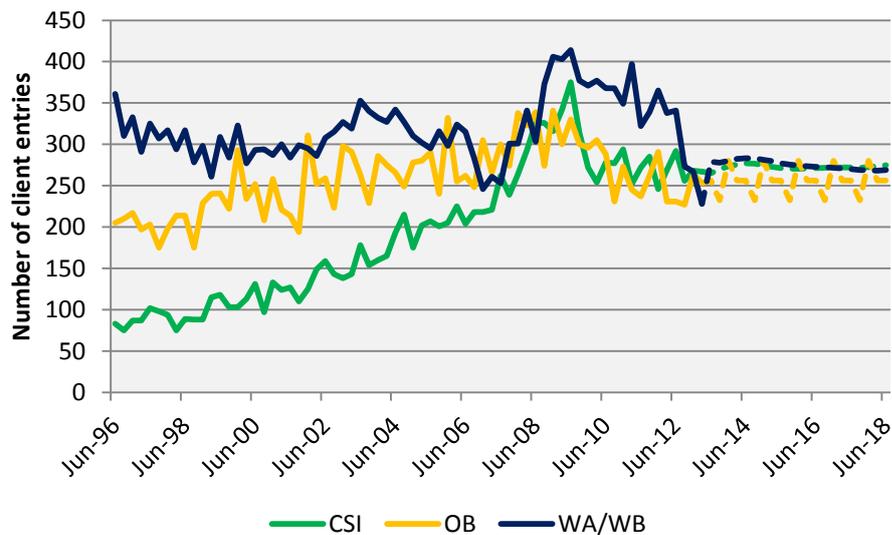
We make the following comments regarding these three figures above:

- The numbers entering WA/WB fell sharply over the past year, probably due to the October 2012 reforms, but perhaps also in advance of the discontinuation of the benefits in July 2013. We have projected future numbers at a level consistent with the past couple of quarters, without the downward trend.

- The numbers entering CSI has stabilised over the past couple of years, after large changes in the historical levels.

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- DPB entries have historically been fairly stable at just under 2,000 per quarter. This is the basis of our projection, which is very close to the level used last year.

- EB and OB are both relatively stable and have been forecast close to their recent levels.

- IB entries have been lower over the last twelve months and we have reduced entries by about 8% relative to the previous valuation.

- The number of entries into UB has the highest sensitivity to the unemployment rate, and the decrease in forecast numbers reflects the projected fall in the unemployment rate. Projected levels are somewhat lower than the previous valuation.

In the previous valuation we also estimated these numbers on a "no duplication" basis. In the current valuation we now remove double counting by removing observations from the current client liability. See Section 16.2.2 for further discussion.

12.2   Distribution of future clients

In Section 16.4.3 we describe how characteristics of clients entering as part of the future liability are assigned by sampling from the "pool" of clients who entered in the 2012/13 year. That is, characteristics (age, previous benefit history, etc.) are assigned as part of the sampling process, on the assumption that the distribution of these characteristics will be similar to those entering as part of the future client cohorts. This sampling allows for:

- Seasonal effects: Different distributions in different quarters
- Benefit state bias: Different distributions for different benefit types

While difficult to provide a full multi-dimensional picture of the distributions of characteristics assigned to clients, we present a few of the two-way dimensions in Figure 12.4, Figure 12.5 and Figure 12.6 below.

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Figure 12.4 Distributions for gender and new versus returning clients[25] by starting benefit for future liability clients
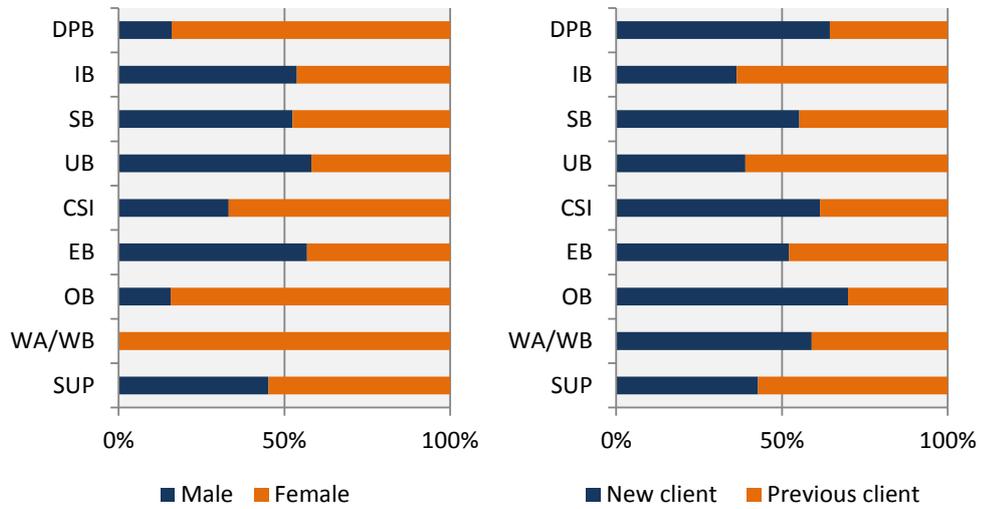
Figure 12.5 Distributions for ethnicity by starting benefit for future liability clients

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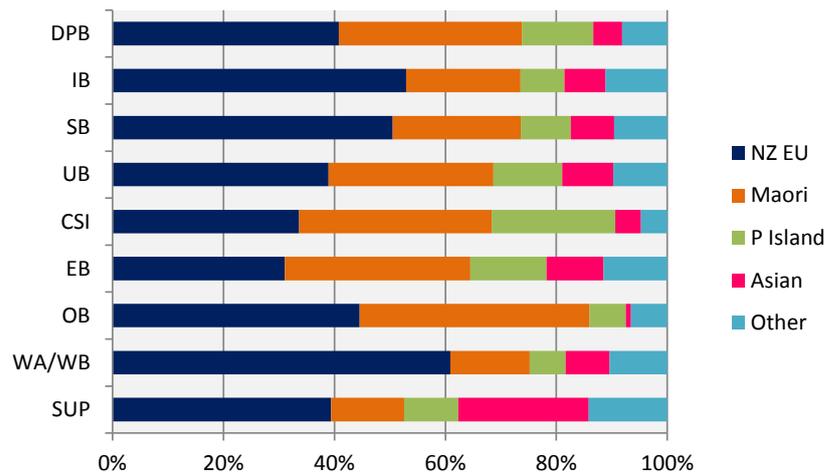
[25] Due to the nature of the data provided, a "new" client refers to a client who is genuinely new to the welfare system or one who has not received a benefit since 1993.

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Figure 12.6 Age distributions for future liability clients entering DPB, IB, SB and UB. Grey distribution represents future liability clients across all benefits as a benchmark
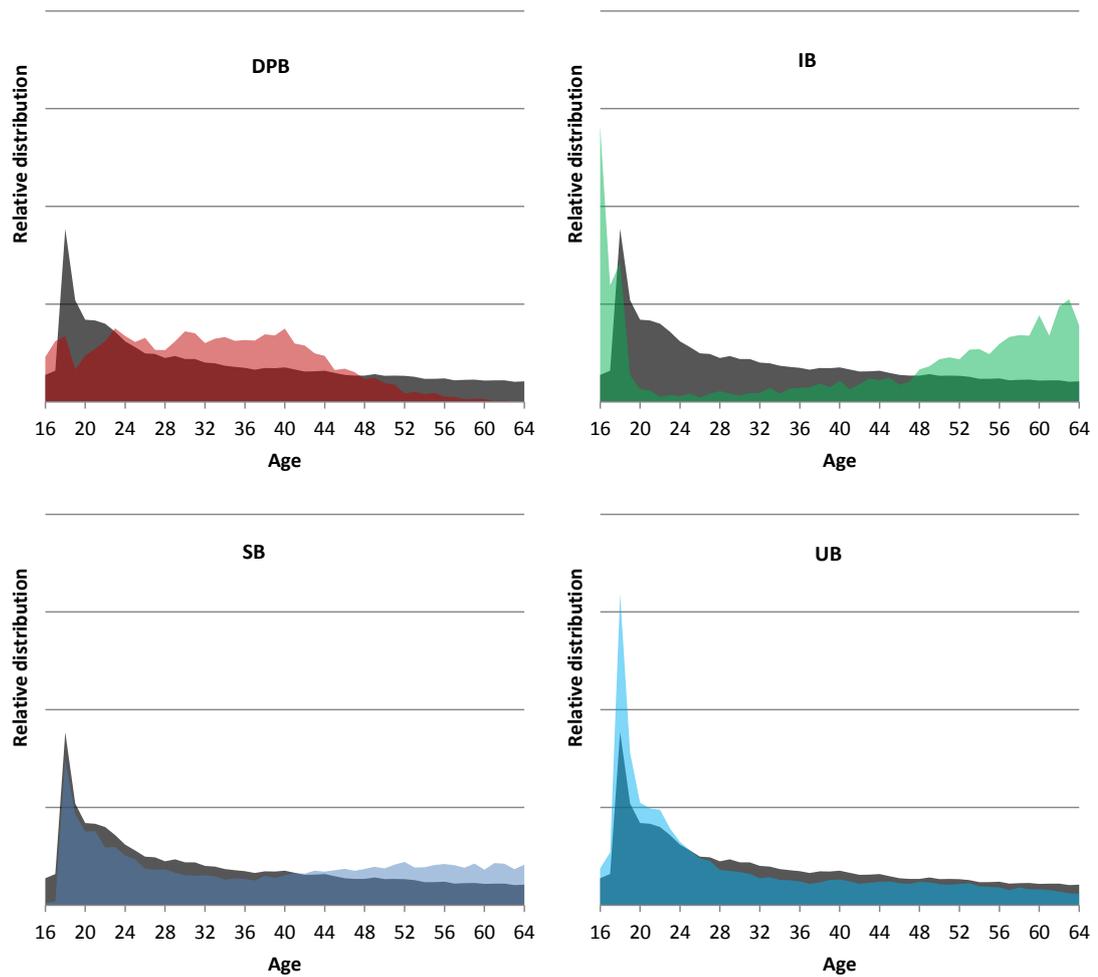
Note that the spike at young ages for IB relates to those clients who would be eligible for IB except for their age – once they turn 16 (or soon after) they move onto benefits.

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PART C.3
NET LOANS COST AND MSD EXPENDITURE

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13   NET LOANS COST

There are a number of different ways a "loan" to a client can arise. This is discussed further in Section 16.6. We have been provided with data on recoverable amounts related to:

- Overpayments, including those due to benefit fraud
- Recoverable assistance (including benefit advances)

Various subcomponents related to each of these items have been valued separately. Details are provided in the following sub-sections.

It is important to note that our entire analysis of overpayments and fraud is based on the level of previously detected amounts. We have not attempted to determine the level of undetected overpayments and fraud.

13.1   Overpayments, including fraud

13.1.1   Introduction and current experience

Overpayments, including fraud, represent slightly more than 3% of payments made by MSD. The table below shows the recent experience for payments and recoveries. Over the past year about 90% of these payments relate to overpayments, with the remainder attributable to fraud. In the remainder of this section a reference to overpayments includes the small amounts related to fraud.

Table 13.1 **Recent Overpayments and fraud experience**

Calendar quarter	Payments ($m)	Recoveries ($m)
Sep-10	58.9	33.4
Dec-10	54.9	32.7
Mar-11	51.3	30.3
Jun-11	57.6	30.2
Sep-11	60.2	32.5
Dec-11	57.4	33.2
Mar-12	59.4	32.1
Jun-12	60.0	32.1
Sep-12	65.2	33.5
Dec-12	55.7	34.6
Mar-13	52.9	32.8
Jun-13	59.7	34.2

The majority of overpayments are eventually recovered – we estimate about 83% of their value (see Section 13.1.5). However, the speed of recovery is limited due to legal requirements not to cause undue hardship on clients. In some cases there is a maximum deduction from benefits of $25 per week.

For these reasons a large amount of the debt outstanding is from debts established for past payments. An estimate of the proportion of this total that will be recovered is required. At the valuation date we estimate that there is $760m of overpayments and recoveries outstanding in respect of working-age clients, an increase of 9.6% over the equivalent amount at the previous valuation. This growth is well above the rate of growth of benefit payments generally. We are not in a position to say whether this growth relates to more overpayments taking place or better detection of it by MSD (such as the 2013 data matching program with Inland Revenue).

We estimate future debts and recoveries for overpayments by considering a number of stages to the process. These are illustrated in Figure 13.1.

Figure 13.1 **Models for the projection of the amount of detected overpayments (including fraud) and their related recoveries**
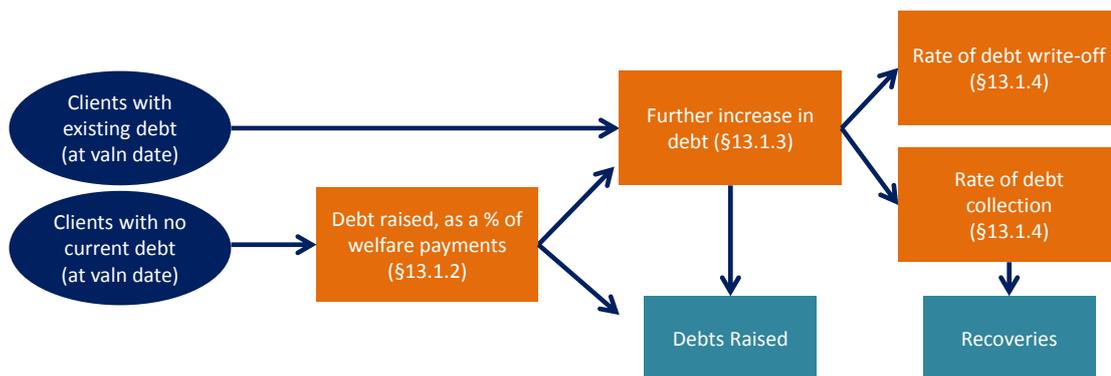
In brief, we model:

- The rate at which new debts arise amongst clients without an existing debt
- How existing debts tend to have additional overpayments over time
- How debts are recovered or written off over the time after debts are raised

Each of these elements is discussed in the corresponding section below.

13.1.2   Debts raised

Levels of **detected** overpayments, including fraud, have been relatively stable as a percentage of overall welfare payments. We have adopted 3.6% as the rate of detected overpayments applicable to all future payments as shown in Figure 13.2. This assumption is a slight increase on the 3.55% adopted for the previous valuation.

Figure 13.2 **Actual and adopted rates of detected overpayments, including fraud**
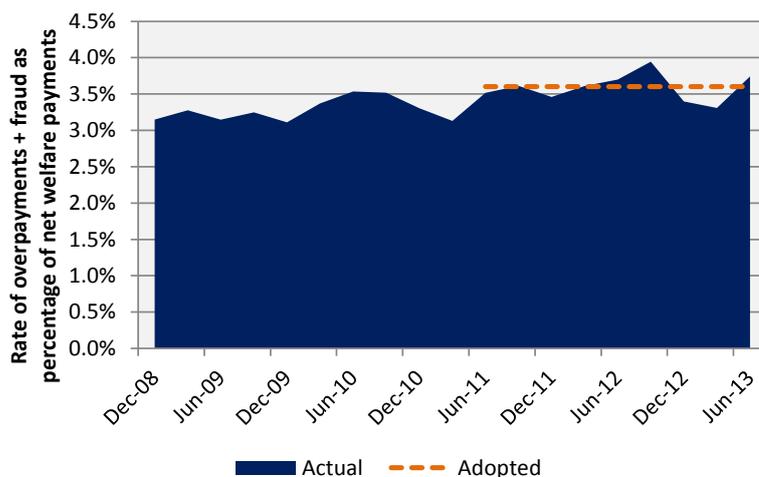
13.1.3　Development on outstanding debt

One feature of the outstanding debts is that it seems to be possible for clients to accrue further debt before the existing balance is paid off. We have modelled this pattern using historical data, as shown in Figure 13.3. Debts are assumed to continue to develop for 10 years – see Section 13.1.6 on tail assumptions below for further information. Estimates are fairly similar to the previous valuation, although the tail assumption has been lowered somewhat in response to recent experience.

Figure 13.3 **Development of total overpayment and fraud debts amongst existing debtors**
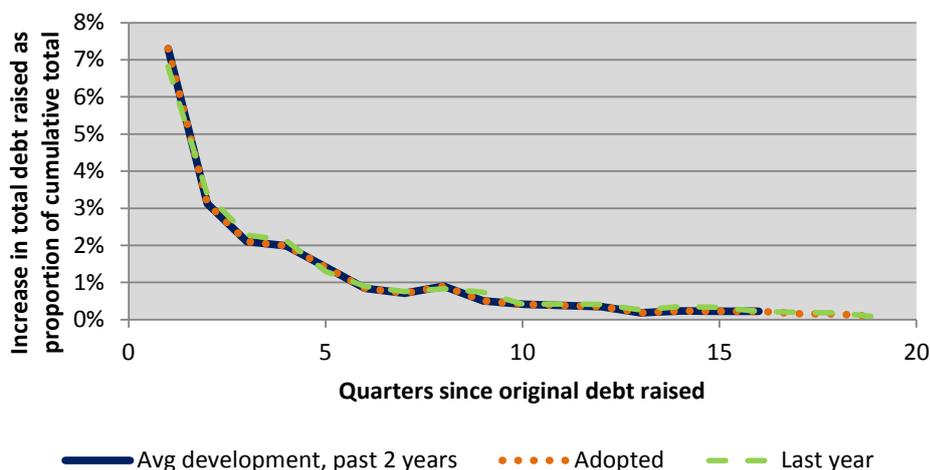
13.1.4　Recovery and write-off rates

We have estimated the proportion of outstanding debts that are recovered or written off, which depends on the time since the original debt was raised. Recovery rates are strong for the first few quarters, but decay quickly to low levels. Recent history and projected rates are shown in the figure below. These rates are very similar to what was assumed in

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the previous valuation. For the purposes of this analysis, debt adjustments and transfers have been treated as recoveries.

Figure 13.4 **Proportion of outstanding debt recovered or written-off**
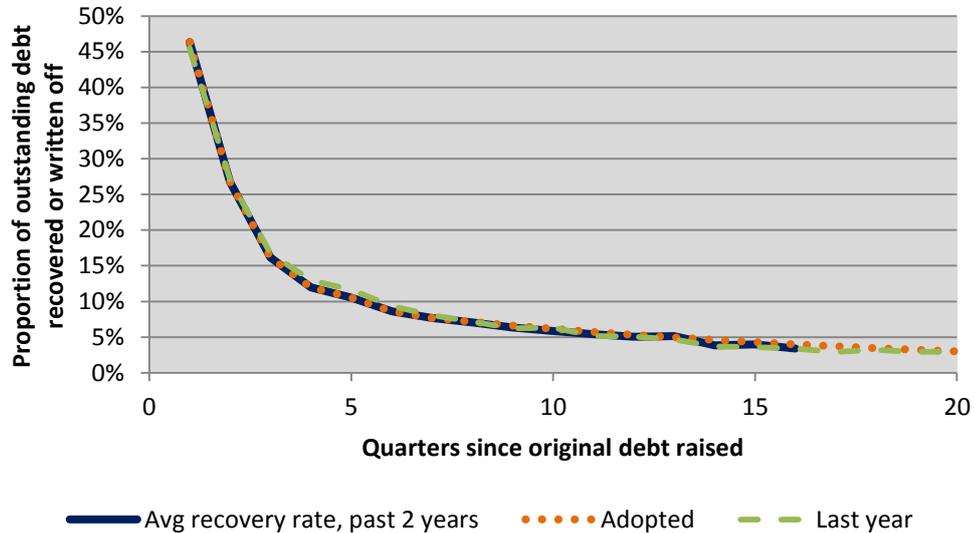
We then apportion these amounts between that recovered and that written-off. Other than the first quarter, we assume that 4.7% of the amounts are written off, with the remainder recovered (see Figure 13.5). These rates are essentially unchanged since the previous valuation.

Figure 13.5 **Rate of debt write-offs, relative to the total of recoveries + write-offs**

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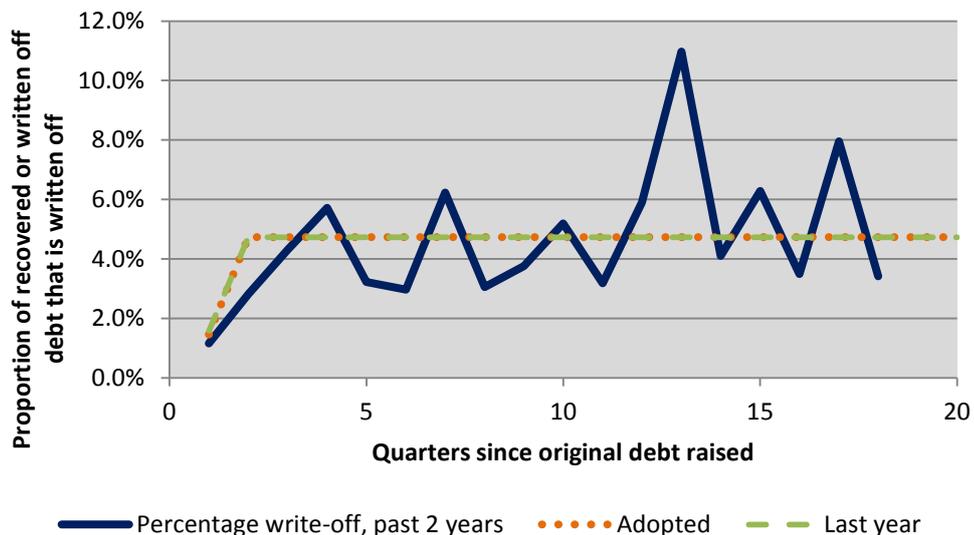
13.1.5　Applying the models

The four sets of assumptions covered in sections 13.1.2, 13.1.3 and 13.1.4 allow future cash flows related to overpayments to be calculated. First, the duration (number of quarters since original debt) of currently outstanding debts is calculated. These debts are then projected by

- Increasing, to allow for the pattern of debt growth over time
- Decreasing, to allow for the pattern of recoveries and write-offs.

Second, the 3.60% assumption can be applied to current and future client liability cash flows. Once the debts are established their subsequent increase and decrease due to development can be projected in a similar fashion.

For debts established before June 2007 we needed to identify the balance attributable to overpayments . We estimated this portion to be 66%, using the distribution of outstanding balances at the valuation date for debts raised after June 2007. We also estimated that the debt had an average duration of ten quarters as at June 2007.

Combining the models gives the following implications concerning overpayments:

- After a debt is established, total debts raised are expected to increase by a further 26%. This represents extra overpayments that will be accrued by a client before their outstanding debt reduces to zero.

- About 84.2% of overpayments are assumed to be recovered, with the remainder written off or uncollected. After allowing for the time value of money during the period the debt is collected, the recovery percentage reduces to about 82.7%.

- The average collection date is 1 year after the establishment of the original debt.

13.1.6　Tail assumptions

The relatively short time period for which data is available means that trends in development need to be extrapolated to durations for which there is no observed data. We have made the following assumptions, recognising that they are subject to significant uncertainty:

- Existing debts do not increase beyond ten years after original debt establishment.

- At the ten year mark 5% of the outstanding balance is assumed to be recovered, as a means of allowing for later recoveries, spread over the next 10 quarters. The remainder is written off.

13.1.7　Results

Overpayments, including fraud can be divided into four categories, related to the time the debt was established and the direction of the cash flow (to or from MSD).

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Table 13.2 **Current and future client liability estimates for overpayments, including fraud**

Category	Current client liability ($m)	Future client liability 2013/14 ($m)	Future client liability 2014/15 ($m)	Future client liability 2015/16 ($m)	Future client liability 2016/17 ($m)	Future client liability 2017/18 ($m)
Further overpayments / fraud on existing debtors	72	0	0	0	0	0
Recoveries on overpayments / fraud on existing debtors	-196	0	0	0	0	0
Overpayments / fraud related to future payments	2,446	247	244	228	218	209
Recoveries on overpayments / fraud related to future payments	-2,022	-204	-201	-188	-180	-172
Net cost – overpayments / fraud	**301**	**43**	**42**	**40**	**38**	**37**

We have assumed that the cost of existing debtors is fully attributable to the current liability component of the valuation.

Finally Figure 13.6 shows the projected payments and recoveries over the next five years.

Figure 13.6 **Projected cash flows for overpayments, including fraud over the next five years.**
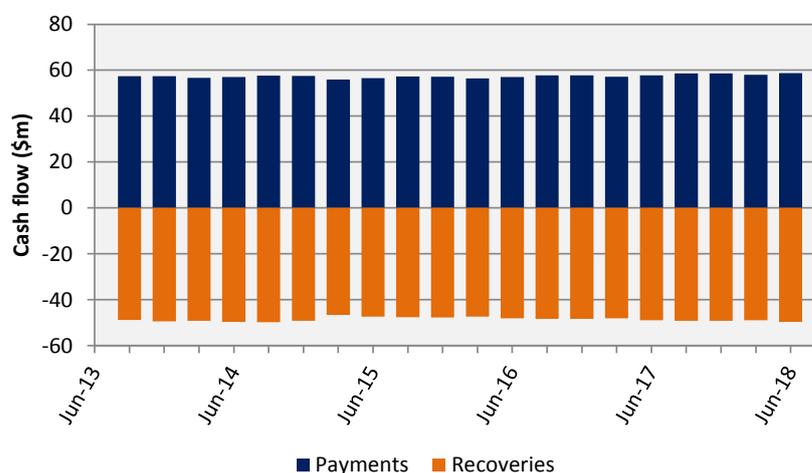
13.2   Recoverable assistance

We start by discussing recoverable assistance payments, which was modelled along similar lines to Tier 2 and Tier 3 payments, as described in Section 16.3.2. We then discuss the assumptions made relating to recoveries.

13.2.1   Introduction

The following benefit types have been classed as recoverable assistance for the purposes of this valuation.

Benefit Name	% 12/13 benefit
Advance of Benefit	85.28%
Special Needs Grant	5.10%
Recoverable Assistance Payment	8.94%
SWIFTT excess/DMS refund	0.53%
Unidentified receipt refund	0.16%

Advance of benefit is the dominant category, with smaller but still significant amounts related to the Special Needs Grant and Recoverable Assistance Payments. These payments totalled $133m for the 2012/13 year.

13.2.2   Current experience

The following table and graph show the recent experience for recoverable assistance.

Table 13.3 **Recent Recoverable Assistance payment experience**

Year	Payments ($m)	Average number on benefit (nearest 100)	Average quarterly benefit payment (ABP) per client ($)
2008/09	146	69,500	530
2009/10	165	79,400	520
2010/11	150	74,000	510
2011/12	135	64,200	530
2012/13	133	61,800	540

Recoverable Assistance payments are received by clients across the benefit system. Around 40% are paid to DPB recipients and around 15% paid to each of IB, SB and UB clients. The total payments in each quarter, and the underlying benefit received by the client at the time, are shown in Figure 13.7.

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Figure 13.7 **Amounts of Recoverable Assistance by underlying benefit type. Payments in June 2013 values.**
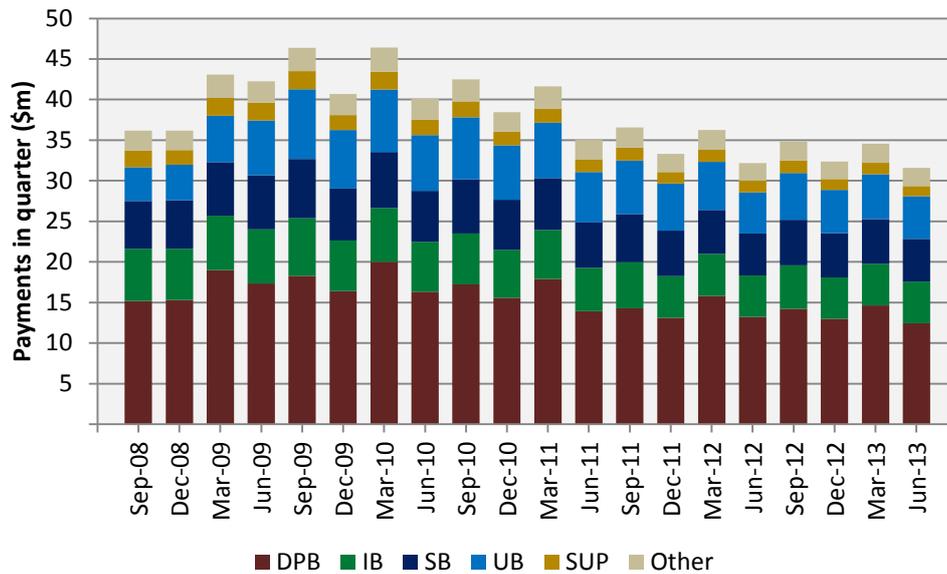
The number of clients receiving some form of recoverable assistance increased significantly from 2008 through to 2010, but has reduced since then and has been fairly stable over the most recent year.

13.2.3   Modelling Recoverable Assistance payments

Recoverable Assistance payments are modelled as an average amount per client, depending on their benefit state as well as other characteristics. This is the same approach used for Tier 2 and 3 benefit types, described in Section 16.3. The past and projected payment levels for the most significant benefit states are shown in Figure 13.8.

Figure 13.8 **Average Recoverable Assistance quarterly payment per client in main benefit states. Amounts are in June 2013 values.**

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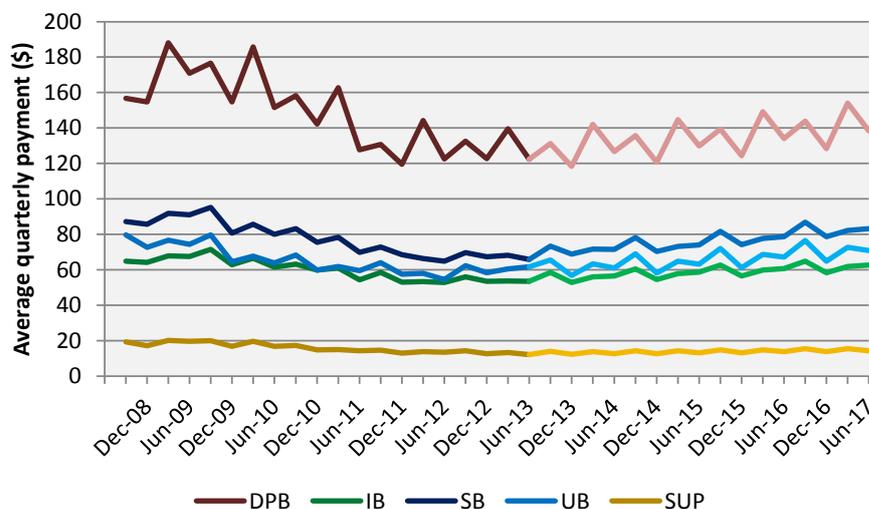
We note that average payments are forecast to increase over the next five years for DPB (10%), SB (18%) and UB (15%). These increases are substantial, but are lower than those forecast in the previous valuation. Rather than these being built in trends, they reflect the changing composition of the welfare population over the forecast period. Higher Recoverable Assistance payments per client are associated with higher propensity to stay on benefits:

- Middle to Older ages
- Maori and Pacific Islander ethnicities
- History of other benefits

As the unemployment rate drops, the proportion of recipients with these higher propensities tends to increase, increasing the average Recoverable Assistance payment. This is largely offset by the expected decrease in numbers on these benefit types, leading to the total payments projection seen in Figure 13.9. Payments are expected to increase by about 1% per annum over the next five years, which is lower than the forecast rate of inflation.

Figure 13.9 **Projected quarterly recoverable assistance payments by calendar quarter. Payments in actual values.**
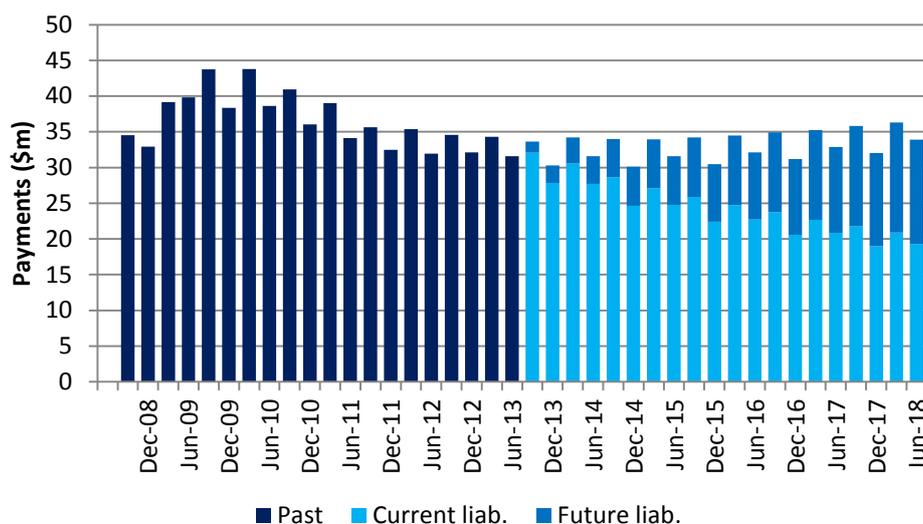
Note: current liability payments have been adjusted to remove the impact of double-counting of some liabilities (Section 16.2.2)

13.2.4   Recoverable Assistance recoveries

The following table and figure show the recent relationship between recoverable assistance payments and recoveries.

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Table 13.4 **Total benefits paid (excluding expenses) and recoverable assistance payments recovered by calendar quarter**

Calendar quarter	Payments ($m)	Recoveries ($m)
Sep-10	41	36
Dec-10	36	39
Mar-11	39	33
Jun-11	34	35
Sep-11	36	36
Dec-11	32	34
Mar-12	35	33
Jun-12	32	32
Sep-12	35	30
Dec-12	32	30
Mar-13	34	29
Jun-13	32	30

Table 13.4 shows historical recoveries related to recoverable assistance. The recoveries have been stable over the past two years, both in absolute terms and relative to total recoverable assistance payments made by MSD. Thus for projection purposes we have assumed that these recoveries are a constant proportion of recoverable assistance payments.

Figure 13.10 **Recoverable assistance recoveries as a proportion of recoverable assistance payments**
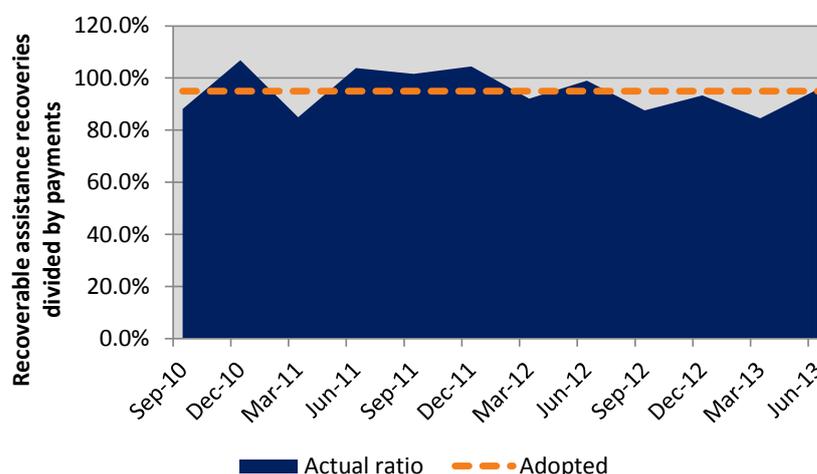
We have assumed that recoveries will equal 95.0% of payments, in line with the average over the past year. This means that the net cost of Recoverable Assistance is 5% of payments, which is the combined cost of non-recovery rates and the time lag associated with collecting debts. This recovery percentage is down slightly from the 97% assumed in the previous valuation.

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The following table shows the current and future client liabilities for both Recoverable Assistance payments and recoveries.

Table 13.5 **Current and future client liabilities for Recoverable Assistance**

Loans category	Current client liability ($m)	Future client liability 2013/14 ($m)	Future client liability 2014/15 ($m)	Future client liability 2015/16 ($m)	Future client liability 2016/17 ($m)	Future client liability 2017/18 ($m)
Recoverable assistance payments	1,425	152	151	141	136	130
Recoveries on recoverable assistance	-1,354	-144	-143	-134	-129	-124
Net cost – recoverable assistance	**71**	**7.6**	**7.5**	**7.1**	**6.8**	**6.5**

The net cost is reasonably small in the overall context of the valuation, but there is a significant amount of relative uncertainty in the estimate. This is because the net cost is the difference between two significantly larger numbers; a small error for either one can lead to a large impact on the net cost.

Finally Figure 13.11 shows the projected pattern of Recoverable Assistance payments. The pattern for recoveries and net cost is the same, apart from scaling numbers down by 95% and 5% respectively. As with other liability types, the future liability represents a growing proportion of the overall cost with time, increasing to about a third by June 2018.

Figure 13.11 **Quarterly benefit payments, in current values**
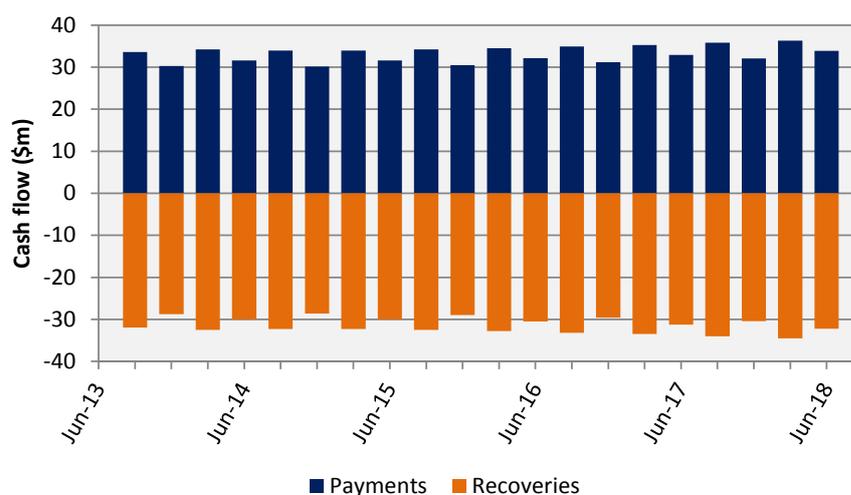
13.3   Key risks for loans

Some of the uncertainties relating to the modelling of loans are covered in Section 16.6. There is a larger than usual uncertainty associated with the loan estimate due to:

- The lack of data prior to June 2007

- The fact that net cost is small relative to the estimated inflows and outflows

- The dimensions of loans not considered as part of the valuation. For example, the undetected portion of overpayments and fraud

- The difficulty in setting tail assumptions

- The difficulty in setting recoveries for long term outstanding debts

While we believe the loan estimates are a plausible estimate of the future given the available data, a more comprehensive and detailed analysis of loans is likely to give superior results.

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14 MSD EXPENDITURE

MSD expenses included within the scope of the valuation are those required to administer the benefits for working-age adults in the valuation, and to help clients prepare for and return to work. Expenditure has been analysed and categorised under the following headings.

- Income support administration
  - Benefit processing ("income" share of Tailored Sets of Services to Help People into Work or Achieve Independence appropriation)
  - Integrity services
  - Collections
  - Temporary measures

- Work focused investments
  - OSCAR (Out of School Care and Recreation subsidy to providers)
  - Training and employment support (includes Employment Assistance, Vocational Skills Training, Mainstream Supported Employment Programme, Youth Support Services)
  - Work-focused case management (includes "work" share of Tailored Sets of Services appropriation; e.g. Job Connect, employment coordinators, work brokerage)

Note that Tailored Sets of Services were apportioned by MSD between income support administration and work focused investments on the basis of time survey data.

The payments made to these categories over the past five years are shown in Table 14.1 below.

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Table 14.1 **Historical MSD expenses, amounts in actual values, plus 2013/14 budget**

Expense category	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14 (budget)
	$m	$m	$m	$m	$m	$m	$m
Income Support Administration							
Benefit processing	254	259	297	290	294	311	271
Integrity Services	35	37	33	35	35	32	34
Collections	13	13	13	11	11	11	11
Admin sub-total	**302**	**309**	**343**	**344**	**340**	**354**	**316**
Work-focused Investments							
Work focused case management	132	147	133	136	130	141	170
OSCAR	15	19	19	18	19	17	19
Training and employment support:							
Employ. Assist	73	71	109	113	107	93	102
Vocational skills training	94	89	86	69	55	55	23
Youth transition services / Youth support services	7	10	12	12	13	26	33
Mainstream employ. Support	0	2	4	3	3	4	4
Job support scheme	0	0	1	0	0	0	0
Life skills training	0	0	0	1	0	0	0
Sub-total Training	*174*	*173*	*212*	*197*	*177*	*177*	*162*
Invest sub-total	**321**	**339**	**364**	**350**	**326**	**335**	**351**
Expenses total	**623**	**648**	**706**	**694**	**666**	**689**	**667**

These costs are included in the liability calculation. The main complication in determining the future expense attached to the liability is one of attribution; only a portion of future expenses will correspond to clients belonging to the current or future client liability cohorts, with the remainder attributable to those future clients falling outside the scope of the valuation. To allow for this, the following methodology has been adopted:

- Our model for future expenses assumes that the total expense costs are **fixed in real terms**. This means that they increase in line with benefit rate inflation (tied to CPI) in nominal terms. The expense level is set equal to the 2013/14 budget of $667m. This amount is 4.2% lower than that budgeted for 2012/13 in the previous valuation.

- This amount is divided into quarterly expenses, based on historical seasonality of benefit payments.

- For each future calendar quarter, expenses were allocated proportionally between current client liability cash flows, future client liability cash flows and cash flows falling outside the current and future client liability valuations. The last category was

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calculated assuming a 0.5% decrease in real benefit payments from the end of 2017/18 to the end of 2022/23, and constant real benefit payments after that.

- This allocation was converted into an expense rate for each quarter.

- Finally, total projected expenses in each quarter are allocated between administration and work-focused investments, as well as their subcomponents, based on their relative proportions in the 2013/14 budget.

Figure 14.1 shows the quarterly forecast benefit payments over the next 10 years, which drives the attribution of expenses. As future client liability has been calculated for the next five years there are no liability payments outside the scope of the valuation during this period. Thereafter a growing portion of payments fall outside the scope of the valuation liability and thus a decreasing amount of future expense is attached to the valuation liability. The slowly increasing expense rate from 10.5% to 11.5% is due to expense payments being held fixed in current values while total benefit payments gradually fall. The adopted average expense rate is higher than the previous valuation, as discussed in Section 5.4.

Figure 14.1 **Projected future cash flows in current values and implied expense rate required to hold expenses fixed in real terms over the next ten years.**
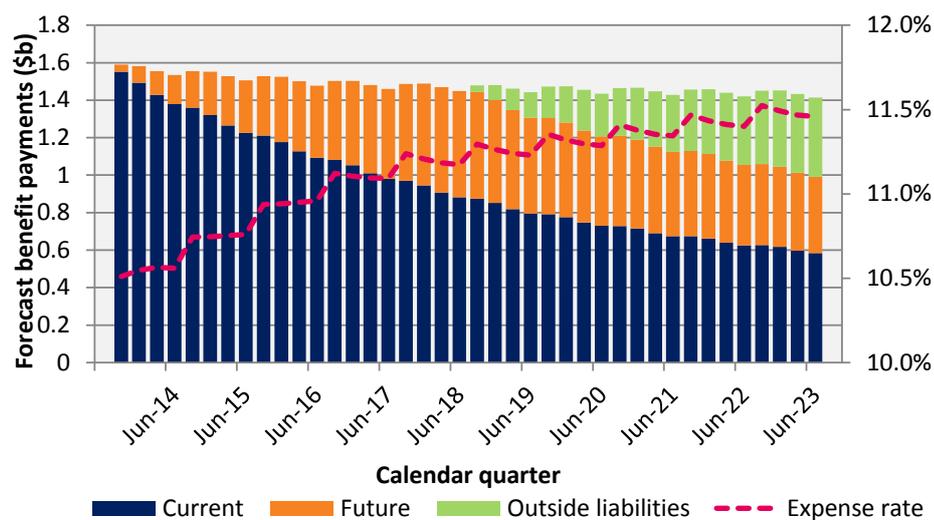
The quarterly expense rate can be used to allocate expenses across age bands and benefit types. The results can also be broken down by expense category. Overall expense results were given in Table 4.8 and Figure 4.12, but both are reproduced here for convenience.

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Table 14.2 Expense category breakdown for current and future client liabilities

Expense category	Current client liability ($m)	Future client liability 2013/14 ($m)	Future client liability 2014/15 ($m)	Future client liability 2015/16 ($m)	Future client liability 2016/17 ($m)	Future client liability 2017/18 ($m)
Income support administration						
Benefit processing	3,129	320	326	313	310	308
Integrity services	391	40	41	39	39	38
Collections	126	13	13	13	13	12
Temporary measures[26]	0	0	0	0	0	0
Sub- total	**3,646**	**373**	**379**	**365**	**361**	**359**
Work-focused investments						
Work focused case management	1,964	201	204	197	195	193
OSCAR	217	22	23	22	21	21
Training and employment support:						
Employment Assistance	1,178	121	123	118	117	116
Vocational skills training	270	28	28	27	27	27
Youth support services	383	39	40	38	38	38
Mainstream supported employment program	41	4	4	4	4	4
Job support scheme[27]	0	0	0	0	0	0
Life skills training[28]	0	0	0	0	0	0
Sub-total Training and employment support	*1,872*	*191*	*195*	*187*	*185*	*184*
Sub-total	**4,052**	**415**	**422**	**406**	**402**	**399**
MSD Expenses total	**7,698**	**788**	**801**	**771**	**763**	**758**

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[26] Temporary measures include payments related to special events such as the Canterbury Earthquake. No forecast of such future events has been attempted. Hence the liability is estimated as nil.

[27] Job support scheme and life skills training expenditure occurred in several of the 5 years of history used to apportion expenses between categories. However, in the most recent year, 2012/13, expenditure on both items was nil. It has been assumed that this will continue.

[28] See note above.

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Figure 14.2 **Current client liability: MSD Expenses by category**
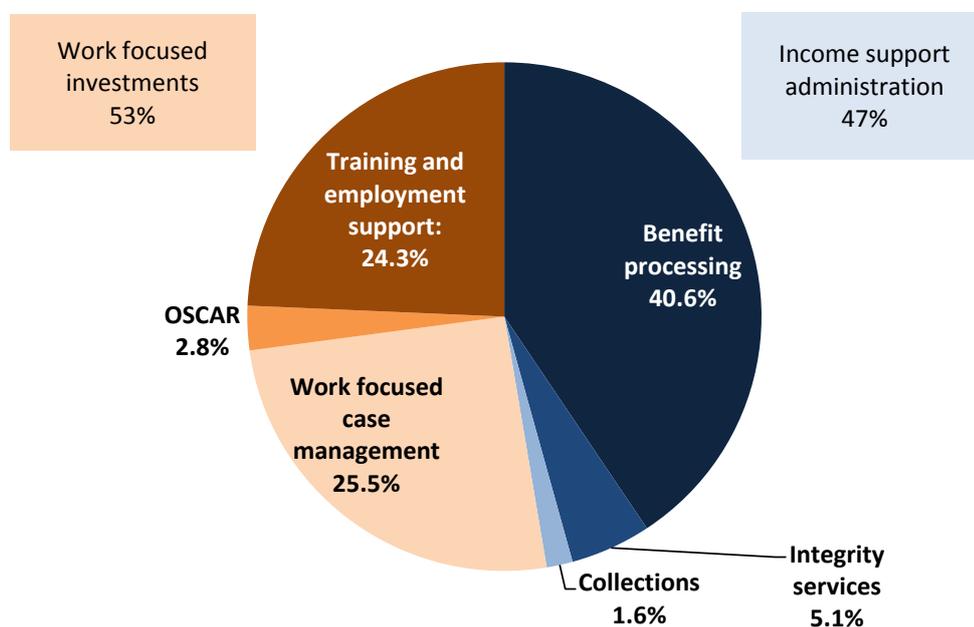
Relative to the previous valuation:

- A lower proportion of expenses has been allocated to benefit processing costs (46% last year)

- A higher proportion of expenses has been allocated to work focused case management (19% last year)

- Expenses as a proportion of the total current client liability are a little higher. In the previous aggregate valuation expenses represented 10.1% of total projected benefit payments, compared with 11.2% in this valuation. This effect is partly due to forecast expenses being similar to last year while forecast benefits are slightly lower, and also due to a change in the expense rate projection – see Section 5.4.

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PART D
VALUATION APPROACH

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15   DATA

15.1   Privacy

To protect the privacy of individuals, original social welfare numbers (SWN's) were not supplied in the datasets described below. The client identification numbers used for matching datasets were separately created by MSD. Other personal information such as names and addresses were not supplied.

15.2   Data supplied

SAS datasets

The following SAS datasets supplied by MSD were used to conduct the valuation. All data is up to 30 June 2013 but extracted as at 31 July 2013 (see Section 15.3):

1. **rate_period_30jun2013.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 2013, the valuation date.

2. **ahpy_lumpsum1_30jun2013.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

3. **ahpy_ccs_30jun2013.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.

4. **rate_cda_30jun2013.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.

5. **Spel1306.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

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payment date for the spell, which was used to overwrite spell commencement dates before the 1993 system change.

6. **swn1306.sas7bdat:** File with one row per client, with a range of static variables. This dataset was used to determine date of birth, gender and ethnicity for each client.

7. **swns_not_on_bdd.sas7bdat:** File with one row per client, containing client ID and date of birth for those not included in the swn1306 file.

8. **chd1306.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.

9. **Dist1306.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.

10. **dv_debt_summary_extract_tf.sas7bdat**: Dataset containing loans cost information.

11. **Yp_ypp_30jun13_v2.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.

Loan data

Data on client loans in the form of recoverable assistance was provided in a SAS dataset, **dv_debt_summary_extract_tf.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 2013. Pre-1 July 2007 data is not split by breach type.

The file **TF sent prov9yr_details_Jun13.csv** was also provided. It is a data table giving the outstanding provision for debts owed to MSD as at 30 June 2013. It contains one row per client, their aggregated debt plus a range of other static variables.

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. were 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** was provided with values applicable before 1999. All but the most recent benefit rate information was carried across from the previous valuation.

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Historical and forecast economic variables

- **fsm-befu13.xlsx**: Treasury fiscal strategy model, 2013 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-jun13.xls**: Excel spreadsheet containing Treasury assumptions for government accounts for future discount and inflation rates for a number of dates, including June 2013.

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:

- **revwt.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
- **20111123 - BDD intro for Taylor Fry.PPT**: Slide presentation entitled "The Benefit Dynamics Data Set," describing some of the key data files
- **bendyn.doc**: Document entitled "Benefit Dynamics Data Set documentation," containing a description of the BDD data files, dated February 2011
- **Benefits 101#2.doc**: Document entitled "Benefits 101: An overview of social assistance benefits in New Zealand," giving a broad description of the social welfare system

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

15.3   Investigations regarding reliability of data

The following checks and reconciliations were performed on the supplied data.

Checks on internal consistency of rate files

This included, amongst other checks:

- Checks that clients are on at most one spell at any time
- Checks for duplicate spells and payments
- Checks for presence and consistency in spell start and end dates
- Checks that payment amounts are reasonable given the spell length
- Checks that ratios between gross and net payment levels are plausible
- Checks for missing or clearly inappropriate entries in each field

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Consistency across provided files

This included, amongst other checks:

- Checks that client IDs matched properly across files and appeared consistent
- Checks that payments went to appropriately aged clients (i.e. at least age 16)
- Checks on plausibility of child and parent ages, for child related benefits
- Checks on number of benefit days and payment amounts by benefit type for rate files provided at different snapshot dates

Consistency with files used in previous valuation

The datasets supplied by MSD for the 2013 valuation should be largely identical to the ones used in the 2012 valuation. That is, the newly supplied files should simply be updated versions of those previously used. After processing the given files into a form suitable for modelling (as discussed in Section 15.5), the data was examined to identify changes from the previous version that cannot be explained by the additional year of experience. There were about two million client IDs that were common between the new and old data. In addition, about 97 million records were common in the way that they shared the same benefit quarter and client ID information. The results of the comparison between these common records are shown in the Table 15.1 below.

Table 15.1 **Data reconciliation results**

Variable	Number of clients where variable differs from previous (of 2 million)	Number of payment records where variable differs from previous (of 97 million)	Comments
Benefit State	1,849	4,174	Changes to NOB accounts for 70% of the difference
Gender	71	-	
Age	552	-	
Retirement age	3	-	
Ethnicity	6,371	-	
District	1,109	1,162	
Child count	745	5,562	Only applicable to DPB states
Age of youngest child	360	1,435	Only applicable to DPB states
Incapacity group	79	736	Only applicable to IB and SB states
Number of Incapacities	83	647	Only applicable to IB and SB states

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Overall the data consistency is good – the variable that changed the most since 2012, primary ethnicity, did so for only 0.3% of the client base. We also expect that most of the changes represent corrections to the underlying datasets.

While differences in the input data has the potential to change the estimated parameter values of the projection models and hence the liability valuation, the inconsistencies here are extremely minor in the context of the millions of client IDs and tens of millions of records so the impact should be negligible. We believe that a majority of the noted differences can be explained as retrospective corrections made by MSD.

Conclusions

Based on our checks and reviews we believe the datasets are sufficiently accurate, consistent and coherent and are satisfied that they appropriately represent benefit payments made by MSD. This conclusion is subject to the following limitations:

- There appears to be some evidence of retrospective changes to payment levels. MSD has confirmed that backdated benefit grants do exist and can change; for some benefit types, total payments can fall by about 1% compared to the earliest available dataset. This has led us to conclude that a one month lag should be allowed before using data for the liability valuation; this will allow most of the payment changes to be made while not unduly delaying the valuation. This has implications for the timing of quarterly monitoring results.

- A small but non-trivial number of clients have start dates that do not reconcile between the provided spell and rate files. Responses from MSD suggest this is either a consequence of:
    - Retrospective data amendments
    - The cleaning process applied to the spell data
    - Treatment of partners of clients receiving benefits

    Where these differences have occurred we have used the rate file start date as authoritative. We do not believe this has a material impact on the valuation results.

Note that while we make significant efforts to check the quality of data used in our analysis, we do not take ultimate responsibility for the accuracy and completeness of the data. Section 18.2 also discusses our reliance on the data provided.

15.4   Data adjustments

15.4.1   Benefit state and payments

An adjustment was made to the benefit type recorded in the main payments dataset provided, relating to clients in the youth segments (YP or YPP recipients). The original file did not distinguish between YP and YPP, having the same payment code for both types of clients. An additional file, **yp_ypp_30jun13_v2.sas7bdat**, was subsequently provided by MSD which allowed us to identify which clients received YP and who received YPP. Data issues related to Youth segments are discussed further in Section 15.4.3.

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No other direct changes were required. However we note here, to prevent later confusion that some aspects of our approach may be different to that typically seen at MSD:

- Numbers on benefit per quarter in this report means the number who receive **any** benefit payment in a quarter, rather than number receiving a benefit at the end of a quarter.

- Some benefit type definitions have been broadened to include small payments that may sometimes be considered separately. For instance, the following payment types have all been classed under the Unemployment Benefit:
  - Unemployment Benefit Hardship
  - Unemployment Benefit Hardship Training
  - Unemployment Benefit Training
  - Unemployment Benefit
  - Independent Youth Benefit
  - Young Job Seekers Allowance
  - 55+ BENEFIT

  These groupings are covered in detail in Sections 7-13, as well as Appendix C.

- All modelling of average benefits paid per quarter has been done in current dollar (30 June 2013) values. This means older payments have been increased in line with historical benefit inflation.

15.4.2 Interpolation of missing values for modelling variables

A number of variables had a significant percentage of missing values:

- Gender
- Ethnicity
- District
- Incapacity (type and number)
- Education

In some circumstances missing variables are reasonable and can be included in the modelling process as an extra categorical level. In this case however, one of the main determinants of missing variables was a fast exit from the benefit system, presumably as there was insufficient time to collect client information fully. **This means that missing variables appear to predict a fast exit from the welfare system, where in actual fact the causality is the reverse.**

To avoid this bias we have interpolated missing values – that is, we randomly allocated values in cases where they were missing. This allocation was performed based on the distribution of variables for the clients with non-missing values when they first enter the welfare system. We believe this is the most effective way of handling missing values (while avoiding having to delete them entirely). Extra check variables were created to indicate when variables had been interpolated.

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15.4.3   Data quality issues for Youth segments

As discussed in Section 2.4, new Youth Service initiatives were implemented in August 2012. One consequence of these changes is that the benefit history data available for these clients has changed and is generally of lower quality:

- The main payment file no longer distinguishes between YP and YPP clients. While a secondary file was provided to do this allocation, the way in which the secondary file is retrospectively updated means that there are potentially some inconsistencies. This creates extra uncertainty in determining which clients receive YP and which receive YPP.
- The geographic region for these clients is no longer provided, as they are now listed under a central processing regional code. We have attempted to match clients with the regions listed in the 2012 data, and interpolated the rest. This creates extra uncertainty in any regional results related to Youth segments. MSD may wish to consider the inclusion of regional data for Youth segments in future valuations.
- The rate of missing variables is generally higher. This includes fields such as child information and education level. We interpolate fields where they are missing, but this will tend to lower the overall accuracy of the youth segments and make apportionment across youth cohorts more difficult.

We have attempted to amend the provided dataset as much as possible to ensure that results for the youth segments are not unduly affected. However, increased uncertainty around the youth projections is unavoidable.

15.5   Quarterly format and allocation to state

We have assigned a single state to each client for every quarter. Each allocation is to one of ten states:

1. UB (Unemployment benefit)
2. SB (Sickness benefit)
3. DPB (DPB-Sole Parent)
4. IB (Invalid's benefit – as a partner or as the invalid)
5. CSI (Carer's benefit)
6. EB (Emergency benefit)
7. WB/WA (Widow's or Women living alone benefit)
8. OB (Orphan or unsupported child benefit)
9. SUP (Supplementary benefits only)
10. NOB (Not on benefits)

We recognise that it is possible to receive more than one benefit in a quarter; however the incidence of this is low enough that the single state approximation is appropriate and significantly simplifies the analysis. Where it is possible to assign more than one state to a client in a quarter, we use the following precedence rules:

- If a client receives UB, SB, DPB, IB, CSI, EB or WB/WA, assign to whichever benefit is received for the most number of days
- Otherwise, if any OB is received in the quarter, assign to this

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- Otherwise, if any AS, DA or CDA is received in the quarter, assign to SUP

- Otherwise, assign to NOB

There are two immediate implications of these precedence rules. First, a client can only be NOB if they receive no Tier 1 or Tier 2 benefits (excluding CCS). Second, a client can only be in SUP if they receive no Tier 1 benefit.

This assignment uses the broader definitions of benefit types discussed in Section 15.4.1.

15.6   Payment information

All payments are allocated to the appropriate client quarter. Payment spells that span more than one quarter are allocated pro rata based on number of days of the spell lying in each quarter. We also make the following transformations:

- All payments are scaled to June 2013 benefit levels, using the CPI index applied to benefit payments over the past 20 years. We have used the increases in DPB payment levels to infer these CPI increases.

- All Tier 1 payments (excluding Orphan benefits) are aggregated for each client quarter and assigned to the client's benefit state in that quarter. The impact of this reallocation has been tested and is very small.

- The remaining benefit types (OB, AS, DA, CDA, CCS, EI, HS) are not aggregated and are modelled separately using additional payment models.

15.7   Reconciling Taylor Fry and MSD definitions

15.7.1   Client benefit status

There are two key points of difference in how client status is determined in our valuation definitions compared to MSD's standard definitions:

- **Whether a client is on benefit:** Under our definition, a client is on benefit in the projection if they receive any payment in the quarter. In comparison, MSD typically defines this to be whether a client is on a spell at the end of a quarter; and

- **The continuous duration of a client:** We calculate continuous duration as time since the client had a full quarter off benefits. In contrast, MSD typically uses a 14 day rule to reset the continuous duration counter.

These issues affect the allocation of clients to segments. To allow for this, we have received an extra file from MSD with each client's status and continuous duration at the valuation date, to enable a consistent allocation between segments.

These definition issues still exist to some extent in the projection; the projected number of people on benefits in each quarter generally uses our definition, but we have also used this to estimate the corresponding number of people on benefits at the end of the quarter, and

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a corrected measure of continuous duration. Also, some additional adjustments have been made to ensure that the liability estimates are accurate at a segment level.

15.7.2   Treatment of partners

MSD typically counts the number of primary beneficiaries. Partners of these beneficiaries may also receive benefits, but are not typically counted. We take an individual level approach to the valuation, where we treat these partners as beneficiaries in their own right. This will give higher numbers of clients on benefit than other MSD estimates.

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16   VALUATION METHODOLOGY

16.1   Structure of the valuation model: overview

In its broadest outline, the methodology for the estimation of the liability for future benefit payments consists of:

- Predicting the **future number of working-age clients** receiving benefits in all future quarters and **the payments** received by these clients, starting in the September 2013 quarter.

    - Note that in this report clients are restricted to those who have received a benefit in the year to 30 June 2013 or those who are expected to receive a benefit in the five years following that date**.**

- The payments are initially estimated in 30 June 2013 dollar values but are subsequently increased to allow for **inflation** from that date to the date of payment.

- The liability is estimated by:

    - Discounting these inflated claim payments to allow for **investment return**
    - Adding components for loan recoveries and MSD expenses.

The liability is estimated separately for each of the various components which are shown in Figure 16.1. This is the last valuation before a significant revision of these components, in line with the July 2013 Welfare Reforms.

The methodology applied for the 2013 is virtually identical to that used in the previous valuation. The most significant changes are:

- A methodological correction to remove some recent exits accidentally included in the 2012 valuation (see Section 16.4.1)

- The inclusion of Education as a client characteristic in the models. This variable was omitted from the previous valuation (see Section 16.3.4)

Figure 16.1 **Overview of valuation structure**

Figure 16.1 **Overview of valuation structure**
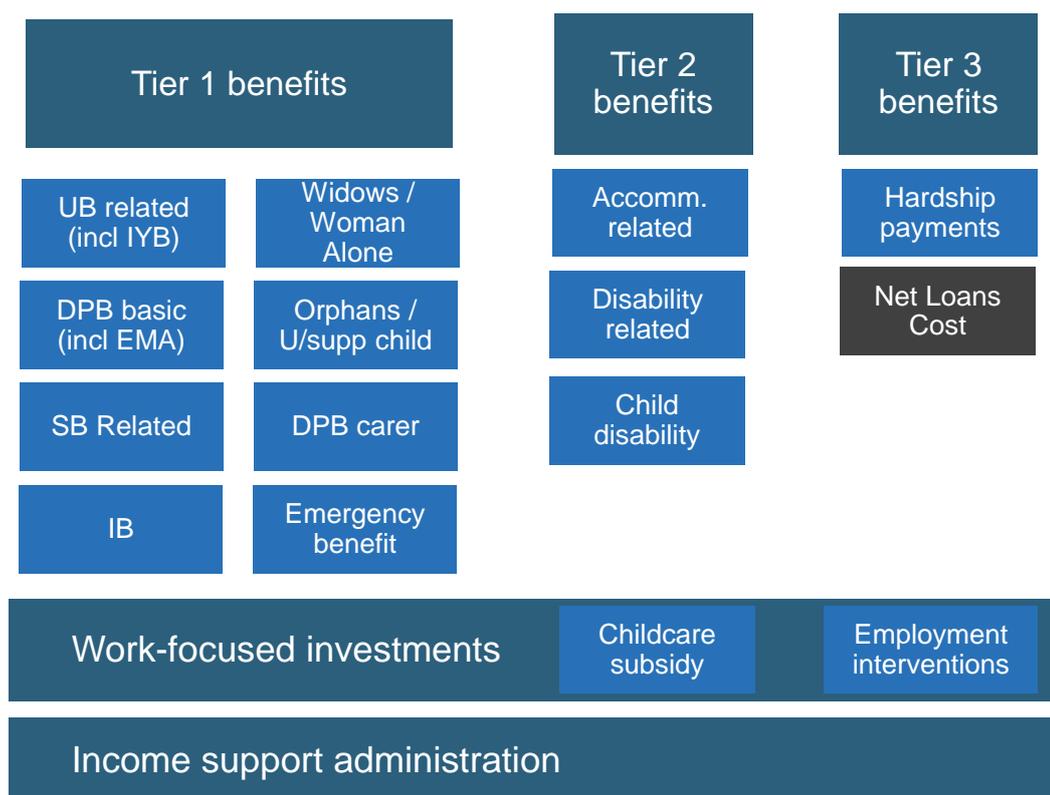
Section 16.2 discusses the definition of the liability and some of its implications in further detail.

As in the previous valuation, all Tier 1 benefits have been modelled using the transition approach, as described in Section 16.3. The Tier 2 and Tier 3 benefits (including childcare subsidy and employment interventions but excluding net loans cost) are modelled as additional amounts paid to clients, depending on their (Tier 1) benefit state.

Finally net loans cost, work-focused investments (excluding CCS and EI) and income support administration each have their own specific valuation approaches. These are discussed further in Sections 16.6 and 16.7.

16.2   Definition of the liability

Section 2.5 introduced the concept of the liability. This is divided into the following components:

- **Current client liability:** All future lifetime costs of 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

- **Future client liability years 1, 2, 3, 4 and 5:** 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

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16.2.1   Benefit groups

The liability has been calculated for the following benefit groups. Translation to specific groups of payment codes was provided in Sections 7-13 as well as Appendix C:

- Tier 1 benefits include:
    - Unemployment Benefit (UB)
    - Invalid's Benefit (IB)
    - Sickness Benefit (SB)
    - Domestic Purposes Benefit – Sole parent (DPB)
    - Domestic Purposes Benefit – Care of Sick and Infirm (DPB-CSI)
    - Emergency Benefit (EB)
    - Unsupported Child and Orphan Benefit (OB)
    - Widow's Benefit (WB) and Domestic Purposes Benefit – Woman Alone (WA)

- Tier 2 benefits include:
    - Accommodation Supplement (AS)
    - Disability Allowance (DA)
    - Child Disability Allowance (CDA)
    - Childcare Subsidy (CCS)

- Tier 3 benefits include:
    - Employment Interventions (EI)
    - Hardship Assistance (HS)

16.2.2   Further discussion of the definition

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 believe this choice is appropriate 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 returned to Tier 1 benefits in the 2011/12 and 2012/13 financial years, we calculate that 44% of them had been out of the system for less than a year; see Figure 16.2. This high percentage means it is appropriate to still consider them at risk. By contrast, only 19% of clients returning were in their second year off benefits and 9% in their third.

- **Reducing the potential for seasonal impacts:** The particular choice of the 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.

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Figure 16.2 **Duration off benefits of former clients returning to Tier 1 and Tier 2 benefits in the 2011/12 and 2012/13 years**
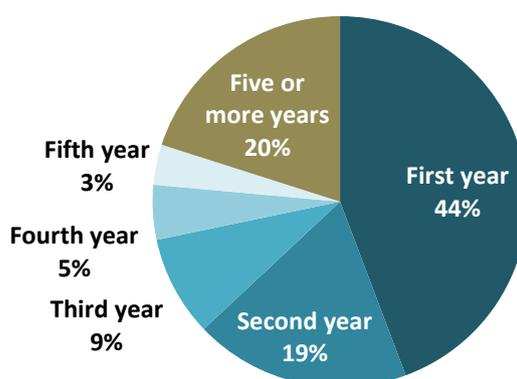
Working-age beneficiary assumption

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 Independent Youth Benefit ("IYB") and Emergency Maintenance Allowance ("EMA") 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.

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 which is unlikely to make a material difference on the quantum of valuation.

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.

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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 Unemployment Benefit may in the future receive Invalid's Benefit; these cash flows have been included. 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 Invalid's Benefit 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 (Unemployment Benefit say), these future cash flows are included.

Thus, helping an Unemployment Benefit recipient off benefits today would have a compound effect of removing both their Unemployment Benefit 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 an Unemployment Benefit recipient is more likely to make use of the Invalid's 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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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 UB in March 2013
- Was not on benefits at the valuation date
- Received no benefits over the 2013/14 year
- Received further UB benefits in 2014/15

In this example, cash flows relating to the client are now included in both the current liability and the future liability for 2014/15. 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.

Exclusion of Unemployment Benefit – Student Hardship

As in the previous valuation, it was judged that the Unemployment Benefit – 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 – see Figure 16.3. 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.

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Figure 16.3 **Monthly numbers receiving Unemployment Benefit - Student Hardship**
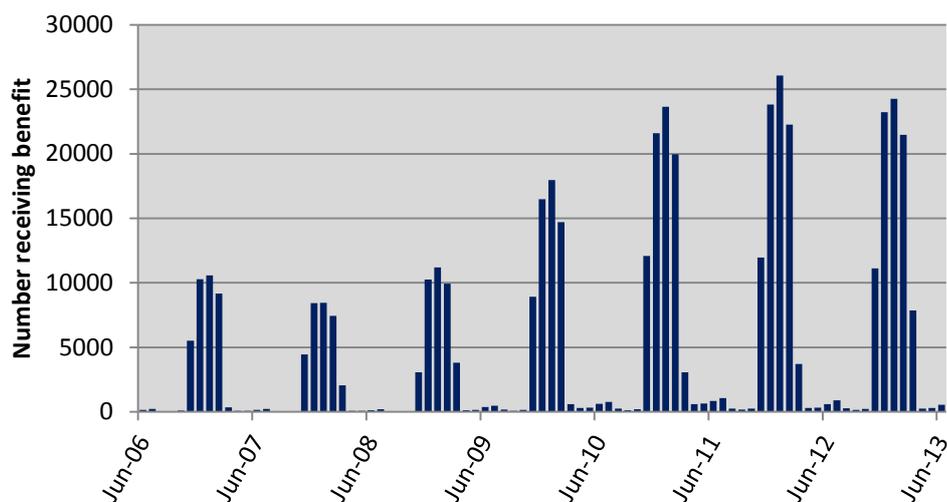
Valuation of CCS, EI and HS components

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.

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.

16.3   Main modelling structure

Each client is assumed to be in a single benefit state each quarter, out of a possible ten states. The rationale for this and the actual definitions for the 10 states were discussed in Section 15.5. Clients then move between states from quarter to quarter and have expected payments assigned, depending on their state. Given this general structure two broad types of model are needed:

- Transition models, which model the probability of remaining in the current state, or moving to each of the other 9 states, for each quarter

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- Payment models, which calculate the average benefits received by the client given their current state

We discuss these two groups in turn.

16.3.1 Transition models

The modelling involves producing probability estimates for transitioning from any given state to any other each quarter. These probabilities will depend on a client's state as well as other modelling variables, listed in Section 16.3.3. Further detail on the exact nature of the transition models are given in Appendix D.

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 ten benefit states are illustrated diagrammatically in Figure 16.4. While most of the 100 (i.e. 10 x 10) 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)

Such movements receive particular attention as we model the historical experience.

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Figure 16.4 **Benefit states in the valuation quarterly transition model**
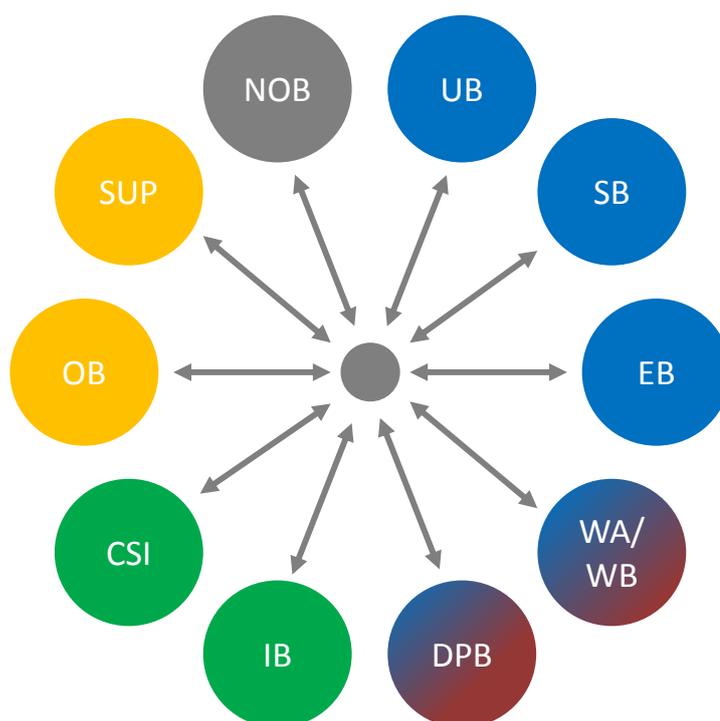
16.3.2   Payment models

Clients in each state can receive a number of different benefit types simultaneously:

- Their main Tier 1 payment
- Accommodation supplement
- Disability allowance
- Child disability allowance
- Childcare subsidy
- Hardship assistance
- Employment intervention payments

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 16.3.3.

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Figure 16.5 **Schematic of payment models fit to benefit state**
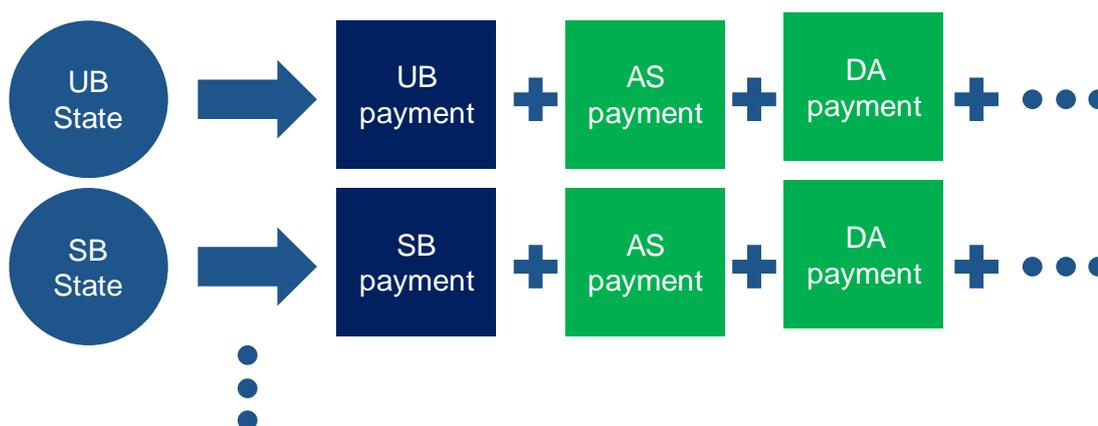
These models are summarised in Table 16.1, which shows the payment models required for each of the states. More detail on the modelling approach adopted for each is given in Appendix D. The "Main T1" column reflects our approach to aggregate all Tier 1 benefits paid to an individual in a given quarter. These payments are allocated to the one benefit state, notwithstanding the possibility a client might receive more than one type of Tier 1 benefit in a quarter (see Section 15.6). The LOA1 model refers to recoverable assistance payments made to clients. These are later partly offset by recoveries of recoverable assistance – see Sections 16.6 and 13.

Table 16.1 **Payment models attributable to each state**

Benefit state	Benefit type								
	Main T1 (excl OB)	OB	AS	DA	CDA	CCS	HS	EI	LOA1
DPB	●	●	●	●	●	●	●	●	●
IB	●	●	●	●	●	●	●	●	●
SB	●	●	●	●	●	●	●	●	●
UB	●	●	●	●	●	●	●	●	●
CSI	●	●	●	●	●	●	●	●	●
EB	●	●	●	●	●	●	●	●	●
WB/WA	●	●	●	●	●	●	●	●	●
OB		●	●	●	●	●	●	●	●
SUP			●	●	●	●	●	●	●
NOB						●	●	●	●

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There is an important point to note regarding the non-main payment models (that is, every column of models except the first in Table 16.1). 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 UB state estimates the average AS paid to clients receiving UB, conditional on all their attributes like age, gender etc. However in reality some UB 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.

While there are a large number of payment models, we note that the relative significance of them differs greatly. Table 16.2 shows the percentage of total payments in 2012/13 that apply to each of the models. The main Tier 1 benefits for DPB, IB, SB and UB plus their corresponding AS benefits comprise 79% of the total payment cost, with the remaining 74 payment models representing the remaining 21%.

Table 16.2 **Relative size of payment category, 2012/13 financial year**

Benefit state	Benefit type								
	Main T1 (excl OB)	OB	AS	DA	CDA	CCS	HS	EI	LOA1
DPB	24.7%	0.2%	5.4%	0.2%	0.3%	0.7%	1.2%	0.1%	0.8%
IB	19.9%	0.2%	1.9%	1.0%	0.1%	0.0%	0.7%	0.0%	0.3%
SB	11.9%	0.1%	2.5%	0.3%	0.0%	0.0%	0.7%	0.0%	0.3%
UB	10.7%	0.1%	2.0%	0.0%	0.0%	0.0%	0.4%	0.2%	0.3%
CSI	1.9%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%
EB	0.6%	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
WB/WA	1.7%	0.1%	0.2%	0.0%	0.0%	0.0%	0.1%	0.0%	0.0%
OB		0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SUP			3.4%	0.1%	0.8%	0.7%	0.2%	0.0%	0.1%
NOB						1.0%	0.2%	0.0%	0.1%

16.3.3   Modelling variables

Both the transition and payment models use a number of variables to adjust predictions for the client being simulated. The following variables were allowed for in the valuation:

- Benefit quarter and the corresponding unemployment rate
- Client age
- Gender
- Number of quarters:
  - On current benefit

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- Since first benefit
- Spent in each of the various benefit states
- Ethnicity
- Region
- Youngest child age and number of registered children (for DPB clients)
- Partner flag (IB, SB, UB and EB clients)
- Incapacity type (IB and SB clients)
- Whether the incapacity belongs to the client's partner (IB and SB client)
- Education level

The omission of certain variables does not mean they are unimportant. Rather, it indicates that our results can be viewed as an average over that variable.

16.3.4   Inclusion of education level as a modelling variable

Education was not included as a modelling variable in the previous valuation. There were a number of reasons for this:

- A large number of clients did not have their education level collected
- The data was only collected by MSD in certain circumstances
- It was unclear how often it was updated, or how regularly a client's education level changed

The rate of missing education level by segment is shown in Table 16.3. Additionally, the table shows the proportion of clients listed as having "No schooling". This label may be genuine, but in most cases is likely to refer to historical collection practices for certain segments of the welfare clientele. The table shows that less than 40% of the current clients have a useful (neither missing nor "No schooling") education level listed on the dataset. Further, this figure is less than 5% for the youth segments.

Table 16.3 Education level field in current client liability cohort, by segment

Segment		Proportion education level missing	Proportion education listed as "No schooling"	Education neither missing or "No schooling"
Jobseeker Support	Work-ready, <1 year	28%	33%	40%
	Work-ready, >1 year	15%	45%	40%
	HCID, <1 year	30%	34%	36%
	HCID, >1year	16%	45%	39%
Sole Parents	Youngest child 0-2	27%	34%	39%
	Youngest child 3-4	23%	37%	40%
	Child 5-13, <1 year	21%	36%	44%
	Child 5-13, >1 year	17%	42%	41%
Supported Living	Carer	19%	42%	39%
	Partner	23%	42%	35%
	HCID	34%	38%	28%
Youth	Youth payment (<18)	95%	3%	2%
	Young parent payment (<19)	93%	3%	4%
Non-beneficiaries	Sup only, <1 year	53%	15%	32%
	Sup only, >1 year	42%	19%	40%
	Orphan only	45%	27%	28%
	Recent exits, <1 year	35%	26%	39%
All		31%	32%	37%

Despite the obvious limitations to the data, educational level is a highly important consideration for MSD's management of the social welfare system. At MSD's request, we have included it as a predictor this year.

There are some implications to including education level in the valuation:

- If certain levels of educational achievement are more likely to be missing, than there will be material bias in the interpolated values. This in turn could lead to material bias in the overall liability calculation.
- **Great care must be taken in conclusions regarding individual education level cohorts**. In most cases the bulk of these observations will be interpolated, leading to possibly false conclusions.
- There is also a dilutive property inherent to the interpolation process – the misallocation of certain individuals to wrong education levels tend to make behaviours across the various education levels more similar.

For the 2012 valuation, we performed an additional exercise to test the impact on the results of including education level. Overall, the impacts were small (see Appendix K of the previous report), giving some confidence that the variable's inclusion does not unduly bias the valuation.

We understand that MSD will continue to investigate improving the quality of the education level information for future valuations.

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16.3.5   Further implications for the transition methodology

One assumption imposed by the key benefit transition model is that each client can be on just one benefit per quarter. This is clearly a simplifying assumption, because in reality:

- Unless someone transitions to a new benefit on the last day of the quarter, any transition would involve more than one actual state in the quarter

- There are quite often gaps in spells, meaning that NOB in conjunction with another benefit is common

The key advantage of the assumption is that the sum of the number of clients in each state equals the number of clients being modelled, reducing difficulties related to double counting. The average benefit payment models are fitted to balance out the impact of multiple payment types in the one quarter.

Given the one state assumption, an obvious question is how that state is assigned when more than one is present in a quarter. This treatment was discussed in Section 15.5.

Three implications of this formulation are:

- The sum of numbers of clients in the eight Tier 1 states gives the number of people who receive any Tier 1 benefit in a given quarter

- The sum of numbers in the eight Tier 1 states plus those in SUP gives the number of people who receive any qualifying benefit in a given quarter

- The numbers in NOB are genuinely those who receive no (qualifying) benefit. One further implication of this is that anyone who has been in the NOB state for all of the four quarters to 30 June 2013 is not part of the current client liability definition.

These properties, particularly the last, mean that the definition of benefit states aligns well with the definition of the liability.

16.3.6   Retirements

Recall that the definition of the liability only includes payments to working-age recipients. The age of individual clients, in quarter years, is tracked throughout the projection and increased each quarter. This allows us to remove clients from the liability when they turn 65. Thus, when someone is aged 64.75, all transition probabilities other than the transition to retirement are set to zero, meaning that the probability of retiring is one. When a client is younger than 64.75, the probability of retiring from the system is zero.

Additionally, we have allowed for the change in the retirement age from 60 to 65 (which occurred over the period 1992 to 2001) in the historical data modelling; to not do so would bias upwards the probability of moving to the NOB state in ages 60-65.

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16.4   Projecting the client base

16.4.1   Methodological correction to 2012 projection cohort

It was discovered during the 2013 valuation analysis that the 2012 projection cohort included a group of clients who had not received benefits in the 12 months previous to June 2012, but had received benefits in the 15 months previous. These clients should not have been included in the current client liability, and any payments attributable to them should be included in the future client liability instead. The main impacts of the error were that:

- The current client liability was overstated by $1.5b. This liability corresponds to the 30,046 clients who were accidently included.

- This extra liability was entirely attributable to the Recent Exits segment – the liability estimates for other segments was unaffected

- The future client liability amounts were understated by about 5%

To properly correct for the error, we have re-cast the 2012 valuation results to exclude the group of clients. In particular:

- The actual versus forecast comparison results of Section 3 use the amended forecasts, where a portion of payments formally attributable to the 2012 current client liability has been moved to the future client liability.

- The analysis of change in Section 5 begins with an adjustment of $1.5b for the methodological correction.

16.4.2   The projection cohort

The projection of the current client liability commences with the June 2013 current client liability cohort: this consists of those who have received a benefit in the previous 12 months. For each of the recipients, the appropriate modelling variables are collected and they are also allocated to segments.

For each future quarter starting with September 2013, the transition probabilities are calculated and then applied to the cohort at the start of the quarter.

Simulated versus exact projection

A key choice in projection design was between calculating an exact liability and using a simulation approach:

- **Exact:** tracks every possible outcome for each client for every future quarter and its associated probability. This process has a heavy computational load due to the many possible outcomes.

- **Simulation:** follows each person through time, using the transition probabilities to simulate their path. This process is then repeated many times. This is also computationally intensive, though less so than the exact approach unless a very large number of simulations are run.

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In many ways the exact approach is preferable – for instance it gives more correct estimates of the mean and on the relative likelihood of rarer events. This approach was taken in the 2011 valuation. However, the addition of extra benefit states and modelling variables makes the exact approach computationally infeasible.

We have adopted the simulation based approach for the 2012 valuation and have continued to use it for the 2013 valuation. The results presented make use of 100 independent runs of the projection. Based on an analysis of simulation variability, we believe the estimated mean should be within 0.02% of the true mean that would have been obtained from an exact approach.

Further details on computational aspects of the projection are included in Appendix I.

16.4.3   Projection of future client liability

In principle, the future client liability projection works in the same manner as the current client liability, i.e.:

- First, identify the number of clients entering the benefits system as part of the future client liability for each quarter of the next five years (twenty quarters in total)

- Choose appropriate modelling variables for these clients (age, gender etc.)

- Project the benefit payments to these clients using the approach described in Section 16.4.1 above

- Repeat the simulation a number of times to obtain a reliable estimate of the mean

The future client liability is defined as comprising those cohorts who receive benefits in the next five years who are either new to the system or have been off benefits for more than 12 months before the most recent 30 June (Section 2.6.1). We model this by:

- Building a model of aggregate numbers entering each benefit type each quarter. This depends on demographic and macroeconomic measures such as population growth and unemployment rates.

- Randomly sampling client characteristics from the equivalent population of people entering the system in 2012/13.

- Projecting the sampled clients forward.

This approach treats client returns and new entries simultaneously, and assumes that the distribution of new entrants versus returns will be similar to that seen in 2012/13.

Total results are obtained by summing the 20 quarterly cohorts of future clients into five annual cohorts and discounting their lifetime liabilities into the middle of each year. Related results are presented in Section 4 and Section 12.

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16.5 Dynamic variables

Some of the modelling variables tend to remain fixed over the projection – for example gender and date of birth. However other variables, such as duration and registered children will evolve over the course of the projection. We refer to these variables as "dynamic". The pattern of this evolution needs to be modelled and allowed for. We describe our treatment for each of the dynamic variables below.

The performance of the dynamic variables is checked in the back-testing process, described in Section 16.8.2. More detail on the adopted models for dynamic variables is given in Appendix D.

16.5.1 Client duration

A number of duration measures are tracked over the course of the valuation – number of quarters on the current benefit, number of quarters since first benefit, a continuous duration measure, and counters of the number of quarters in various states. These evolve in a fairly natural manner:

- Number of quarters on current benefit is incremented each quarter and reset upon transition.

- Number of quarters since first benefit is incremented each quarter.

- Continuous duration is incremented each quarter if the client is not in the "Not On Benefit" state. Further, a model is run to determine the likelihood of a brief spell off benefits during the quarter, which is used to reset the continuous duration.

- The variables indicating the number of quarters in various states are incremented depending on the client's projected state.

16.5.2 Region

We have built simple models to simulate how people move between regions, while they are on benefits and while they are off. These depend on:

- A client's current region
- Their benefit and duration on that benefit
- Time trends
- Age
- Ethnicity

The probability of moving to a different region is calculated each quarter as part of the projection. If they do move, they are randomly allocated to a region based on historical movement patterns.

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16.5.3   Incapacity type

While clients are in IB or SB their incapacity type is used as a predictor variable, using about 15 different incapacity groups. We have models that allocate:

- Incapacity type upon entry into SB or IB
- The probability of incapacity type changing while in SB or IB
- The new type of incapacity if there is a change while in SB or IB

These models rely on a number of client characteristics:

- Age
- Gender
- Client duration
- Current incapacity type (if applicable)
- Current benefit state
- Ethnicity
- Trends over time

16.5.4   Partner related variables

Two partner related variables are maintained in the projection. The first is a flag indicating whether the partner is also registered on the benefit, applicable for UB, SB, IB and EB. Secondly we have a flag indicating whether it is the partner who carries the incapacity for IB and SB. We estimate the evolution of these flags:

- When people enter the appropriate benefits
- While people remain on benefits

These models depend on:

- Client age and gender
- Duration on benefits
- Current benefit type
- Existing partner status
- Ethnicity
- Trends over time

16.5.5   Child related variables for DPB recipients

The number and ages of registered children for DPB recipients is highly predictive of both average benefits paid and the likelihood of moving to other benefits or out of the system. However, the use of the child related variables introduces a number of issues:

- People not currently on DPB do not necessarily have any child related information recorded

- There will be changes to the children of a DPB beneficiary going forward in time (new children being born, children becoming older than 18 and therefore becoming independent, children living with a different carer etc.)

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- There is a cost to adding more variables in terms of computation time, both from the requirement to update more variables and from the need to store more information at each iteration

Consequently, a number of pragmatic decisions have been made to deal with children, striking the balance between retaining useful information for modelling and projecting and keeping the computational burden at manageable levels. We retain two child related variables, being the **number of children** and **age of youngest child**. There are three possible values for the number of children: 1, 2 or "3 and higher". We then model:

- The distribution of child numbers and youngest age upon entry into DPB. These depend on client age only.

- The probability of a change in the youngest registered child while on DPB. This depends on age, gender, child age, duration on benefit, ethnicity, plus some time trends.

- The distributions of child numbers and youngest ages, given the outcome of the new youngest child model. These also depend on the same variables as listed in the previous bullet point.

16.6   Net loans cost

There are a number of ways in which clients become indebted to MSD. For the purposes of this valuation all debts to MSD are termed "loans". The scope of net loans cost was discussed in Section 2.6.4. We value overpayments (whether arising from fraud or otherwise) and recoverable assistance (including benefit advances) separately.

Results for all loan subcomponents are discussed in Section 13. Summary results in Section 4 present the combined total of all subcomponents as a "net loans cost".

16.6.1   Overpayments

The rate file data provided is net of the first two items listed in section 16.6 – overpayment and fraud are corrected when MSD is made aware of them. If recoveries were made immediately and in full then there would be no need to value these components as part of the liability. However,

- Not all overpayments and fraud debts are fully recovered

- It can take a number of quarters to collect amounts that are recovered. Since no interest is charged on these amounts, this lag represents a cost to MSD due to the time value of money

For this reason we have constructed models for overpayments and fraud combined. These models involve:

- Estimating the level of overpayments/fraud as a percentage of total welfare payments.

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- Estimating quarterly factors for the growth in total debts raised for clients who have nonzero outstanding debt. That is, modelling how raised debts can continue to increase.

- Estimating the proportion of outstanding debts that is either recovered or written off, given the number of quarters since the original debt was raised.

- Estimating the allocation of this last amount to recoveries and write-offs.

These models can then be applied to both the outstanding balances at the valuation and the projected future welfare payments, giving four distinct components related to overpayments and fraud:

- Further overpayments/fraud for existing debtors
- Recoveries on overpayments/fraud for existing debtors
- Overpayments/fraud related to future payments for new debtors
- Recoveries on overpayments/fraud related to future payments for new debtors

16.6.2   Recoverable assistance

As noted above we have used the term "recoverable assistance" to include all types of benefits and assistance that are recoverable (excluding overpayments and fraud). Thus recoverable assistance includes benefit advances and recoverable Special Needs Grants (SNGs), as well as a few very minor related payments. In the provided data the payments related to recoverable assistance are included under specific benefit codes, and recoveries are included in the loan datasets. As with overpayments/fraud, the costs associated with recoverable assistance relate to the non-recoverability of some assistance as well as any associated time lags.

The following methodology has been used for recoverable assistance:

- The payments have been estimated in the same fashion as the *other benefits and assistance*

- The recoveries have been estimated as a simple percentage of recoverable assistance payments

The amount of recoveries related to recoverable assistance has been relatively stable over the past few years when compared to recoverable assistance payments. For this reason we believe that a simple percentage adjustment to the liability for loan recoveries is appropriate. This was discussed further in Section 13.

16.6.3   Limitations to the loans methodology

Although we believe our valuation of the net loans cost is a plausible forecast of future cash flows, there are a number of significant limitations to the approach:

- Consider that the amount of fraud and overpayments recovered is comprised of the following 3 components:
    - The total amount of fraud and overpayments as a percentage of total benefit payments in the system
    - The percentage of total fraud and overpayments detected

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- The percentage of detected fraud and overpayments recovered

- The valuation provides an assessment of the last component listed but neither of first two. In our opinion, the first two items are at least as important if not more so than the last. Hence, for complete financial control of the fraud and overpayments in the system an expanded framework compared to what is possible within this valuation is required. Also note that caution needs to be exercised when using results from the valuation in relation to this last component. Without knowing whether the total amount of fraud and overpayments in the system is stable it would be difficult to draw definitive conclusions about performance in recoveries. For example, reduced recoveries may not be indicative of deteriorating performance in detection but a sign of an overall reduction in fraud and overpayments.

- Data for debts raised prior to June 2007 are not available. This makes modelling the behaviour of "old" debts very difficult – the extrapolations carry extra uncertainty. Furthermore, outstanding debts raised before this date are not classified according to overpayment/fraud/recoverable assistance, so this split must be approximated.

- There was some uncertainty as to whether the main rate files were net of loan adjustments (e.g. when it is realised that an overpayment was actually correct). Adjustments represent about 7% of total recoveries.

- A small proportion (about 9%) of both existing and new debts relate to clients outside the scope of the valuation, i.e. to clients over age 65. Removal of these debts would be difficult due to the format of the data. In any case, the overall impact of their inclusion is negligible in the context of the valuation.

- The assumption that Recoverable Assistance recoveries are a straight proportion of corresponding payments assumes the dynamics of this loan type are stable. For instance, it ignores the amount of Recoverable Assistance debt outstanding at any given point in time, even though changes in this could well impact the size of recoveries.

We believe a more detailed analysis of loans is possible that better captures the dynamics of loans and recoveries, as well as giving some insight into the total level of overpayments and fraud, not just the detected level. However, such an analysis is beyond the scope of the current valuation.

16.7   MSD Expenses

MSD incurs expenses in delivering benefits, services and programs in addition to the cost of the benefit payments. These can be broadly categorised into:

- Administration costs, such as costs related to processing benefits for working-age adults

- Program costs, such as those services provided to help clients prepare for, and return to work, which prevent or reduce the duration of benefit receipt

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These costs, to the extent they are attributable to the current and future client liability cohorts, are added to the liability estimates. The detailed scope of expenses included within the valuation can be found in Appendix C.

Unlike demand-driven benefit receipt, the level of expenditure is determined each year through the budget process, and tends to remain relatively stable. Annual expenses as well as 2013/14 budget expenses have been provided to us. Our methodology for determining the liability for administration and programs is:

- To assume the total expense costs are **fixed in real terms**

- Allocate expense costs to either current client liability, future client liability, or clients outside the scope of this valuation

- Proportionally allocate these expenses into the various categories listed below.

The categories used for the allocation of expenses are:

- Income support administration
    - Benefit processing ("income" share of Tailored Sets of Services to Help People into Work or Achieve Independence appropriation)
    - Integrity services
    - Collections
    - Temporary measures (e.g. Canterbury earthquake)

- Work focused investments
    - OSCAR (Out of School Care and Recreation subsidy to providers)
    - Training and employment support (includes Employment Assistance, Vocational Skills Training, Mainstream Supported Employment Programme, Youth Transition Services)
    - Work-focused case management (includes "work" share of Tailored Sets of Services appropriation; e.g. Job Connect, employment coordinators, work brokerage)

Note that Tailored Sets of Services were apportioned by MSD between income support administration and work focused investments on the basis of time survey data. Results for expenses were discussed in Section 14.

16.8   Model checking and validation

As with the previous valuation, all aspects of the modelling were heavily tested for appropriateness. The two main tools for this were:

- Generalised linear model (GLM) based diagnostics for the individual transition and payment models
- Backtests on historical cohorts to check that the projected cohorts tracked the actual reasonably closely.

More details are provided in the following subsections.

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16.8.1 Typical GLM diagnostics

Actual versus expected plots

One key graphical diagnostic is the actual versus expected plot. As the name suggests, this involves graphing the average observed (or "actual") values and the average fitted (or "expected") values against a chosen predictor.

Figure 16.6 **Probability of remaining in UB by number of quarters on benefit**
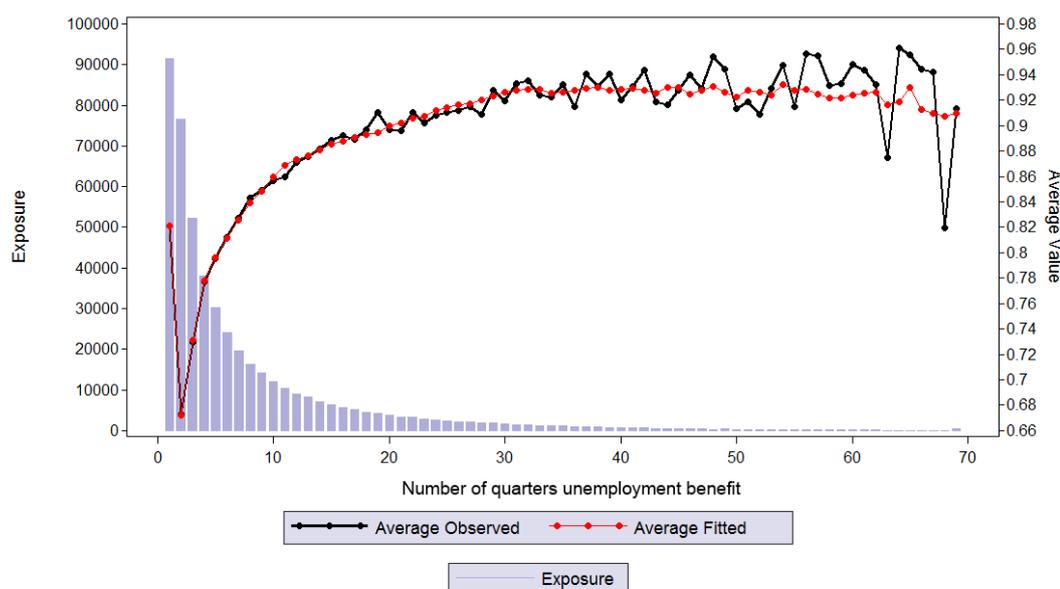
Studying a range of these charts allows identification of possible regions of misfit. The diagnostic is also very flexible, for example:

- By choosing specific cohorts of the modelling datasets, it is possible to test the need for further interactions. For instance, plotting the actual versus expected chart for age using only male clients can reveal age-gender interactions.

- The charts can be used to determine whether variables can be omitted completely, thus simplifying an analysis – this is useful when variables are highly correlated.

- Plotting against the time variable and comparing to key economic variables gives insight into the extent to which the economy impacts on behaviour.

We have produced and checked thousands of actual versus expected charts in constructing the various GLMs.

Parameter significance tables

The statistical significance of every term (for instance, an effect for a specific client age range) is tested. This is useful in determining whether an effect is "real", or likely to be an artefact of the random fluctuations in the datasets. These tables give significant insight into the appropriate complexity needed for the GLMs.

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AIC monitoring

The Akaike Information Criterion, or AIC, is a useful overall score for the goodness of fit of a model. This is particularly useful in simplifying and grouping effects relating to each variable; for example, if two districts can be grouped together and the AIC improves, this is good evidence that they behave similarly and a more parsimonious model is achieved.

This score is monitored throughout the modelling process, particularly for the transition models.

16.8.2 Backtests

It is difficult to gain a sense of the overall performance of the transition structure without combining them into a backtest, where the models are applied to some pretend historical valuation date and the projected evolution of the cohort is compared to the actual evolution. We have done this, breaking down the results in a number of ways, such as:

- Examining backtest performance at different historical starting dates
- Examining performance at an aggregate, benefit, and segment level
- Examining the evolution of predictor variables as well as benefit state

These tests are done "in-sample", in the sense that they make use of time effects added over the course of modelling. Thus backtesting cannot be used to estimate the accuracy of the valuation projection, which does not allow for new trends emerging from policy changes and other sources.

The backtests are a useful tool for identifying any errors in the way models have been set up, as well as gaining an overall sense of how accurately historical patterns are being reproduced by the transition model structure. Results are generally very close to those seen in previous reports.

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17 ECONOMIC ASSUMPTIONS

17.1 Introduction

Section 2.6.6 discussed that the liabilities estimated in this report are on an inflated and discounted basis. Furthermore many of the models described in Section 16 use the level of unemployment as a predictor. Therefore the following economic assumptions are required:

- Future inflation rates
- Future discount rates (also referred to as rates of investment return)
- Forecast unemployment rates (to match historical rates as published by Statistics New Zealand in its Household Labour Force Survey)

In order to ensure consistency across valuations reported to the Crown, Treasury releases account assumptions for CPI and discount rates. As agreed with MSD and the Treasury these rates as applicable at 30 June 2013 are used here. Projected unemployment rates have also been provided by Treasury, with some slight modification to reflect experience since their May 2013 forecast.

Quarterly series of adopted assumptions are included in Appendix B.

17.2 Future benefit (CPI) inflation

The previous and current assumptions for future CPI inflation are given in Table 17.1.

Table 17.1 **Future benefit (CPI) inflation**

Year ending 31 March	Adopted 2012 valn	Actual 2012/13	Adopted 2013 valn	Change
	%	%	%	%
2013	2.1	0.8		
2014	2.4		1.9	-0.5
2015	2.5		2.3	-0.2
2016	2.5		2.3	-0.2
2017	2.5		2.4	-0.1
2018	2.5		2.4	-0.1
2019 & later	2.5		2.5	0.0

CPI adjustments to benefit rates are usually made annually on the first of April each year. We have allowed for CPI inflation adjustments on this annual basis, although we recognise that this perhaps over-simplifies some issues, such as the region based recalculation of AS rates.

Inflation rate projections have been reduced compared to the previous valuation. The rate for 2013/14 is set to be 0.5 percentage points lower, and the time to the long term rate of

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2.5% has now been spread across five years. This will tend to lower the overall liability, as seen in Section 5.

17.3   Future rates of investment return

Treasury has supplied a schedule of future rates of investment return to be used for discounting liabilities as at 30 June 2013. These are detailed in Table 17.2.

Table 17.2 **Rates of investment return assumed**

Year ending 30 June	Years from valuation date	2012 valn, 1 year Forward rate at June	2013 valn, 1 year Forward rate at June	Change	2013 valn, spot (discount) rate
		%	%	%	%
2014	1	2.47	2.71	+0.24	2.71
2015	2	2.77	3.14	+0.37	2.92
2016	3	3.25	3.58	+0.33	3.14
2017	4	3.66	4.02	+0.36	3.36
2018	5	3.93	4.46	+0.53	3.58
2019	6	4.07	4.79	+0.72	3.78
2020	7	4.17	4.99	+0.82	3.95
2021	8	4.25	5.11	+0.86	4.09
2022	9	4.29	5.18	+0.89	4.22
2023	10	4.32	5.22	+0.90	4.31
2024	11	4.43	5.24	+0.81	4.40
2025	12	4.58	5.27	+0.69	4.47
2026	13	4.73	5.30	+0.57	4.53
2027	14	4.88	5.32	+0.44	4.59
2028	15	5.03	5.35	+0.32	4.64
2029	16	5.18	5.38	+0.20	4.69
2030	17	5.33	5.41	+0.08	4.73
2031	18	5.48	5.44	-0.04	4.77
2032	19	5.63	5.46	-0.17	4.80
2033	20	5.78	5.49	-0.29	4.84
2034	21	5.93	5.50	-0.43	4.87
2035	22	6.00	5.50	-0.50	4.90
2036	23	6.00	5.50	-0.50	4.92
2037	24	6.00	5.50	-0.50	4.95
2038	25	6.00	5.50	-0.50	4.97
2039	26	6.00	5.50	-0.50	4.99
2040	27	6.00	5.50	-0.50	5.01
2041	28	6.00	5.50	-0.50	5.03
2042	29	6.00	5.50	-0.50	5.04
2043	30	6.00	5.50	-0.50	5.06
2044 & later		6.00	5.50		

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The comments regarding the change in discount rates are similar to the change in assumed real rates in the section below.

17.4 Future real rates of investment return

Table 17.3 **Real rates of investment return assumed**

Year ending 30 June	Years from valuation date	2012 valn, real (forward) rate of return	2013 valn, real (forward) rate of return	Change
		%	%	%
2014	1	0.07	0.81	+0.74
2015	2	0.27	0.84	+0.57
2016	3	0.75	1.28	+0.53
2017	4	1.16	1.62	+0.46
2018	5	1.43	2.06	+0.63
2019	6	1.57	2.29	+0.72
2020	7	1.67	2.49	+0.82
2021	8	1.75	2.61	+0.86
2022	9	1.79	2.68	+0.89
2023	10	1.82	2.72	+0.90
2024	11	1.93	2.74	+0.81
2025	12	2.08	2.77	+0.69
2026	13	2.23	2.80	+0.57
2027	14	2.38	2.82	+0.44
2028	15	2.53	2.85	+0.32
2029	16	2.68	2.88	+0.20
2030	17	2.83	2.91	+0.08
2031	18	2.98	2.94	-0.04
2032	19	3.13	2.96	-0.17
2033	20	3.28	2.99	-0.29
2034	21	3.43	3.00	-0.43
2035	22	3.50	3.00	-0.50
2036	23	3.50	3.00	-0.50
2037	24	3.50	3.00	-0.50
2038	25	3.50	3.00	-0.50
2039	26	3.50	3.00	-0.50
2040	27	3.50	3.00	-0.50
2041	28	3.50	3.00	-0.50
2042	29	3.50	3.00	-0.50
2043	30	3.50	3.00	-0.50
2044 & later		3.50	3.00	-0.50

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Note: Real rate of return is defined as the assumed rate of investment return minus benefit rate inflation. Note that the discount rates are for years ending 30 June whereas the assumed inflation rates are for years ending in 31 March.

The estimate of the outstanding claims liability is sensitive to the differences between rates of claims inflation and investment return assumed, rather than to either one of these sets of assumed rates alone. These differences may be referred to as the "gap" or real rates of investment return and are recorded in Table 17.3.

The changes in the real rates of investment tend to be dominated by the changes in the assumed investment return. These investment returns were very low at the June 2012 valuation; this fall caused an $11.8b increase in the liability, as less interest would have been "earned" over time to pay for future benefits. The real interest rates over the first 15 years of the projection are forecast to be around 0.5%-0.9% higher than the previous valuation. This significantly reduces the liability, as seen in Section 5. However this impact is partly offset by Treasury's decision to adopt a long term forward rate of 5.5%, lower than the 6.0% used in the previous valuation. The real rates of returns used in the current and previous valuation are shown in Figure 17.1.

Figure 17.1 **Real forward rates of return**
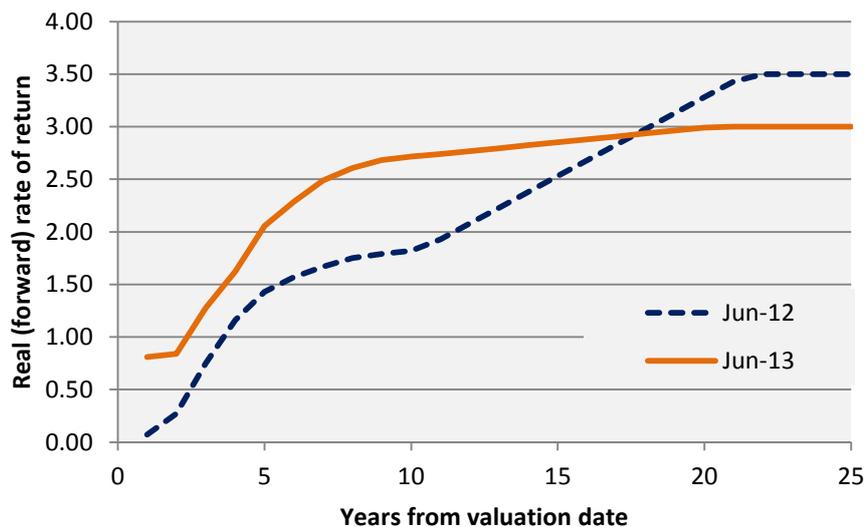

17.5   Future unemployment rate assumptions

Future unemployment rate assumptions were based on forecasts provided by Treasury and are given in Table 17.4.

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Table 17.4 **Future unemployment rate assumptions**

Projection at 30 June	2012 valn, Unemployment rate	2013 valn, Unemployment rate	Change
	%	%	%
2013	6.06	6.40	+0.34
2014	5.51	5.93	+0.42
2015	5.16	5.85	+0.68
2016	4.75	5.46	+0.70
2017	4.53	5.16	+0.63
2018	4.50	4.83	+0.33
2019	4.50	4.73	+0.23
2020	4.50	4.63	+0.13
2021	4.50	4.53	+0.03
2022 & later	4.50	4.50	0.00

The forecasts were based on the Treasury projections in the Budget Economic & Fiscal Update 2013, released in May 2013. However, actual unemployment rates at June 2013 (released by Statistics New Zealand in August 2013) were already 0.5% lower than what Treasury had forecast. For this reason we modified the Treasury curve to make the projection compatible with the June 2013 rates. This is illustrated in Figure 17.2. While the long term unemployment rate is unchanged at 4.5%, we start at the actual unemployment level and amortise the difference between actual and Treasury projected rates over one year.

Figure 17.2 **Forecast unemployment rates**

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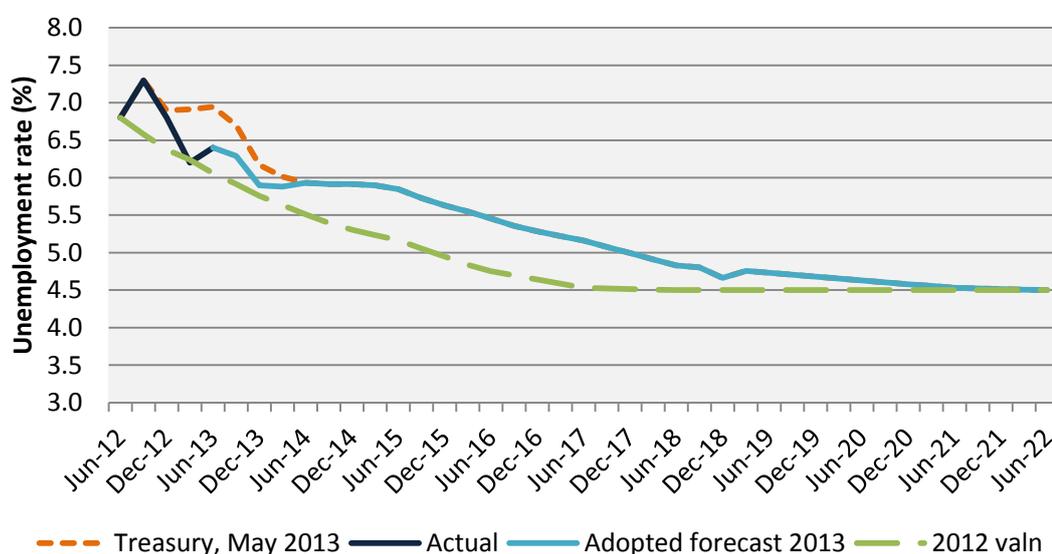
PART E
RELIANCES AND LIMITATIONS

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18 RELIANCES AND LIMITATIONS

18.1 Purpose and use

This report has been prepared for the specific purpose of assisting MSD in determining an estimate of the current client liability for those on or recently on benefit, plus future client liability costs over the next five years. No reliance should be placed on this report for any other purpose without confirming with us that such a purpose is appropriate. Taylor Fry specifically disclaims any responsibility or liability to any party which might claim to suffer any loss as a direct or indirect consequence of relying on this report for any purpose other than the specific purpose described in this paragraph.

Detailed judgements about the definitions, methodology, analyses, assumptions and estimates of current client liability and future client liability described in this actuarial report should be made only after considering the report in its entirety.

Taylor Fry personnel are available to explain or amplify any matter presented in this report.

18.2 Reliance on data

In preparing this report we have relied on historical data and other quantitative information provided by MSD without audit or independent verification. This data is described in Section 15.2. We have sought to validate the data internally and externally as described in Section 15.3. These checks suggest that there are no material problems with the data provided, beyond those related to the new youth benefits (Section 15.4.3) and the education level variable (Section 16.3.4). Nevertheless, data accuracy and completeness remains the responsibility of MSD and we do not take responsibility for inadequacies in the valuation arising from errors in the data.

Any material discrepancies in the data should be reported to us to enable us to consider whether this report should be amended.

18.3 Uncertainty

There is an inherent limitation on the accuracy of liability estimates in this report caused by the fundamental uncertainty of attempting to predict the future. In particular there is a large amount of uncertainty related to:

- Changes to the welfare system
- Changes in the way clients use the welfare system
- Changes in the New Zealand macro-economic environment

All these are highly likely to affect projections, particularly given the long time horizon used in the valuation. A more detailed discussion of key risks is given in Section 6.

Additionally, the liability estimates are inherently uncertain, for the following general reasons:

- Models used to estimate such liabilities represent a simplification of complex real world processes.

- Even if the models used were perfect representations of the nature of the underlying processes, past random fluctuations in the experience of the social welfare system mean that uncertainty arises from estimating the parameters of the models.

- Any shortcomings of and/or errors in the data available increases uncertainty regarding the estimated parameters of the models.

- Even if the true underlying parameters could be determined precisely for a suite of perfect models, the amounts of the current client liability and future client liability would still be uncertain because of:

    - Random fluctuations in the future experience of the social welfare system

    - The possibility of future systemic, i.e. non-random, changes. Note these changes include those listed at the start of this sub-section.

In our opinion, we have used techniques and assumptions which are appropriate, and the conclusions presented in this report are reasonable, given the information currently available. However, it should be recognised that the ultimate costs for the current and future client liability cohorts can be expected to differ, probably materially, from our estimates of those costs.

18.4   More specific limitations of the valuation

There are significant implementation challenges associated with the following issues:

- The specific definition of continuous duration
- The use of simulation to estimate the liability
- The allocation of expenses and loans to segments and individuals
- Future changes to the benefit system

None of the items above undermine the accuracy or usefulness of the valuation – we raise them primarily so MSD are aware of some of the issues likely to arise in future work related to the investment approach.

18.4.1   Definition of continuous duration

Continuous duration is used for allocation to segments, and for some of the reporting of the valuation. We have calculated continuous duration based on MSD's rules (a 14 day gap off benefits means duration resets); however there are some details that may cause discrepancies with MSD's traditional calculations:

- MSD has traditionally ignored spells of partners of beneficiaries. That is, MSD treats the partner as off benefits. We have chosen to treat payments to partners as being on benefits.

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- Our calculation of the 14 day rule applies to periods when not receiving DPB, IB, SB, UB, EB, OB, WA/WB, DPB-CSI and CDA. Additionally, many of these benefit types include some miscellaneous smaller payment codes as described in the scope appendix. This may be different to the payment codes used by MSD for the continuous duration calculation.

While we believe our allocations to segments and calculations of continuous duration is generally close to MSD, exact matching should not be expected.

18.4.2 The liability is simulation based

There will always be a little bit of "noise" induced from the simulation based approach to the projections (currently ~0.02% at an aggregate level, but it can be quite significant at a small cohort and individual level). This could conceivably be reduced in the future via extra simulations of subgroups of particular interest – we believe that the 100 simulations used currently is adequate for the purpose of the valuation.

18.4.3 Allocation of loans and expenses to segments and individuals

After discussion with MSD, we have only calculated loans and expenses at an aggregate level. While we have distributed these amounts proportionally in places (for example, Table 4.4), in general this allocation should be treated as approximate rather than exact. This is because the incidence of expenses and loans are not uniformly distributed across welfare recipients, but performing an accurate allocation was infeasible for the current valuation – it would be difficult to do this without a significant amount of work for both MSD and Taylor Fry. While such an analysis is possible, it is unclear whether the practical benefits of such work outweighs the effort required to do so.

18.4.4 Changes to the benefit system

Both the 2012/13 and 2013/14 financial years bring significant change to the welfare system, particularly with respect to how people are classified. The segment definitions pre-empt this in the sense that the definition of the top tier segments aims to be consistent with the new benefit definitions; for example, the Jobseeker segment combines a number of benefit types that have been combined in the welfare reforms.

There are no theoretical issues in adapting the methodology to the new benefit types. We can simply recast the old benefit types into the new ones and use this as the starting point in modelling. However there will be practical issues:

- The behaviour of clients will almost definitely change due to the reforms. For instance, some clients on Jobseeker Support who originally had lower work requirements (such as Widows), may have higher benefit exit rates than their historical average. It will take some time before the new behaviours can be completely quantified and projected correctly.

- There may still be some practical issues associated with the loss of information that comes from benefit type consolidation. For instance, currently child related variables are collected for DPB recipients with youngest child 14 or over. This will likely no longer be the case, once they are combined with the other Jobseeker

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clients in 2013/14. This information loss is important, since data that correlate to old benefit types will be highly predictive. The issue could make projections more uncertain.

- Reconciling the liability estimates that span the old and new systems will be difficult. Some differences will be due to:
  - Reform related behaviour changes
  - Changes in modelling structure
  - Economic circumstances
  - Improvements in MSD management.

  Separating out all these effects correctly will be virtually impossible, but it is difficult to predict the extent of the issues at this stage.

Thus the July 2013 reforms will have some impact on the valuation and monitoring framework. We expect that allowing for this should be manageable, but there are some potential pitfalls and extra care will be required.

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