

Future Liability

Estimating time on benefit and the associated cost

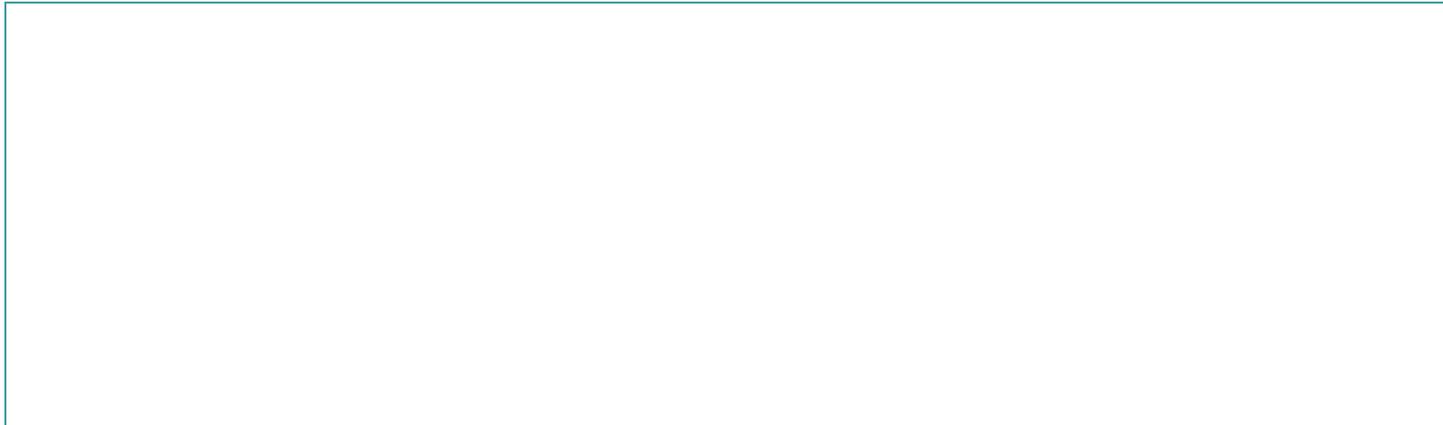
October 2010



MINISTRY OF
SOCIAL DEVELOPMENT
Te Manatū Whakahiato Ora

Prepared by

Centre for Social Research and Evaluation



Acknowledgements

This report was authored by Keith McLeod and Jane Wang. We thank Melissa Adams, Michelle Bly, Marc De Boer, Helen Stott, Greta Gordon, Brenda Crane, and Philip Spier from the Ministry of Social Development for their assistance, advice and support with aspects of the project.

Disclaimer

The Ministry of Social Development has made every effort to ensure the information in this report is reliable, but does not guarantee its accuracy and does not accept liability for any errors.

Suggested citation

Ministry of Social Development (2010). *Future Liability: Estimating time on benefit and the associated cost*, Centre for Social Research and Evaluation, Ministry of Social Development, Wellington, New Zealand.

Published

November 2010 by:
Ministry of Social Development
PO Box 1556
Wellington 6140
New Zealand

www.msd.govt.nz

ISBN

978-0-478-33520-0 (Online)



Contents

Executive summary	2
Introduction	4
Purpose	4
Background and caveats.....	4
Findings	5
Estimated future liability	5
Comparing liability over the next 10 years	7
Drivers of future liability	8
Method and assumptions	12
Appendix 1: Discounted results	14
Appendix 2: Detailed results	17
Appendix 3: Method	41
The general approach	41
Step 1 – Construct the model	41
Step 2 – Forecast benefit receipt	46
Step 3 – Calculate liability	47



Executive summary

This research aimed to produce indicative estimates of the future liability associated with benefit receipt for a cohort of current benefit recipients, and investigate how this varies with benefit type and age. The future liability is the amount that the government might expect to have to pay in benefits to the people on benefit at June 2009 for the period until they reach the age of 65.

The total future liability of benefit expenditure for people who were on a working-age benefit (clients) at the end of June 2009 is estimated (in 2009 dollars) to be between \$44 billion and \$57 billion.¹ The liability over the next 10 years is estimated to be between \$28 and \$32 billion.

For the 355,000 clients on a working-age benefit at the end of June 2009, we estimate that:

- over all future years until they reach the age of 65, clients will spend an average of between 8 and 11 years on benefit (not necessarily on a continuous basis)
- average liability per client over all future years is between \$125,000 and \$160,000
- average liability per client over the next 10 years is between \$78,000 and \$90,000
- total liability for all clients is between \$44 billion and \$57 billion
- total liability for the next 10 years is between \$28 and \$32 billion.

Estimated payments to clients on Invalid's and Domestic Purposes benefits make up the largest proportion of future liabilities

Those on Invalid's and Domestic Purposes benefits have among the highest individual liabilities (Figure 1) and make up the largest proportion of the overall liability. Higher future liabilities for these two benefits arise because of the longer expected duration on benefit and relatively higher rates paid.

The effect of age on future liability is particularly pronounced for the Invalid's Benefit

The effect of age on future liability is particularly pronounced for the Invalid's Benefit where expenditure on 25–34 year old clients is estimated to be more than \$370,000 per client (based on an estimated future benefit duration of 19 years), while expenditure on 35–44 year old clients is estimated to be around \$280,000 per client (based on an estimated future benefit duration of 15 years).

Unemployment rates have the largest influence on the future liability of people receiving an Unemployment Benefit

- The average future liability for all future years under a high unemployment rate scenario is 89 percent greater than for a low unemployment rate scenario for clients on an Unemployment Benefit.

¹ These estimates are calculated based on three scenarios with different unemployment rates.

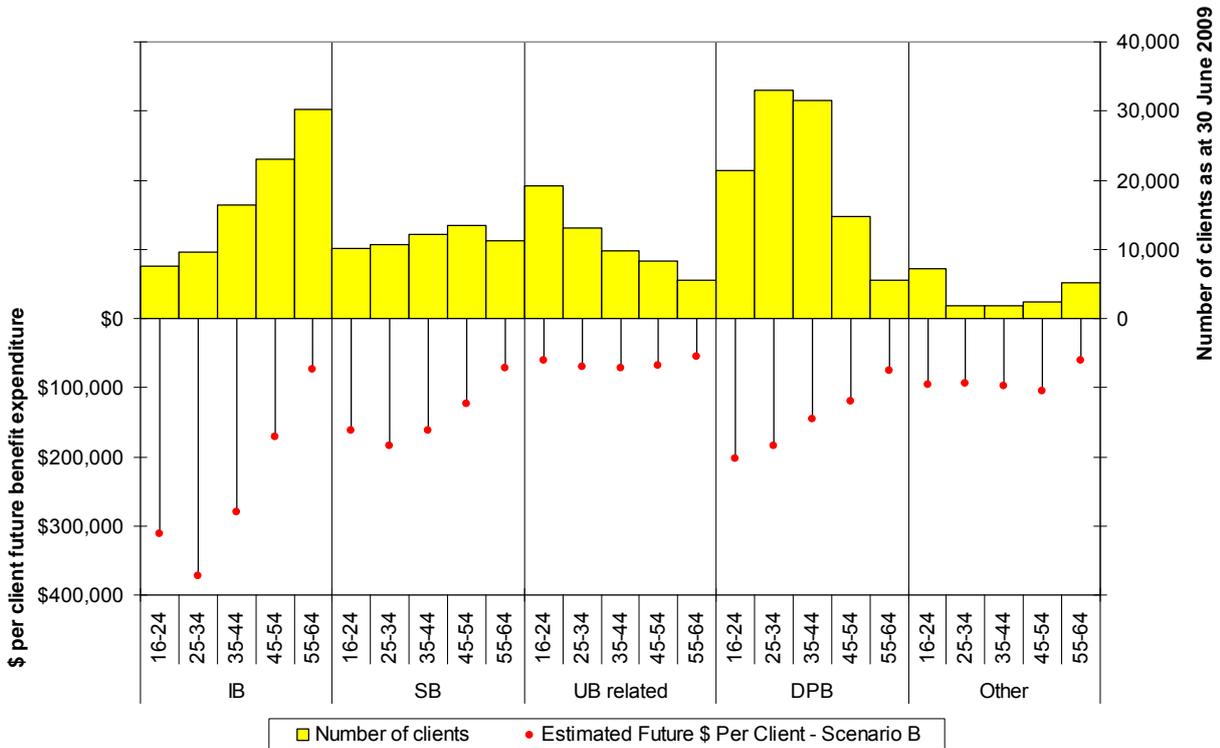
Scenario A (low) = unemployment rates as for scenario B, less 1.5 ppt.

Scenario B (medium) = unemployment rates forecast by Treasury to June 2013 (HYEFU 2009), remaining constant at 5.2 percent thereafter.

Scenario C (high) = unemployment rates as for scenario B, plus 1.5 ppt.

- By comparison, the increase in liability is only 14 percent for clients on an Invalid's Benefit.
- In general, we find that over all future years a one percentage point (ppt) change in unemployment rate changes the estimated average benefit duration per client by approximately one year and the estimated average future liability by 9 percent.

Figure 1: Estimated total future benefit expenditure by benefit group and age band (excluding partners)



Future benefit duration varies across client sub-groups

- Clients on an Invalid's Benefit have the longest estimated future duration (between 12 and 15 years), while Unemployment Benefit clients have the shortest (between 5 and 9 years).
- Young clients (under 25 years) have the longest estimated future duration (11 to 16 years).
- Clients with short previous benefit durations² (a total of less than one year in the three years prior to June 2009) had the shorter estimated future duration, while clients with very long durations (on benefit for the entire three years prior to June 2009) had the longest.

The work assumes that these people will have similar patterns of benefit receipt to those observed historically. The estimates also depend on future economic conditions and a range of other assumptions about future. The methods and assumptions used for this analysis should be carefully considered when using estimates from this report.

² See Appendix 3 Method for the full list of definitions of benefit durations.



Introduction

Purpose

The purpose of this report is to provide information on the long-term fiscal costs of benefit receipt. The analysis estimates the future liability of benefit expenditure for the cohort of working-age clients on benefits at the end of June 2009. This analysis provides:

- detailed estimates of future liability according to estimated benefit duration (not necessarily continuous spells)
- information on how this varies with benefit type and age
- estimates that account for the impact of changing economic conditions on future liability.

This analysis looks at the people on benefit at the end of June 2009 and estimates the future liability for benefit expenditure for these people until they reach the age of 65.

Background and caveats

Estimated future time on benefit and associated benefit payment liability is based on a cohort of clients on benefit and aggregated to a group level. The work assumes that these people will have similar patterns of benefit receipt to those observed historically.

The costs included in the analysis are the cost of main benefits (eg Unemployment Benefit and Domestic Purposes Benefit-Sole Parent) and supplementary assistance (eg Accommodation Supplement), but ad hoc payments (eg Special Needs Grants) and the family tax credit are excluded.

Durations are calculated over the period to a client reaches age 65 and are not necessarily on a continuous basis.

Research shows that most people who newly enter the benefit system are on benefit for a brief period of time. When examining beneficiary populations at any point in time, clients who have been on benefit for longer periods will be over-represented. This means that the estimates in this report do not represent the duration or future liability for new clients coming on to a benefit.

Estimating the future time on benefit and associated benefit payment liability is inherently uncertain because it depends on future economic conditions and a range of other assumptions about future. The methods and assumptions used for this analysis should be carefully considered when using estimates from this report (see Method and Assumptions).



Findings

Estimates of future liability and a discussion of drivers of future liabilities are presented below.

Estimated future liability

The estimated average total liability per client for the 355,000 clients on benefit at the end of June 2009 ranges from \$125,000 under a low unemployment rate scenario to \$160,000 under a high unemployment rate scenario. On the same basis, the estimated total liability is between \$44 billion and \$57 billion.

The estimated average liability per client over the next 10 years for the 355,000 clients on benefit at the end of June 2009 is estimated to be between \$78,000 under a low unemployment rate scenario and \$90,000 under a high unemployment rate scenario. On the same basis, the total liability over the next 10 years is estimated to be between \$28 billion and \$32 billion.

Estimated future liability figures are given in Table 1 and Table 2 for clients on benefit at the end of June 2009. We provide estimates for three scenarios of employment growth represented by low, medium or high unemployment rates (referred to as Scenario A, B and C respectively). Estimated unemployment rates are taken from The Treasury's Half Year Economic and Fiscal Update (HYEFU) 2009. The tables present liabilities on a per client basis (average liability) as well as for all clients in that group (total liability). Table 1 details the estimated total liability for clients, while Table 2 details the estimated liability over the next 10 years.

The main results in this paper are based on June 2009 payment rates. It may be desirable to treat payments or savings in the distant future as having less value than those in the near future. Appendix 1 provides some discounted estimates.

Table 1: Total future liability estimates (real 2009 dollars) by benefit group and unemployment rate scenario

	Average liability (\$)			Future liability (\$bn)		
	A	B	C	A	B	C
Benefit group						
Invalid's Benefit	\$179,000	\$192,000	\$205,000	\$15.6	\$16.7	\$17.8
Sickness Benefit	\$127,000	\$140,000	\$154,000	\$7.3	\$8.1	\$8.9
Unemployment Benefit	\$47,000	\$65,000	\$89,000	\$2.6	\$3.6	\$5.0
Domestic Purposes Benefit	\$144,000	\$161,000	\$181,000	\$15.3	\$17.1	\$19.3
Other benefits	\$69,000	\$87,000	\$110,000	\$1.3	\$1.6	\$2.0
Partners included on a benefit	\$79,000	\$100,000	\$123,000	\$2.3	\$3.0	\$3.7
Age group						
16–24	\$129,000	\$156,000	\$189,000	\$8.8	\$10.6	\$12.9
25–34	\$160,000	\$182,000	\$206,000	\$11.7	\$13.3	\$15.1
35–44	\$148,000	\$163,000	\$180,000	\$11.6	\$12.8	\$14.1
45–54	\$120,000	\$129,000	\$137,000	\$8.3	\$8.9	\$9.4
55–64	\$61,000	\$69,000	\$77,000	\$4.1	\$4.6	\$5.1
Previous benefit duration						
Short (less than one of the past three years on benefit)	\$66,000	\$82,000	\$104,000	\$6.0	\$7.5	\$9.5
Medium (between one and two of the past three years on benefit)	\$106,000	\$125,000	\$147,000	\$5.5	\$6.5	\$7.7
Long (between two and three of the past three years on benefit)	\$138,000	\$157,000	\$178,000	\$8.7	\$9.9	\$11.3
Very long (all of the past three years on benefit)	\$164,000	\$177,000	\$190,000	\$24.2	\$26.1	\$28.1
Total	\$125,000	\$141,000	\$160,000	\$44.4	\$50.1	\$56.6

Scenario A = unemployment rates as for Scenario B, less 1.5 ppt.

Scenario B = unemployment rates forecast by Treasury to June 2013, remaining constant at 5.2 percent thereafter.

Scenario C = unemployment rates as for Scenario B, plus 1.5 ppt.

Those on Invalid's and Domestic Purposes benefits have the highest individual liability and make up the largest proportion of total future liabilities

The combination of longer expected benefit durations and higher benefit payment rates means that those clients on Invalid's and Domestic Purposes benefits have the highest individual future liabilities of any benefit group. Further, as these groups represent a large proportion of clients at the end of June 2009, estimates for these groups make up the largest proportion of the total future liability.

Comparing liability over the next 10 years

Table 2 shows future liability estimates for the next 10 years. This enables more consistent comparisons between benefits, age groups and previous benefit durations, by removing the effect of very long durations for some benefit types and age groups.

Table 2: Future liability estimates (real 2009 dollars) over the next 10 years by benefit group and unemployment rate scenario

	Average liability (\$)			Future liability (\$bn)		
	A	B	C	A	B	C
Benefit group						
Invalid's Benefit	\$102,000	\$107,000	\$112,000	\$8.9	\$9.3	\$9.7
Sickness Benefit	\$74,000	\$78,000	\$83,000	\$4.3	\$4.5	\$4.8
Unemployment Benefit	\$33,000	\$41,000	\$49,000	\$1.8	\$2.3	\$2.7
Domestic Purposes Benefit	\$94,000	\$100,000	\$106,000	\$10.0	\$10.6	\$11.3
Other benefits	\$49,000	\$56,000	\$63,000	\$0.9	\$1.0	\$1.2
Partners included on a benefit	\$54,000	\$63,000	\$72,000	\$1.6	\$1.9	\$2.1
Age group						
16–24	\$64,000	\$70,000	\$76,000	\$4.3	\$4.7	\$5.2
25–34	\$81,000	\$87,000	\$93,000	\$5.9	\$6.3	\$6.8
35–44	\$87,000	\$93,000	\$99,000	\$6.8	\$7.3	\$7.7
45–54	\$92,000	\$97,000	\$102,000	\$6.4	\$6.7	\$7.0
55–64	\$61,000	\$69,000	\$77,000	\$4.1	\$4.6	\$5.1
Previous benefit duration						
Short (less than one of the past three years on benefit)	\$43,000	\$50,000	\$57,000	\$4.0	\$4.5	\$5.2
Medium (between one and two of the past three years on benefit)	\$66,000	\$73,000	\$80,000	\$3.5	\$3.8	\$4.2
Long (between two and three of the past three years on benefit)	\$84,000	\$90,000	\$97,000	\$5.3	\$5.7	\$6.1
Very long (all of the past three years on benefit)	\$100,000	\$105,000	\$110,000	\$14.8	\$15.5	\$16.3
Total	\$78,000	\$83,000	\$90,000	\$27.5	\$29.6	\$31.8

Scenario A = unemployment rates as for Scenario B, less 1.5 ppt.

Scenario B = unemployment rates forecast by The Treasury to June 2013, remaining constant at 5.2 percent thereafter.

Scenario C = unemployment rates as for Scenario B, plus 1.5 ppt.

Drivers of future liability

The main drivers of future liability are the expected time on benefit and rate of benefit payments

The estimates of future liability among different client groups are mainly driven by the expected time each group remains on benefit (see Table 3). The other main determining factor is the rate of benefit payments (Figure 2).

While Sickness Benefit recipients are expected to be on benefit for a longer period than Domestic Purposes Benefit recipients, their future liability costs are lower. These lower liability costs occur even though many Sickness Benefit recipients move onto the higher payment rate of Invalid's Benefit over time³.

It is estimated that the approximately 355,000 people under the age of 65 in receipt of benefit at the end of June 2009 will spend an average of between 8 and 11 years on benefit (not necessarily on a continuous basis) before reaching age 65, depending on future economic conditions. The separate effects of benefit type, age and benefit duration are presented in Table 3.

³ The move from Sickness Benefit to Invalid's Benefit is taken into account in our analysis if it happens within four years from the time the cohort is selected.

Table 3: Future benefit duration (in years) for three unemployment rate scenarios

	Number on benefit at end June 2009	Scenario A	Scenario B	Scenario C
Benefit group				
Invalid's Benefit	86,684	12.3	13.7	15.1
Sickness Benefit	57,694	10.0	11.0	12.1
Unemployment Benefit	55,764	5.3	7.0	9.0
Domestic Purposes Benefit	106,202	7.5	8.4	9.4
Other benefits	18,598	6.2	7.5	9.0
Partners included on a benefit	29,721	7.9	10.1	12.4
Age group				
16–24	68,145	10.7	13.2	16.2
25–34	72,986	9.9	11.6	13.7
35–44	78,318	8.5	9.8	11.3
45–54	68,900	7.4	8.2	8.9
55–64	66,314	4.6	5.2	5.9
Previous benefit duration				
Short (less than one of the past three years on benefit)	91,452	5.7	6.8	8.2
Medium (between one and two of the past three years on benefit)	52,263	7.1	8.5	10.0
Long (between two and three of the past three years on benefit)	63,284	9.0	10.6	12.3
Very long (all of the past three years on benefit)	147,664	11.1	12.6	14.2
Total	354,663	8.2	9.6	11.2

Scenario A = unemployment rates as for Scenario B, less 1.5 ppt.

Scenario B unemployment rates forecast by The Treasury to June 2013, remaining constant at 5.2 percent thereafter.

Scenario C = unemployment rates as for scenario B, plus 1.5 ppt.

Clients in receipt of an Invalid's Benefit have the longest predicted future duration (between 12 and 15 years), while Unemployment Benefit clients have the shortest (5 to 9 years).

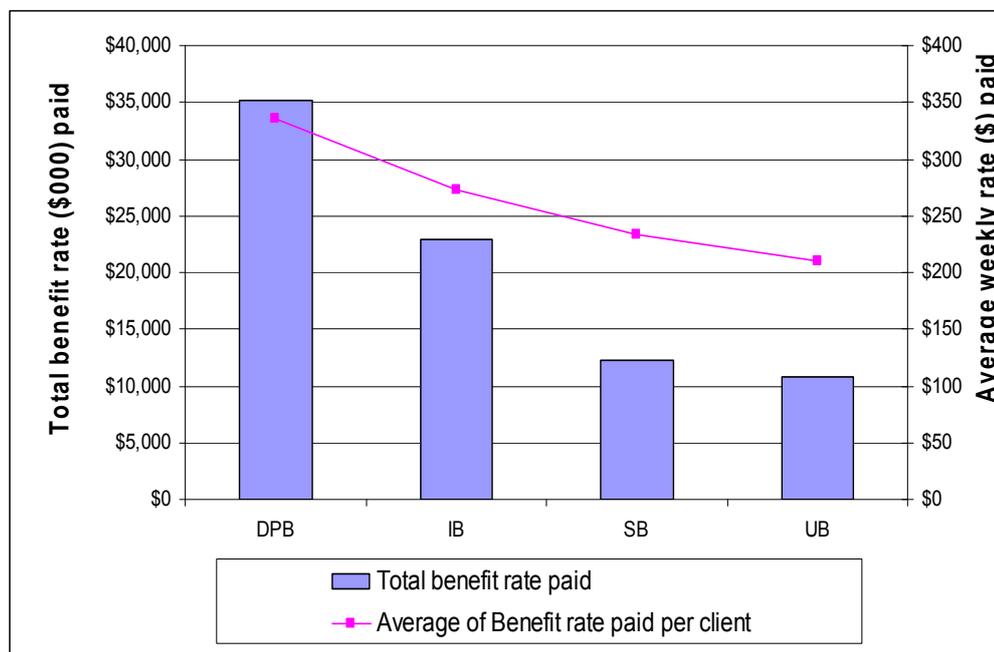
Young clients (under 25 years) have the longest future duration (11 to 16 years) while clients aged 55 to 64 have the shortest (5 to 6 years)⁴.

Clients who had been on benefit for only a short duration before June 2009 (less than one of the last three years on benefit) have shorter estimated future benefit durations, while clients who had been on benefit for very long periods (all of the last three years) have the longest.

⁴ These clients have at most 10 years until they reach age 65.

While a change from using Scenario A to Scenario C results in a 70 percent increase in estimated future duration for Unemployment Benefit clients, it results in only a 23 percent increase for Invalid's Benefit clients.

Figure 2: Total benefits paid for one week at end of June 2009¹ and average weekly rate per client paid at end of June 2009 by benefit group



Benefit rates include both benefit payments and supplementary assistance received, but do not include family tax credit payments. DPB clients tend to receive greater amounts of supplementary assistance than other clients, and hence have higher average benefit rates.

The forecast unemployment rate is a driver of future liability for clients receiving an Unemployment Benefit

Of the four major benefit groups (Unemployment Benefit, Sickness Benefit, Domestic Purposes Benefit and Invalid's Benefit) the unemployment rate has the greatest impact on people receiving Unemployment Benefit followed by those on a Domestic Purposes Benefit. Under the high unemployment rate scenario (C) the average future liability for Unemployment Benefit clients is 89 percent higher than the liability under the low scenario (A). This compares to an overall 27 percent increase in liability between scenarios A and C across all clients. In general, overall future years when the unemployment rate increases by one percentage point (eg from 6 to 7 percent), the average benefit duration per client will increase by around one year.

Future liability estimates differ by benefit type

The highest rates of benefit are paid to people in the 25–34 year old age group. Those with medium, long or very long previous benefit duration have higher rates than clients who have been on benefit for a short time. These results are probably both largely a function of the predominance of clients with children (particularly Domestic Purposes Benefit clients) and Invalid's Benefit clients among these age and previous benefit duration groups.

The greatest future liability is estimated for young Invalid's Benefit clients who have already been on benefit for some time. Clients aged 16–24 and clients aged 25–34 with very long previous durations on benefit have an estimated average future liability under Scenario A of \$374,000 and \$381,000 respectively (\$441,000 and \$417,000 under Scenario C).

Apart from Invalid's Benefit clients, the only group with more than \$300,000 of expected future liability is young partners included on a benefit. Partners under the age of 25 with long or very long previous benefit duration have an expected future liability of \$324,000 and \$367,000 respectively under Scenario C.

The estimated future duration and liability for partners is influenced to a large extent by the change in unemployment rates. Under Scenario A, long previous duration clients aged 16–24 have expected liabilities of \$202,000 and under Scenario C, it increases to \$324,000.

Age structures have implications for future benefit duration

Young (25–34 years old) Sickness Benefit clients with very long previous benefit durations have an estimated liability of \$289,000 under Scenario C.

More than a third (35 percent) of Invalid's Benefit clients are over the age of 55, while less than a tenth (9.8 percent) of Unemployment Benefit clients are in this age group. Unemployment Benefit and Invalid's Benefit clients over the age of 55 have 5.1 and 5.0 years estimated future benefit duration respectively.

Under Scenario B, young (under 25 years) Invalid's Benefit clients have an estimated future benefit duration of 19.5 years, while Unemployment Benefit clients of the same age have 8.5 years estimated duration.

Unemployment rates have a particularly strong impact on young Unemployment Benefit clients with short previous benefit duration. Unemployment Benefit clients aged under 25 years and aged between 35 and 44 years have an estimated future duration of 5.9 and 5.4 years respectively under Scenario A. However the younger group has a higher estimated future duration under the higher unemployment rate scenario (12 years, compared to 9 years for the older group).

Invalid's Benefit clients under the age of 25 with very long previous benefit durations have the longest estimated future benefit duration of any group of clients at 31 years under Scenario C, while those aged 25–34 have a estimated duration of 28.6 years. The only non-Invalid's Benefit clients with 20 years or more estimated future duration are young (25–34) Sickness Benefit clients with very long previous durations, and young (under 34) partners on benefit.

More detailed estimates of future duration, broken down by combinations of benefit type, age group and previous benefit duration are given in Appendix 2.



Method and assumptions

Method

The method used to estimate future liability includes:

- constructing data and models to define the relationship between future benefit receipt, time, benefit type, economic change, previous benefit duration and age group
- projecting benefit duration estimates into the future (up to the age of eligibility for New Zealand Superannuation)
- assigning costs to future years on benefit based on current payments of main benefits and supplementary assistance by benefit type, previous benefit duration and age group.

Key assumptions

Several assumptions have an impact on the estimates we have derived. The potential impacts of the main assumptions are expanded on below.

Assumption 1: The relationship between economic conditions (as described by the unemployment rate) and time on benefit observed from July 1996 to June 2009, will continue to hold for future years

Duration on benefit is strongly influenced by economic conditions, and economic conditions were generally favourable over much of the period from June 1996 to June 2007 (particularly from 1999 onwards). These estimates are based on pre-recession duration figures, so could prove an underestimation of future liability, particularly for unemployment benefits.

Assumption 2: Real average weekly payments of benefits and supplements will remain constant at June 2009 levels

Under current policy, all core benefits' maximum rates and some supplementary assistance maximum rates are indexed to the Consumer Price Index. It therefore seems reasonable to assume that real benefit rates will remain close to current levels.

Assumption 3: Policy and service delivery changes will not have a large effect on the model

The model does not include any variables to control for policy or service delivery changes. It is expected that policy and service delivery approaches of the past will influence future liability estimates.

Where significant changes have occurred (such as the reduction of Sickness Benefit payment rates to align with other benefits) they may have resulted in the model fit being compromised to some degree. It is not expected that this will have had a large impact on the estimation.

We may be underestimating liability for the current cohort of 55–64 year olds, although the effect is unlikely to be large. In the late 1990s, the increase in the age of eligibility for New Zealand Superannuation from 60 to 65 was still being phased in, and this means that cohorts are likely to have spent more time on benefit in later cohort years.

Assumption 4: The cohort in each age band is evenly distributed across the band

In certain age bands and for certain benefits clients are not evenly distributed in terms of their age across the age band. The effect of this difference is expected to be minor.

Assumption 5: The proportion of time on different benefits over the observed four year period will continue in future years

Sickness Benefit clients who are still on Sickness Benefit four years from cohort selection are assumed to stay on Sickness Benefit into the future. Some of these clients may move to an Invalid's Benefit, and Sickness Benefit future liability may be underestimated to a small degree as a result.

Appendix 1: Discounted results

When considering the costs and benefits of making an investment, it may be desirable to treat payments or savings in the distant future as having less value than those in the near future. Tables A1.1 and A1.2 estimate future liability with eight percent and six percent discount rates.

Discounting has a differential effect on future liability, depending on each group's expected benefit duration. The longer the expected duration on benefit, the greater the difference between nominal (Table 1) and discounted (Tables A1.1 and A1.2) future liability. The difference between nominal and discounted liability is greater under an economic forecast with high unemployment rates (Scenario C) than one with low unemployment rates (Scenario A).

Table A1.1 Total future liability estimates (discounted eight percent) by benefit group and unemployment scenario

	Average liability (\$)			Future liability (\$bn)		
	A	B	C	A	B	C
Benefit group						
Invalid's Benefit	\$98,000	\$103,000	\$108,000	\$8.5	\$8.9	\$9.3
Sickness Benefit	\$70,000	\$75,000	\$81,000	\$4.1	\$4.3	\$4.7
Unemployment Benefit	\$31,000	\$38,000	\$48,000	\$1.7	\$2.1	\$2.7
Domestic Purposes Benefit	\$87,000	\$94,000	\$102,000	\$9.3	\$10.0	\$10.8
Other benefits	\$44,000	\$51,000	\$60,000	\$0.8	\$1.0	\$1.1
Partners included on a benefit	\$49,000	\$58,000	\$68,000	\$1.5	\$1.7	\$2.0
Age group						
16–24	\$64,000	\$73,000	\$82,000	\$4.4	\$4.9	\$5.6
25–34	\$82,000	\$90,000	\$98,000	\$6.0	\$6.5	\$7.2
35–44	\$85,000	\$92,000	\$99,000	\$6.7	\$7.2	\$7.8
45–54	\$80,000	\$85,000	\$90,000	\$5.5	\$5.8	\$6.2
55–64	\$49,000	\$54,000	\$59,000	\$3.3	\$3.6	\$3.9
Previous benefit duration						
Short (less than one of the past three years on benefit)	\$40,000	\$47,000	\$55,000	\$3.7	\$4.3	\$5.1
Medium (between one and two of the past three years on benefit)	\$62,000	\$70,000	\$78,000	\$3.3	\$3.6	\$4.1
Long (between two and three of the past three years on benefit)	\$79,000	\$87,000	\$94,000	\$5.0	\$5.5	\$6.0
Very long (all of the past three years on benefit)	\$94,000	\$99,000	\$105,000	\$13.9	\$14.7	\$15.5
Total	\$73,000	\$79,000	\$86,000	\$25.8	\$28.1	\$30.6

Scenario A = unemployment rates as for Scenario B, less 1.5 ppt.

Scenario B = unemployment rates forecast by The Treasury to June 2013, remaining constant at 5.2 percent thereafter.

Scenario C = unemployment rates as for Scenario B, plus 1.5 ppt.

Table A1.2 Total future liability estimates (discounted six percent) by benefit group and unemployment scenario

	Average liability (\$)			Future liability (\$bn)		
	A	B	C	A	B	C
Benefit group						
Invalid's Benefit	\$110,000	\$116,000	\$122,000	\$9.6	\$10.1	\$10.6
Sickness Benefit	\$79,000	\$85,000	\$91,000	\$4.5	\$4.9	\$5.3
Unemployment Benefit	\$33,000	\$42,000	\$54,000	\$1.8	\$2.4	\$3.0
Domestic Purposes Benefit	\$96,000	\$105,000	\$114,000	\$10.2	\$11.1	\$12.1
Other benefits	\$48,000	\$56,000	\$67,000	\$0.9	\$1.1	\$1.2
Partners included on a benefit	\$54,000	\$65,000	\$76,000	\$1.6	\$1.9	\$2.3
Age group						
16–24	\$73,000	\$83,000	\$95,000	\$5.0	\$5.7	\$6.5
25–34	\$93,000	\$102,000	\$113,000	\$6.8	\$7.5	\$8.2
35–44	\$95,000	\$103,000	\$112,000	\$7.5	\$8.1	\$8.8
45–54	\$88,000	\$93,000	\$98,000	\$6.0	\$6.4	\$6.8
55–64	\$52,000	\$57,000	\$63,000	\$3.4	\$3.8	\$4.2
Previous benefit duration						
Short (less than one of the past three years on benefit)	\$44,000	\$52,000	\$62,000	\$4.0	\$4.8	\$5.7
Medium (between one and two of the past three years on benefit)	\$69,000	\$78,000	\$88,000	\$3.6	\$4.1	\$4.6
Long (between two and three of the past three years on benefit)	\$88,000	\$97,000	\$107,000	\$5.6	\$6.2	\$6.8
Very long (all of the past three years on benefit)	\$105,000	\$111,000	\$118,000	\$15.5	\$16.4	\$17.4
Total	\$81,000	\$89,000	\$97,000	\$28.7	\$31.4	\$34.4

Scenario A = unemployment rates as for Scenario B, less 1.5 ppt.

Scenario B = unemployment rates forecast by The Treasury to June 2013, remaining constant at 5.2 percent thereafter.

Scenario C = unemployment rates as for Scenario B, plus 1.5 ppt.

Appendix 2: Detailed results

Table A2.1: Future duration estimates by benefit type, age group and previous benefit duration

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
Invalid's Benefit	16–24	All	7,498	16.3	19.5	23.3
Invalid's Benefit	25–34	All	9,567	17.4	19.0	20.5
Invalid's Benefit	35–44	All	16,439	13.6	14.7	15.7
Invalid's Benefit	45–54	All	23,033	9.6	10.1	10.6
Invalid's Benefit	55–64	All	30,147	4.5	5.0	5.7
Sickness Benefit	16–24	All	10,049	12.2	13.9	15.8
Sickness Benefit	25–34	All	10,713	12.8	14.2	15.7
Sickness Benefit	35–44	All	12,210	11.0	12.0	13.1
Sickness Benefit	45–54	All	13,429	8.7	9.2	9.8
Sickness Benefit	55–64	All	11,293	5.4	5.8	6.2
Unemployment Benefit	16–24	All	19,109	5.9	8.5	11.7
Unemployment Benefit	25–34	All	13,102	5.6	7.8	10.5
Unemployment Benefit	35–44	All	9,857	5.4	7.1	9.1
Unemployment Benefit	45–54	All	8,215	5.5	6.6	7.7
Unemployment Benefit	55–64	All	5,481	4.2	5.1	6.0
Domestic Purposes Benefit	16–24	All	21,462	10.5	12.0	13.8
Domestic Purposes Benefit	25–34	All	33,017	8.6	9.9	11.3
Domestic Purposes Benefit	35–44	All	31,476	7.0	7.9	9.0
Domestic Purposes Benefit	45–54	All	14,781	6.3	6.8	7.5
Domestic Purposes Benefit	55–64	All	5,466	4.9	5.3	5.7
Other benefits	16–24	All	7,205	7.2	9.6	12.8
Other benefits	25–34	All	1,878	6.4	7.9	9.7
Other benefits	35–44	All	1,859	6.2	7.3	8.8
Other benefits	45–54	All	2,484	6.9	7.6	8.4
Other benefits	55–64	All	5,172	4.5	5.0	5.5
Partners included on a benefit	16–24	All	2,822	12.1	15.8	19.8
Partners included on a benefit	25–34	All	4,709	8.2	11.0	14.2
Partners included on a benefit	35–44	All	6,477	7.7	9.8	12.0
Partners included on a benefit	45–54	All	6,958	7.4	8.6	9.7
Partners included on a benefit	55–64	All	8,755	4.3	5.2	6.3

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
Invalid's Benefit	All	Short	3,613	9.9	11.2	12.6
Invalid's Benefit	All	Medium	5,323	10.3	11.8	13.5
Invalid's Benefit	All	Long	10,911	11.0	12.7	14.6
Invalid's Benefit	All	Very long	66,837	17.8	18.9	19.9
Sickness Benefit	All	Short	17,807	6.3	7.2	8.4
Sickness Benefit	All	Medium	11,897	8.9	9.9	11.1
Sickness Benefit	All	Long	13,759	11.7	12.7	13.8
Sickness Benefit	All	Very long	14,231	13.3	14.2	15.2
Unemployment Benefit	All	Short	36,147	3.0	4.1	5.5
Unemployment Benefit	All	Medium	9,652	4.5	6.0	7.9
Unemployment Benefit	All	Long	6,632	6.5	8.4	10.6
Unemployment Benefit	All	Very long	3,333	7.3	9.6	12.0
Domestic Purposes Benefit	All	Short	16,110	6.1	6.9	7.9
Domestic Purposes Benefit	All	Medium	17,382	6.9	7.8	8.8
Domestic Purposes Benefit	All	Long	23,226	8.3	9.2	10.3
Domestic Purposes Benefit	All	Very long	49,484	8.7	9.6	10.7
Other benefits	All	Short	7,707	8.3	5.5	6.8
Other benefits	All	Medium	3,605	5.3	6.6	8.2
Other benefits	All	Long	2,826	6.9	8.5	10.3
Other benefits	All	Very long	4,460	8.2	9.5	10.9
Partners included on a benefit	All	Short	10,068	4.4	5.9	7.8
Partners included on a benefit	All	Medium	4,404	6.8	8.7	10.8
Partners included on a benefit	All	Long	5,930	9.4	11.9	14.3
Partners included on a benefit	All	Very long	9,319	11.1	13.9	16.6
All	0–25	Short	32,360	7.8	9.9	12.5
All	0–25	Medium	14,682	9.0	11.4	14.4
All	0–25	Long	11,542	11.0	13.8	17.2
All	0–25	Very long	9,561	15.0	17.7	20.6
All	25–34	Short	18,541	5.8	7.1	8.7
All	25–34	Medium	12,278	8.1	9.8	11.8
All	25–34	Long	15,788	11.1	13.2	15.6
All	25–34	Very long	26,379	14.4	16.4	18.6
All	35–44	Short	16,456	5.4	6.4	7.6
All	35–44	Medium	10,675	7.2	8.5	10.0
All	35–44	Long	14,895	9.6	11.1	12.7
All	35–44	Very long	36,292	11.8	13.2	14.7

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
All	45–54	Short	13,318	5.3	6.0	6.8
All	45–54	Medium	7,958	6.7	7.5	8.3
All	45–54	Long	11,190	8.2	9.0	9.8
All	45–54	Very long	36,434	9.4	10.1	10.9
All	55–64	Short	10,777	4.1	4.7	5.3
All	55–64	Medium	6,670	4.5	5.1	5.8
All	55–64	Long	9,869	4.9	5.6	6.3
All	55–64	Very long	38,998	4.9	5.5	6.2

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.2: Benefit rate paid at end of June 2009 by benefit type and age group

Benefit group	Age group	Number of clients at the end of June 2009	Average benefit rate paid per client	Total benefits paid
DPB	16–24	19362	\$325.14	\$6,295,360.68
DPB	25–34	32961	\$346.69	\$11,427,249.09
DPB	35–44	31607	\$346.26	\$10,944,239.82
DPB	45–54	15524	\$328.70	\$5,102,738.80
DPB	55–64	5556	\$266.66	\$1,481,562.96
EB	16–24	457	\$206.86	\$94,535.02
EB	25–34	618	\$248.54	\$153,597.72
EB	35–44	518	\$255.47	\$132,333.46
EB	45–54	446	\$246.74	\$110,046.04
EB	55–64	596	\$244.19	\$145,537.24
IB	16–24	6965	\$255.20	\$1,777,468.00
IB	25–34	9237	\$278.87	\$2,575,922.19
IB	35–44	15775	\$288.07	\$4,544,304.25
IB	45–54	22568	\$281.05	\$6,342,736.40
IB	55–64	29429	\$262.80	\$7,733,941.20
JSA I	16–24	1693	\$183.46	\$310,597.78
P_IB	16–24	217	\$229.48	\$49,797.16
P_IB	25–34	713	\$236.70	\$168,767.10
P_IB	35–44	1828	\$228.04	\$416,857.12
P_IB	45–54	3041	\$220.88	\$671,696.08
P_IB	55–64	4688	\$213.65	\$1,001,591.20
P_OTH	16–24	255	\$179.71	\$45,826.05
P_OTH	25–34	332	\$190.61	\$63,282.52
P_OTH	35–44	308	\$189.45	\$58,350.60
P_OTH	45–54	235	\$196.12	\$46,088.20
P_OTH	55–64	646	\$197.70	\$127,714.20
P_SB	16–24	574	\$194.02	\$111,367.48
P_SB	25–34	1282	\$200.60	\$257,169.20
P_SB	35–44	1794	\$195.16	\$350,117.04
P_SB	45–54	1879	\$185.65	\$348,836.35
P_SB	55–64	2092	\$177.01	\$370,304.92
P_UB	16–24	1330	\$182.35	\$242,525.50
P_UB	25–34	2061	\$192.75	\$397,257.75
P_UB	35–44	2094	\$193.53	\$405,251.82
P_UB	45–54	1402	\$182.41	\$255,738.82
P_UB	55–64	993	\$167.74	\$166,565.82

Benefit group	Age group	Number of clients at the end of June 2009	Average benefit rate paid per client	Total benefits paid
SB	16–24	8244	\$198.29	\$1,634,702.76
SB	25–34	9647	\$242.16	\$2,336,117.52
SB	35–44	11002	\$249.02	\$2,739,718.04
SB	45–54	12606	\$242.43	\$3,056,072.58
SB	55–64	10886	\$223.79	\$2,436,177.94
UB	16–24	16116	\$180.19	\$2,903,942.04
UB	25–34	12445	\$225.71	\$2,808,960.95
UB	35–44	9248	\$229.64	\$2,123,710.72
UB	45–54	7953	\$226.11	\$1,798,252.83
UB	55–64	5266	\$211.49	\$1,113,706.34
UBT	16–24	4079	\$172.94	\$705,422.26
UBT	25–34	1081	\$216.42	\$233,950.02
UBT	35–44	860	\$222.65	\$191,479.00
UBT	45–54	715	\$226.23	\$161,754.45
UBT	55–64	368	\$217.02	\$79,863.36
UHS	16–24	99	\$182.04	\$18,021.96
UHS	25–34	45	\$215.46	\$9,695.70
UHS	35–44	27	\$217.94	\$5,884.38
UHS	45–54	27	\$228.53	\$6,170.31
UHS	55–64	23	\$213.23	\$4,904.29
WB	16–24	4	\$333.20	\$1,332.80
WB	25–34	94	\$336.89	\$31,667.66
WB	35–44	343	\$312.88	\$107,317.84
WB	45–54	1178	\$266.42	\$313,842.76
WB	55–64	3831	\$223.51	\$856,266.81

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.3: Forecast unemployment rate to June 2013 (Treasury HYEFU 2009)

Quarter	Scenario A unemployment rate low	Unemployment rate low yearly change	Scenario B unemployment rate mid	Unemployment rate mid yearly change	Scenario C unemployment rate high	Unemployment rate high yearly change
Sep-09	6.5	2.2	6.5	2.2	6.5	2.2
Dec-09	7.3	2.6	7.3	2.6	7.3	2.6
Mar-10	5.5	0.5	7.0	2.0	8.5	3.5
Jun-10	5.5	-0.5	7.0	1.0	8.5	2.5
Sep-10	5.5	-1.0	7.0	0.5	8.5	2.0
Dec-10	5.5	-1.8	7.0	-0.3	8.5	1.2
Mar-11	5.4	-0.2	6.9	-0.2	8.4	-0.2
Jun-11	5.3	-0.3	6.8	-0.3	8.3	-0.3
Sep-11	5.0	-0.4	6.5	-0.4	8.0	-0.4
Dec-11	4.8	-0.7	6.3	-0.7	7.8	-0.7
Mar-12	4.5	-0.9	6.0	-0.9	7.5	-0.9
Jun-12	4.3	-0.9	5.8	-0.9	7.3	-0.9
Sep-12	4.1	-0.9	5.6	-0.9	7.1	-0.9
Dec-12	3.9	-0.9	5.4	-0.9	6.9	-0.9
Mar-13	3.8	-0.7	5.3	-0.7	6.8	-0.7
Jun-13	3.7	-0.7	5.2	-0.7	6.7	-0.7

Table A2.4: Average future liability estimates by benefit type, age group and previous benefit duration (without discounting)

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Invalid's Benefit	16–24	All	\$269,000	\$311,000	\$359,000
Invalid's Benefit	25–34	All	\$351,000	\$372,000	\$391,000
Invalid's Benefit	35–44	All	\$268,000	\$281,000	\$292,000
Invalid's Benefit	45–54	All	\$164,000	\$171,000	\$177,000
Invalid's Benefit	55–64	All	\$66,000	\$74,000	\$82,000
Sickness Benefit	16–24	All	\$139,000	\$162,000	\$189,000
Sickness Benefit	25–34	All	\$165,000	\$184,000	\$206,000
Sickness Benefit	35–44	All	\$150,000	\$163,000	\$178,000
Sickness Benefit	45–54	All	\$116,000	\$123,000	\$130,000
Sickness Benefit	55–64	All	\$68,000	\$72,000	\$77,000
Unemployment Benefit	16–24	All	\$39,000	\$61,000	\$91,000
Unemployment Benefit	25–34	All	\$49,000	\$70,000	\$98,000
Unemployment Benefit	35–44	All	\$53,000	\$71,000	\$93,000
Unemployment Benefit	45–54	All	\$56,000	\$68,000	\$82,000
Unemployment Benefit	55–64	All	\$45,000	\$55,000	\$66,000
Domestic Purposes Benefit	16–24	All	\$178,000	\$203,000	\$232,000
Domestic Purposes Benefit	25–34	All	\$163,000	\$184,000	\$208,000
Domestic Purposes Benefit	35–44	All	\$130,000	\$145,000	\$162,000
Domestic Purposes Benefit	45–54	All	\$110,000	\$119,000	\$128,000
Domestic Purposes Benefit	55–64	All	\$70,000	\$75,000	\$80,000
Other benefits	16–24	All	\$66,000	\$95,000	\$137,000
Other benefits	25–34	All	\$76,000	\$94,000	\$118,000
Other benefits	35–44	All	\$82,000	\$97,000	\$115,000
Other benefits	45–54	All	\$96,000	\$105,000	\$115,000
Other benefits	55–64	All	\$54,000	\$60,000	\$66,000
Partners included on a benefit	16–24	All	\$124,000	\$169,000	\$220,000
Partners included on a benefit	25–34	All	\$90,000	\$123,000	\$161,000
Partners included on a benefit	35–44	All	\$89,000	\$114,000	\$139,000
Partners included on a benefit	45–54	All	\$86,000	\$100,000	\$112,000
Partners included on a benefit	55–64	All	\$45,000	\$56,000	\$68,000
Invalid's Benefit	All	Short	\$129,000	\$149,000	\$171,000
Invalid's Benefit	All	Medium	\$126,000	\$147,000	\$171,000
Invalid's Benefit	All	Long	\$140,000	\$160,000	\$182,000
Invalid's Benefit	All	Very long	\$193,000	\$203,000	\$213,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Sickness Benefit	All	Short	\$86,000	\$100,000	\$117,000
Sickness Benefit	All	Medium	\$122,000	\$136,000	\$153,000
Sickness Benefit	All	Long	\$156,000	\$169,000	\$184,000
Sickness Benefit	All	Very long	\$154,000	\$163,000	\$172,000
Unemployment Benefit	All	Short	\$34,000	\$50,000	\$72,000
Unemployment Benefit	All	Medium	\$57,000	\$78,000	\$106,000
Unemployment Benefit	All	Long	\$84,000	\$110,000	\$140,000
Unemployment Benefit	All	Very long	\$82,000	\$104,000	\$127,000
Domestic Purposes Benefit	All	Short	\$112,000	\$129,000	\$149,000
Domestic Purposes Benefit	All	Medium	\$131,000	\$149,000	\$171,000
Domestic Purposes Benefit	All	Long	\$155,000	\$174,000	\$196,000
Domestic Purposes Benefit	All	Very long	\$154,000	\$170,000	\$189,000
Other benefits	All	Short	\$59,000	\$80,000	\$111,000
Other benefits	All	Medium	\$67,000	\$88,000	\$115,000
Other benefits	All	Long	\$84,000	\$102,000	\$123,000
Other benefits	All	Very long	\$78,000	\$87,000	\$97,000
Partners included on a benefit	All	Short	\$52,000	\$70,000	\$93,000
Partners included on a benefit	All	Medium	\$78,000	\$100,000	\$126,000
Partners included on a benefit	All	Long	\$106,000	\$133,000	\$161,000
Partners included on a benefit	All	Very long	\$91,000	\$111,000	\$130,000
All	0–25	Short	\$75,000	\$98,000	\$129,000
All	0–25	Medium	\$131,000	\$161,000	\$197,000
All	0–25	Long	\$174,000	\$206,000	\$245,000
All	0–25	Very long	\$256,000	\$285,000	\$316,000
All	25–34	Short	\$64,000	\$82,000	\$105,000
All	25–34	Medium	\$114,000	\$135,000	\$161,000
All	25–34	Long	\$169,000	\$194,000	\$222,000
All	25–34	Very long	\$245,000	\$266,000	\$290,000
All	35–44	Short	\$64,000	\$78,000	\$96,000
All	35–44	Medium	\$103,000	\$119,000	\$137,000
All	35–44	Long	\$142,000	\$160,000	\$180,000
All	35–44	Very long	\$201,000	\$216,000	\$231,000
All	45–54	Short	\$62,000	\$72,000	\$83,000
All	45–54	Medium	\$91,000	\$101,000	\$111,000
All	45–54	Long	\$117,000	\$126,000	\$135,000
All	45–54	Very long	\$148,000	\$156,000	\$163,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
All	55–64	Short	\$49,000	\$56,000	\$63,000
All	55–64	Medium	\$57,000	\$65,000	\$72,000
All	55–64	Long	\$62,000	\$70,000	\$78,000
All	55–64	Very long	\$65,000	\$73,000	\$81,000

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.5: Average discounted future liability estimates by benefit type, age group and previous benefit duration (eight percent discount rate)

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Invalid's Benefit	16–24	All	\$113,000	\$123,000	\$133,000
Invalid's Benefit	25–34	All	\$144,000	\$149,000	\$154,000
Invalid's Benefit	35–44	All	\$135,000	\$140,000	\$144,000
Invalid's Benefit	45–54	All	\$106,000	\$109,000	\$112,000
Invalid's Benefit	55–64	All	\$53,000	\$59,000	\$64,000
Sickness Benefit	16–24	All	\$62,000	\$69,000	\$77,000
Sickness Benefit	25–34	All	\$76,000	\$83,000	\$90,000
Sickness Benefit	35–44	All	\$81,000	\$87,000	\$93,000
Sickness Benefit	45–54	All	\$76,000	\$80,000	\$84,000
Sickness Benefit	55–64	All	\$53,000	\$56,000	\$59,000
Unemployment Benefit	16–24	All	\$23,000	\$30,000	\$40,000
Unemployment Benefit	25–34	All	\$30,000	\$38,000	\$49,000
Unemployment Benefit	35–44	All	\$34,000	\$43,000	\$53,000
Unemployment Benefit	45–54	All	\$40,000	\$47,000	\$55,000
Unemployment Benefit	55–64	All	\$37,000	\$44,000	\$51,000
Domestic Purposes Benefit	16–24	All	\$96,000	\$104,000	\$112,000
Domestic Purposes Benefit	25–34	All	\$93,000	\$101,000	\$110,000
Domestic Purposes Benefit	35–44	All	\$85,000	\$91,000	\$99,000
Domestic Purposes Benefit	45–54	All	\$79,000	\$84,000	\$89,000
Domestic Purposes Benefit	55–64	All	\$56,000	\$59,000	\$63,000
Other benefits	16–24	All	\$35,000	\$44,000	\$56,000
Other benefits	25–34	All	\$45,000	\$52,000	\$61,000
Other benefits	35–44	All	\$53,000	\$60,000	\$68,000
Other benefits	45–54	All	\$66,000	\$71,000	\$77,000
Other benefits	55–64	All	\$44,000	\$48,000	\$52,000
Partners included on a benefit	16–24	All	\$56,000	\$68,000	\$81,000
Partners included on a benefit	25–34	All	\$49,000	\$60,000	\$72,000
Partners included on a benefit	35–44	All	\$54,000	\$64,000	\$74,000
Partners included on a benefit	45–54	All	\$58,000	\$66,000	\$72,000
Partners included on a benefit	55–64	All	\$37,000	\$45,000	\$52,000
Invalid's Benefit	All	Short	\$73,000	\$79,000	\$86,000
Invalid's Benefit	All	Medium	\$77,000	\$84,000	\$91,000
Invalid's Benefit	All	Long	\$85,000	\$93,000	\$100,000
Invalid's Benefit	All	Very long	\$103,000	\$108,000	\$112,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Sickness Benefit	All	Short	\$49,000	\$55,000	\$61,000
Sickness Benefit	All	Medium	\$66,000	\$71,000	\$78,000
Sickness Benefit	All	Long	\$83,000	\$88,000	\$93,000
Sickness Benefit	All	Very long	\$88,000	\$92,000	\$96,000
Unemployment Benefit	All	Short	\$23,000	\$30,000	\$39,000
Unemployment Benefit	All	Medium	\$35,000	\$44,000	\$55,000
Unemployment Benefit	All	Long	\$51,000	\$61,000	\$72,000
Unemployment Benefit	All	Very long	\$55,000	\$64,000	\$74,000
Domestic Purposes Benefit	All	Short	\$69,000	\$76,000	\$84,000
Domestic Purposes Benefit	All	Medium	\$79,000	\$86,000	\$94,000
Domestic Purposes Benefit	All	Long	\$90,000	\$97,000	\$105,000
Domestic Purposes Benefit	All	Very long	\$95,000	\$102,000	\$109,000
Other benefits	All	Short	\$35,000	\$43,000	\$53,000
Other benefits	All	Medium	\$42,000	\$50,000	\$59,000
Other benefits	All	Long	\$54,000	\$61,000	\$69,000
Other benefits	All	Very long	\$56,000	\$61,000	\$66,000
Partners included on a benefit	All	Short	\$33,000	\$41,000	\$50,000
Partners included on a benefit	All	Medium	\$47,000	\$56,000	\$66,000
Partners included on a benefit	All	Long	\$62,000	\$73,000	\$83,000
Partners included on a benefit	All	Very long	\$60,000	\$69,000	\$78,000
All	0–25	Short	\$40,000	\$47,000	\$57,000
All	0–25	Medium	\$68,000	\$77,000	\$87,000
All	0–25	Long	\$88,000	\$98,000	\$108,000
All	0–25	Very long	\$114,000	\$122,000	\$129,000
All	25–34	Short	\$38,000	\$46,000	\$55,000
All	25–34	Medium	\$63,000	\$71,000	\$81,000
All	25–34	Long	\$88,000	\$96,000	\$105,000
All	25–34	Very long	\$118,000	\$125,000	\$132,000
All	35–44	Short	\$42,000	\$49,000	\$57,000
All	35–44	Medium	\$64,000	\$71,000	\$79,000
All	35–44	Long	\$84,000	\$91,000	\$99,000
All	35–44	Very long	\$112,000	\$117,000	\$123,000
All	45–54	Short	\$44,000	\$50,000	\$56,000
All	45–54	Medium	\$63,000	\$68,000	\$74,000
All	45–54	Long	\$79,000	\$84,000	\$89,000
All	45–54	Very long	\$98,000	\$102,000	\$105,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
All	55–64	Short	\$39,000	\$44,000	\$49,000
All	55–64	Medium	\$46,000	\$51,000	\$56,000
All	55–64	Long	\$49,000	\$55,000	\$60,000
All	55–64	Very long	\$53,000	\$57,000	\$63,000

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.6: Detailed future duration estimates by benefit type, age group and previous benefit duration

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
Invalid's Benefit	16–24	Short	1,055	15.9	19.4	23.1
		Medium	1,310	12.8	16.5	20.9
		Long	1,559	10.0	13.4	18.1
		Very long	3,574	26.4	28.8	31.0
	25–34	Short	169	12.1	13.3	14.6
		Medium	394	14.3	15.9	17.6
		Long	1,413	17.1	19.2	21.3
		Very long	7,591	26.1	27.4	28.6
	35–44	Short	342	9.9	10.8	11.7
		Medium	664	11.5	12.7	13.8
		Long	2,033	13.5	14.9	16.3
		Very long	13,400	19.6	20.4	21.1
	45–54	Short	687	7.6	8.0	8.5
		Medium	1,109	8.7	9.3	9.8
		Long	2,510	10.0	10.6	11.2
		Very long	18,727	11.9	12.4	12.8
	55–64	Short	1,360	4.1	4.6	5.1
		Medium	1,846	4.3	4.9	5.5
		Long	3,396	4.4	5.1	5.9
		Very long	23,545	5.0	5.5	6.1
Sickness Benefit	16–24	Short	5,042	7.7	9.2	11.1
		Medium	2,679	11.0	12.7	14.7
		Long	1,862	14.5	16.3	18.3
		Very long	466	15.6	17.3	19.3
	25–34	Short	3,191	6.7	7.9	9.5
		Medium	2,560	10.7	12.1	13.8
		Long	3,079	15.2	16.7	18.3
		Very long	1,883	18.6	19.9	21.4
	35–44	Short	3,058	6.5	7.5	8.7
		Medium	2,459	9.6	10.6	11.8
		Long	3,392	12.8	13.8	14.8
		Very long	3,301	15.1	16.0	16.9
	45–54	Short	3,485	6.0	6.6	7.3
		Medium	2,394	7.9	8.5	9.1

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
		Long	3,166	9.8	10.3	10.8
		Very long	4,384	11.1	11.4	11.8
	55–64	Short	3,031	4.4	4.8	5.2
	Medium	1,805	5.2	5.6	6.0	
	Long	2,260	5.9	6.3	6.6	
		Very long	4,197	6.1	6.4	6.8
Unemployment Benefit	16–24	Short	15,043	2.7	4.1	6.2
		Medium	2,894	4.7	6.9	9.8
		Long	1,082	7.5	10.6	14.3
		Very long	90	8.7	12.3	16.7
	25–34	Short	8,124	2.6	3.8	5.6
		Medium	2,724	4.5	6.3	8.7
		Long	1,772	7.1	9.7	12.7
		Very long	482	8.4	11.4	14.9
	35–44	Short	5,658	2.8	3.9	5.4
		Medium	1,840	4.5	6.0	7.9
		Long	1,642	6.7	8.6	10.8
		Very long	717	7.7	9.9	12.4
	45–54	Short	4,595	3.4	4.3	5.3
		Medium	1,476	4.8	5.9	7.0
		Long	1,267	6.5	7.7	8.8
		Very long	877	7.4	8.6	9.8
	55–64	Short	2,727	3.4	4.2	5.1
		Medium	718	4.1	4.9	5.8
		Long	869	4.7	5.6	6.5
		Very long	1,167	4.4	5.5	6.5
Domestic Purposes Benefit	16–24	Short	4,618	9.4	10.8	12.5
		Medium	5,617	10.1	11.5	13.3
		Long	5,997	11.7	13.3	15.1
		Very long	5,230	11.0	12.5	14.2
	25–34	Short	4,354	6.4	7.5	8.8
		Medium	5,167	7.6	8.8	10.2
		Long	7,896	9.7	11.0	12.5
		Very long	15,600	10.8	12.1	13.6
	35–44	Short	4,479	5.4	6.2	7.2
		Medium	4,296	6.3	7.2	8.2

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)			
				A	B	C	
		Long	6,022	7.8	8.8	9.9	
		Very long	16,679	8.6	9.5	10.6	
	45–54	Short	1,879	4.8	5.4	6.1	
		Medium	1,656	5.7	6.2	6.9	
		Long	2,473	6.9	7.4	8.1	
		Very long	8,773	7.7	8.3	8.9	
	55–64	Short	780	4.4	4.7	5.2	
		Medium	646	4.7	5.1	5.5	
		Long	838	5.2	5.6	6.0	
		Very long	3,202	5.3	5.7	6.1	
	Other benefits	16–24	Short	5,020	4.9	7.0	9.9
			Medium	1,583	5.5	7.9	11.1
Long			498	7.5	10.6	14.4	
Very long			104	10.8	12.9	15.7	
25–34		Short	743	3.8	4.8	6.2	
		Medium	505	5.1	6.6	8.6	
		Long	416	7.7	9.5	11.8	
		Very long	214	9.1	10.6	12.3	
35–44		Short	579	4.1	5.0	6.2	
		Medium	439	5.3	6.5	7.9	
		Long	444	7.1	8.6	10.3	
		Very long	397	8.1	9.3	10.7	
45–54		Short	556	5.2	5.9	6.7	
		Medium	449	6.1	6.8	7.7	
		Long	532	7.5	8.3	9.1	
		Very long	947	8.8	9.5	10.2	
55–64		Short	809	4.2	4.7	5.2	
		Medium	629	4.5	5.0	5.5	
		Long	936	4.8	5.3	5.8	
		Very long	2,798	4.5	5.0	5.6	
Partners included on a benefit	16–24	Short	1,582	6.5	9.1	12.3	
		Medium	599	9.9	13.2	16.8	
		Long	544	14.5	18.8	23.0	
		Very long	97	17.3	22.3	27.0	
	25–34	Short	1,960	3.6	5.2	7.5	
		Medium	928	6.3	8.7	11.6	

Benefit group	Age group	Previous benefit duration	Number on benefit at end June 2009	Future duration (years)		
				A	B	C
		Long	1,212	10.0	13.2	16.8
		Very long	609	13.1	17.0	20.9
	35–44	Short	2,340	3.5	4.9	6.6
		Medium	977	6.2	8.1	10.2
		Long	1,362	9.5	11.9	14.3
		Very long	1,798	11.5	14.2	16.8
	45–54	Short	2,116	4.7	5.7	6.9
		Medium	874	6.9	8.0	9.1
		Long	1,242	8.6	9.8	10.9
		Very long	2,726	9.4	10.7	11.8
	55–64	Short	2,070	4.0	4.9	5.8
		Medium	1,026	4.5	5.4	6.3
		Long	1,570	4.6	5.6	6.6
		Very long	4,089	4.0	5.1	6.3

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.7: Detailed average future liability estimates by benefit type, age group and previous benefit duration (without discounting)

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Invalid's Benefit	16–24	Short	\$221,000	\$272,000	\$326,000
		Medium	\$176,000	\$230,000	\$293,000
		Long	\$136,000	\$184,000	\$252,000
		Very long	\$374,000	\$409,000	\$441,000
	25–34	Short	\$175,000	\$193,000	\$212,000
		Medium	\$207,000	\$230,000	\$254,000
		Long	\$249,000	\$279,000	\$309,000
		Very long	\$381,000	\$400,000	\$417,000
	35–44	Short	\$145,000	\$158,000	\$171,000
		Medium	\$169,000	\$185,000	\$201,000
		Long	\$198,000	\$218,000	\$238,000
		Very long	\$287,000	\$298,000	\$308,000
	45–54	Short	\$109,000	\$115,000	\$121,000
		Medium	\$125,000	\$133,000	\$140,000
		Long	\$144,000	\$152,000	\$160,000
		Very long	\$171,000	\$177,000	\$183,000
	55 – 64	Short	\$57,000	\$63,000	\$70,000
		Medium	\$58,000	\$67,000	\$75,000
		Long	\$60,000	\$70,000	\$81,000
		Very long	\$68,000	\$76,000	\$83,000
Sickness Benefit	16–24	Short	\$107,000	\$129,000	\$155,000
		Medium	\$148,000	\$172,000	\$200,000
		Long	\$194,000	\$219,000	\$247,000
		Very long	\$207,000	\$231,000	\$258,000
	25–34	Short	\$91,000	\$108,000	\$130,000
		Medium	\$145,000	\$165,000	\$187,000
		Long	\$207,000	\$226,000	\$248,000
		Very long	\$251,000	\$269,000	\$289,000
	35–44	Short	\$88,000	\$101,000	\$117,000
		Medium	\$128,000	\$142,000	\$157,000
		Long	\$172,000	\$185,000	\$199,000
		Very long	\$204,000	\$215,000	\$227,000
	45–54	Short	\$78,000	\$86,000	\$95,000
		Medium	\$104,000	\$112,000	\$120,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
		Long	\$128,000	\$134,000	\$140,000
		Very long	\$145,000	\$150,000	\$156,000
	55–64	Short	\$55,000	\$60,000	\$65,000
		Medium	\$65,000	\$69,000	\$75,000
		Long	\$73,000	\$78,000	\$82,000
	Very long	\$76,000	\$80,000	\$84,000	
Unemployment Benefit	16–24	Short	\$32,000	\$50,000	\$77,000
		Medium	\$57,000	\$86,000	\$124,000
		Long	\$94,000	\$134,000	\$184,000
		Very long	\$107,000	\$155,000	\$213,000
	25–34	Short	\$33,000	\$49,000	\$72,000
		Medium	\$57,000	\$81,000	\$112,000
		Long	\$93,000	\$127,000	\$167,000
		Very long	\$110,000	\$151,000	\$196,000
	35–44	Short	\$36,000	\$50,000	\$69,000
		Medium	\$57,000	\$77,000	\$100,000
		Long	\$86,000	\$111,000	\$139,000
		Very long	\$99,000	\$128,000	\$159,000
	45–54	Short	\$41,000	\$52,000	\$65,000
		Medium	\$59,000	\$72,000	\$86,000
		Long	\$81,000	\$95,000	\$109,000
		Very long	\$92,000	\$107,000	\$122,000
	55–64	Short	\$40,000	\$49,000	\$59,000
		Medium	\$47,000	\$57,000	\$68,000
		Long	\$54,000	\$65,000	\$75,000
		Very long	\$51,000	\$63,000	\$75,000
Domestic Purposes Benefit	16–24	Short	\$157,000	\$181,000	\$210,000
		Medium	\$169,000	\$193,000	\$222,000
		Long	\$195,000	\$221,000	\$252,000
		Very long	\$185,000	\$210,000	\$238,000
	25–34	Short	\$111,000	\$129,000	\$151,000
		Medium	\$131,000	\$151,000	\$174,000
		Long	\$166,000	\$187,000	\$212,000
		Very long	\$186,000	\$208,000	\$233,000
	35–44	Short	\$91,000	\$105,000	\$121,000
		Medium	\$107,000	\$121,000	\$138,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)			
			A	B	C	
		Long	\$131,000	\$147,000	\$164,000	
		Very long	\$145,000	\$161,000	\$178,000	
	45–54	Short	\$77,000	\$86,000	\$96,000	
		Medium	\$89,000	\$98,000	\$108,000	
		Long	\$108,000	\$116,000	\$126,000	
		Very long	\$122,000	\$131,000	\$140,000	
	55–64	Short	\$59,000	\$64,000	\$70,000	
		Medium	\$64,000	\$69,000	\$75,000	
		Long	\$72,000	\$77,000	\$82,000	
		Very long	\$73,000	\$78,000	\$83,000	
	Other benefits	16–24	Short	\$61,000	\$89,000	\$129,000
			Medium	\$68,000	\$100,000	\$143,000
Long			\$94,000	\$133,000	\$184,000	
Very long			\$139,000	\$166,000	\$201,000	
25–34		Short	\$51,000	\$64,000	\$83,000	
		Medium	\$69,000	\$88,000	\$114,000	
		Long	\$103,000	\$128,000	\$157,000	
		Very long	\$128,000	\$147,000	\$170,000	
35–44		Short	\$56,000	\$68,000	\$83,000	
		Medium	\$70,000	\$85,000	\$103,000	
		Long	\$96,000	\$116,000	\$138,000	
		Very long	\$117,000	\$133,000	\$152,000	
45–54		Short	\$69,000	\$78,000	\$88,000	
		Medium	\$80,000	\$90,000	\$100,000	
		Long	\$98,000	\$108,000	\$119,000	
		Very long	\$118,000	\$127,000	\$136,000	
55–64		Short	\$51,000	\$56,000	\$62,000	
		Medium	\$53,000	\$59,000	\$65,000	
		Long	\$57,000	\$63,000	\$69,000	
		Very long	\$53,000	\$60,000	\$67,000	
Partners included on a benefit	16–24	Short	\$88,000	\$126,000	\$173,000	
		Medium	\$131,000	\$176,000	\$226,000	
		Long	\$202,000	\$263,000	\$324,000	
		Very long	\$233,000	\$302,000	\$367,000	
	25–34	Short	\$45,000	\$67,000	\$97,000	
		Medium	\$80,000	\$111,000	\$148,000	

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
		Long	\$131,000	\$175,000	\$223,000
		Very long	\$166,000	\$215,000	\$264,000
	35–44	Short	\$42,000	\$58,000	\$78,000
		Medium	\$75,000	\$97,000	\$123,000
		Long	\$118,000	\$147,000	\$177,000
		Very long	\$138,000	\$170,000	\$200,000
	45–54	Short	\$52,000	\$64,000	\$76,000
		Medium	\$77,000	\$91,000	\$103,000
		Long	\$98,000	\$113,000	\$125,000
		Very long	\$109,000	\$124,000	\$137,000
	55–64	Short	\$41,000	\$51,000	\$61,000
		Medium	\$48,000	\$58,000	\$68,000
		Long	\$50,000	\$61,000	\$72,000
		Very long	\$44,000	\$56,000	\$70,000

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit

Table A2.8: Detailed average discounted future liability estimates by benefit type, age group and previous benefit duration (8 percent discount rate)

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
Invalid's Benefit	16–24	Short	\$103,000	\$114,000	\$125,000
		Medium	\$95,000	\$108,000	\$121,000
		Long	\$86,000	\$100,000	\$116,000
		Very long	\$135,000	\$142,000	\$148,000
	25–34	Short	\$85,000	\$90,000	\$95,000
		Medium	\$99,000	\$105,000	\$112,000
		Long	\$116,000	\$123,000	\$131,000
		Very long	\$153,000	\$157,000	\$161,000
	35–44	Short	\$83,000	\$88,000	\$92,000
		Medium	\$95,000	\$101,000	\$107,000
		Long	\$109,000	\$117,000	\$123,000
		Very long	\$143,000	\$147,000	\$150,000
	45–54	Short	\$74,000	\$77,000	\$80,000
		Medium	\$84,000	\$88,000	\$92,000
		Long	\$95,000	\$100,000	\$104,000
		Very long	\$110,000	\$113,000	\$116,000
	55–64	Short	\$46,000	\$50,000	\$55,000
		Medium	\$48,000	\$53,000	\$59,000
		Long	\$50,000	\$56,000	\$63,000
		Very long	\$55,000	\$60,000	\$65,000
Sickness Benefit	16–24	Short	\$50,000	\$57,000	\$65,000
		Medium	\$66,000	\$73,000	\$80,000
		Long	\$82,000	\$89,000	\$96,000
		Very long	\$91,000	\$97,000	\$103,000
	25–34	Short	\$46,000	\$53,000	\$61,000
		Medium	\$69,000	\$76,000	\$84,000
		Long	\$93,000	\$99,000	\$106,000
		Very long	\$110,000	\$115,000	\$121,000
	35–44	Short	\$51,000	\$57,000	\$64,000
		Medium	\$71,000	\$77,000	\$84,000
		Long	\$92,000	\$97,000	\$103,000
		Very long	\$107,000	\$111,000	\$116,000
	45–54	Short	\$53,000	\$58,000	\$63,000
		Medium	\$69,000	\$73,000	\$78,000

Benefit group	Age group	Previous benefit duration	Average liability (\$)			
			A	B	C	
		Long	\$83,000	\$86,000	\$90,000	
		Very long	\$94,000	\$96,000	\$99,000	
	55–64	Short	\$43,000	\$46,000	\$50,000	
		Medium	\$50,000	\$53,000	\$57,000	
		Long	\$56,000	\$59,000	\$62,000	
	Very long	\$59,000	\$61,000	\$64,000		
Unemployment Benefit	16–24	Short	\$20,000	\$26,000	\$35,000	
		Medium	\$31,000	\$41,000	\$52,000	
		Long	\$46,000	\$58,000	\$71,000	
		Very long	\$54,000	\$67,000	\$82,000	
	25–34	Short	\$22,000	\$29,000	\$38,000	
		Medium	\$34,000	\$44,000	\$55,000	
		Long	\$52,000	\$64,000	\$77,000	
		Very long	\$61,000	\$75,000	\$89,000	
	35–44	Short	\$25,000	\$32,000	\$41,000	
		Medium	\$37,000	\$46,000	\$57,000	
		Long	\$53,000	\$64,000	\$75,000	
		Very long	\$61,000	\$73,000	\$86,000	
	45–54	Short	\$30,000	\$37,000	\$45,000	
		Medium	\$42,000	\$50,000	\$58,000	
		Long	\$56,000	\$63,000	\$71,000	
		Very long	\$63,000	\$71,000	\$79,000	
	55–64	Short	\$32,000	\$39,000	\$45,000	
		Medium	\$38,000	\$45,000	\$52,000	
		Long	\$43,000	\$50,000	\$57,000	
		Very long	\$41,000	\$49,000	\$57,000	
	Domestic Purposes Benefit	16–24	Short	\$85,000	\$93,000	\$102,000
			Medium	\$91,000	\$99,000	\$108,000
			Long	\$102,000	\$110,000	\$118,000
			Very long	\$105,000	\$112,000	\$120,000
25 – 34		Short	\$68,000	\$75,000	\$84,000	
		Medium	\$78,000	\$86,000	\$95,000	
		Long	\$94,000	\$101,000	\$110,000	
		Very long	\$106,000	\$113,000	\$122,000	
35–44		Short	\$62,000	\$69,000	\$77,000	
		Medium	\$72,000	\$78,000	\$87,000	

Benefit group	Age group	Previous benefit duration	Average liability (\$)			
			A	B	C	
		Long	\$85,000	\$91,000	\$99,000	
		Very long	\$94,000	\$101,000	\$108,000	
	45–54	Short	\$57,000	\$62,000	\$69,000	
		Medium	\$65,000	\$71,000	\$77,000	
		Long	\$77,000	\$82,000	\$87,000	
		Very long	\$87,000	\$91,000	\$96,000	
	55–64	Short	\$48,000	\$51,000	\$55,000	
		Medium	\$51,000	\$55,000	\$58,000	
		Long	\$57,000	\$60,000	\$64,000	
		Very long	\$58,000	\$62,000	\$65,000	
	Other benefits	16–24	Short	\$32,000	\$42,000	\$53,000
			Medium	\$37,000	\$47,000	\$59,000
Long			\$47,000	\$59,000	\$72,000	
Very long			\$66,000	\$74,000	\$83,000	
25–34		Short	\$32,000	\$38,000	\$46,000	
		Medium	\$42,000	\$50,000	\$59,000	
		Long	\$57,000	\$66,000	\$76,000	
		Very long	\$73,000	\$79,000	\$87,000	
35–44		Short	\$38,000	\$44,000	\$51,000	
		Medium	\$46,000	\$53,000	\$61,000	
		Long	\$60,000	\$68,000	\$78,000	
		Very long	\$75,000	\$82,000	\$90,000	
45–54		Short	\$49,000	\$54,000	\$60,000	
		Medium	\$56,000	\$62,000	\$68,000	
		Long	\$67,000	\$73,000	\$79,000	
		Very long	\$80,000	\$85,000	\$89,000	
55–64		Short	\$41,000	\$44,000	\$48,000	
		Medium	\$43,000	\$47,000	\$51,000	
		Long	\$46,000	\$50,000	\$54,000	
		Very long	\$44,000	\$48,000	\$53,000	
Partners included on a benefit	16–24	Short	\$42,000	\$53,000	\$66,000	
		Medium	\$59,000	\$71,000	\$83,000	
		Long	\$85,000	\$99,000	\$113,000	
		Very long	\$97,000	\$112,000	\$126,000	
	25–34	Short	\$28,000	\$36,000	\$47,000	
		Medium	\$45,000	\$56,000	\$68,000	

Benefit group	Age group	Previous benefit duration	Average liability (\$)		
			A	B	C
		Long	\$69,000	\$83,000	\$97,000
		Very long	\$85,000	\$99,000	\$113,000
	35–44	Short	\$28,000	\$35,000	\$44,000
		Medium	\$46,000	\$56,000	\$66,000
		Long	\$69,000	\$81,000	\$92,000
		Very long	\$80,000	\$92,000	\$103,000
	45–54	Short	\$37,000	\$43,000	\$51,000
		Medium	\$53,000	\$60,000	\$67,000
		Long	\$66,000	\$74,000	\$80,000
		Very long	\$73,000	\$81,000	\$88,000
	55–64	Short	\$33,000	\$40,000	\$46,000
		Medium	\$39,000	\$45,000	\$52,000
		Long	\$41,000	\$48,000	\$55,000
		Very long	\$38,000	\$46,000	\$55,000

Short = less than one of the past three years on benefit

Medium = between one and two of the past three years on benefit

Long = between two and three of the past three years on benefit

Very long = all of the past three years on benefit



Appendix 3: Method

The general approach

We estimated the future time on benefit and the associated benefit payment liability of a cohort of clients who were on benefits at a point in time (end of June 2009).

We aggregated the data to a group level, and fitted a survival curve functional form as a non-linear regression model. The chosen functional form for this regression model was the Weibull model⁵. This model has two parameters; the shape parameter (α) and the scale parameter (λ). Changes in the shape parameter allow the hazard function to change in shape, while changes in the scale parameter increase or decrease the level of hazard across all time periods. This gives a great deal of flexibility in the survival model.

The Weibull survival curve is represented by the formula $S(t) = \exp(-\lambda t^\alpha)$ where t represents time and $S(t)$ represents the survival rate at time t . This equation was modified to allow other factors to influence the scale and shape. The estimation of future liability has three main steps:

1. *Construct the model* – Develop models which define the relationship between future benefit receipt (observed at monthly intervals over a four-year period), time, benefit type, economic change and age group.
2. *Forecast benefit receipt* – Project benefit duration estimates into the future (up to the age of eligibility for New Zealand Superannuation).
3. *Calculate liability* – Assign costs to future years on benefit based on current payments of main benefits and supplements by benefit type and age.

Step 1 – Construct the model

Data construction

The data for the analysis came from the Benefit Dynamics Database (BDD), a longitudinal database of benefit records extracted from the Ministry of Social Development's Information Analysis Platform. Before model construction could begin, the data was constructed, formatted and aggregated. This involved selecting all clients on benefit as at 1 July over a number of cohort years (1996 to 2005). For each cohort a number of variables were constructed describing each individual on benefit at that time. Each individual was then followed for 48 months, and their spells of benefit receipt tracked over that time. The individual data across all cohorts was combined into a maximum of 2,400 groups made up of the 12 benefit groups⁶ and broken down by the 10 cohort years, five age groups, and four duration groups.

⁵ A number of common functional forms were considered, with the Weibull providing the best fit over a wide range of different models.

⁶ Initially there were 13 benefit groups. However, Unemployment – Student Hardship was excluded from the modelling as very few people received this benefit as at 1 July, with receipt being irregular and highly seasonal.

Definitions used in the future benefit duration model

Benefit type	Acronym	Includes
Invalid's Benefit*	IB	Invalid's Benefit
Sickness Benefit	SB	Sickness Benefit Sickness Benefit Hardship
Unemployment Benefit	UB	Unemployment Benefit Unemployment Benefit Hardship
Unemployment Benefit (in Training)	UBT	Unemployment Benefit (in Training) Unemployment Benefit Hardship (in Training)
Job Search Allowance and Independent Youth Benefit	JSA_IYB	Job Search Allowance Independent Youth Benefit
Domestic Purposes Benefit	DPB	Emergency Maintenance Allowance DPB Sole Parent DPB Woman Alone DPB Care of Sick or Infirm
Widow's Benefit	WB	Widow's Benefit
Emergency Benefit	EB	Emergency Benefit
Partners included on an Invalid's Benefit	P_IB	Partners included on an Invalid's Benefit
Partners included on a Sickness Benefit	P_SB	Partners included on a: <ul style="list-style-type: none"> • Sickness Benefit • Sickness Benefit Hardship
Partners included on an Unemployment Benefit	P_UB	Partners included on an: <ul style="list-style-type: none"> • Unemployment Benefit • Unemployment Benefit Hardship
Partners included on another benefit	P_OTH	Partners included on an: <ul style="list-style-type: none"> • Unemployment Benefit (in Training) • Unemployment Benefit Hardship (in Training) • Job Search Allowance • Independent Youth Benefit • Emergency Benefit

* Two models were constructed for Invalid's Benefit, one with clients with long benefit duration only, and the other with all other clients.

Age groups

16 to 24 years of age

25 to 34 years of age

35 to 44 years of age

45 to 54 years of age

55 to 64 years of age

Benefit durations

Benefit duration	Definition
Short	Client has spent less than one of the past three years on benefit
Medium	Client has spent between one and two of the past three years on benefit.
Long	Client has spent between two and three of the past three years on benefit.
Very long	Client has spent all of the past three years on benefit.

Model specification

A separate model was constructed for each benefit type, except Invalid's Benefit, for which two models were constructed. One model included Invalid's Benefit clients with very long benefit duration, defined as having spent all of the last three years in receipt of benefit. The other included all other shorter-term Invalid's Benefit clients. It was not possible to construct a single Invalid's Benefit model which fitted the very long duration Invalid's Benefit clients well.

Each model was based around the form of the two-parameter Weibull survival function. The survival function S_t was redefined as P_t , the proportion of a group of clients on benefit at time t . Terms were added which changed the shape and scale of the function according to the age group and benefit duration the clients were identified as belonging to at that time, as well as the relevant economic conditions. An additive component was also included in some models⁷ to control for seasonal increases in December and January.

Economic conditions were controlled for through the introduction of two variables. Both the level of and change in the unemployment rate were found to be good predictors of benefit receipt. Exploratory analysis confirmed that the total future liability for a cohort of clients depended to a large degree on the unemployment rate from that point forwards, but in particular on the rate over the next few months and years. In practice, by including in the model at any particular month the quarterly unemployment rate for the current quarter, as well as the change in rate since the same quarter the previous year, we were able to control for much of the effect of changing labour market conditions on future liability.

Model

The future benefit duration model was defined as follows:

⁷ Seasonal dummy variables were added to the models relating to all clients under the age of 45 on Sickness Benefits, Unemployment Benefits, Unemployment Benefits (in training), Emergency Benefits, Job Search Allowances and Independent Youth Benefits, as well as partners included on all benefits except Invalid's Benefits.

$$p_t = \exp(-\lambda_q t^{\alpha_q}) + s_1 \phi_1 + s_2 \phi_2$$

where

$$\lambda_q = \lambda_0 (1 + \lambda_u u_q + \lambda_{\Delta u} \Delta u_q) \sum_{i=1}^5 \beta_{ai} x_i \sum_{j=1}^4 \beta_{dj} z_j$$

and

$$\alpha_q = \alpha_0 (1 + \alpha_u u_q + \alpha_{\Delta u} \Delta u_q) \sum_{i=1}^5 \gamma_{ai} x_i \sum_{j=1}^4 \gamma_{dj} z_j$$

Variables

p_t = probability of being on benefit at time t (proportion of clients on benefit at time t)

t = time in months from the cohort selection date (0 to 48)

q = time in quarters from the cohort selection date (0 to 16)

$u_1 - u_{16}$ = unemployment rate at quarters 1 to 16

$\Delta u_1 - \Delta u_{16}$ = annual change in employment rate for quarters 1 to 16

$x_1 - x_5$ = dummy variable for age groups

$z_1 - z_4$ = dummy variable for benefit duration parameter

$s_1 - s_2$ = seasonal dummy for December and January months

Model parameters

λ_0 = base Weibull scale parameter

λ_u = unemployment rate level scale parameter

$\lambda_{\Delta u}$ = unemployment rate change scale parameter

α_0 = base Weibull shape parameter

α_u = unemployment rate level shape parameter

$\alpha_{\Delta u}$ = unemployment rate change shape parameter

$\beta_{a1} - \beta_{a5}$ = age group scale parameters

$\beta_{d1} - \beta_{d4}$ = duration group scale parameters

$\gamma_{a1} - \gamma_{a5}$ = age group shape parameters

$\gamma_{d1} - \gamma_{d4}$ = duration group shape parameters

$\theta_1 - \theta_2$ = additive seasonal parameters

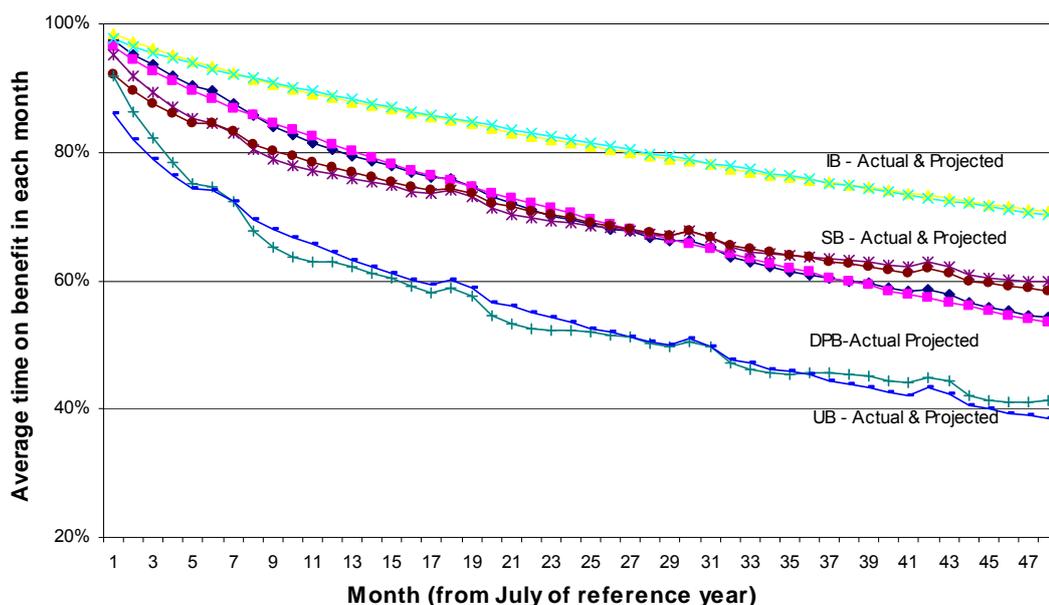
A large number of models were defined at a very detailed level for each cohort year based on the variables of interest (benefit type, age group and previous benefit duration)⁸. Models were progressively refined to include most of these variables as covariates, resulting in 13 models per cohort year.

⁸ This resulted in the construction of a maximum of $12 \times 5 \times 4 = 240$ models for each cohort.

Finally these models were collapsed into 13 models covering all 10 cohort years by combining all years into a single model for each benefit type (except the Invalid's Benefit), which attempted to capture the effects of economic change over the period covered by the cohorts.

This approach to estimating future benefit duration, and hence liability, was only possible through the modelling of groups of clients rather than individual clients. This means any variation at the individual level is not represented in the analysis. In addition, the observations were auto-correlated due to the same individuals being represented both in multiple cohorts and, over time, within the same cohort. Projections and actual average proportion of time on benefit for Invalid's Benefit, Sickness Benefit, Domestic Purposes Benefit and Unemployment Benefit are illustrated in Figure A3.1.

Figure A3.1: Actual and projected average time on benefit, by benefit type



Any estimates of standard errors and statistical significance will be biased and somewhat meaningless. If we were interested in understanding the relationship between covariates, and their independent impact on future benefit duration, this would be of concern. However, the focus of this work is on estimation and, as there are strong and clearly established independent relationships between the variables used we believe the approach is justified.

The fit of the model has been assessed using a range of measures. Two measures presented in this report are the mean absolute error over the 48 months being modelled, and the percentage difference between the actual observed duration and the estimated duration over the same time period.

The same measures were also constructed for the last 12 months of the model period (months 37 to 48), as this gives a better idea of the amount of error towards the tail of the graph, and hence the extent to which we should be concerned that the model might estimate poorly beyond 48 months, and into the longer term.

Table A3.1 presents a summary of model fit statistics for groupings of the thirteen models, by benefit type.

As can be seen in Figure A3.1 overall the model fits very well. There is some indication that the model may underestimate duration for Invalid's Benefit recipients, particularly in the last 12 months. Models for other benefits seem to fit very well overall, but overestimate in the last 12 months, and may also overestimate to some degree in out-years. All of these effects are only a few percentage points and hence are not of great concern if the estimates are treated with caution and seen as indicative. The

average absolute error for any particular month and group of clients is less than 0.1 for each model, indicating that overall the model fits the data well.

Table A3.1: Summary of model fit by benefit group

Benefit group*	All 48 months		Last 12 months only	
	Mean absolute error	% difference estimated from actual total duration	Mean absolute error	% difference estimated from actual total duration
Invalid's Benefit	0.06	-1.8%	0.09	-3.0%
Sickness Benefit	0.02	0.0%	0.02	1.4%
Unemployment Benefit	0.04	0.1%	0.04	4.0%
Domestic Purposes Benefit	0.02	0.0%	0.03	0.9%
Other benefits	0.05	0.0%	0.05	2.2%
Partners included on a benefit	0.04	0.0%	0.05	1.4%

* Each benefit group includes a number of individual benefits, and in some cases more than one model was estimated.

Step 2 – Forecast benefit receipt

With the models defined, the next step was to apply these models to estimate future benefit receipt for a recent cohort of benefit recipients. Information was extracted for the cohort of clients on benefit as at the end of June 2009, and they were grouped according to their age and history of benefit receipt. To estimate future benefit receipt for this cohort, it was necessary to formulate three economic scenarios which described changes in unemployment into the future.

The three scenarios were not designed to illustrate the range of likely economic change after June 2013, but to highlight the way economic change could influence future liability for clients currently on benefit. The three scenarios therefore include lower than forecast unemployment; forecast unemployment rates to 2013 from HYEUFU 2009; and higher than forecast unemployment. All scenarios assume unemployment stabilises and does not change from June 2013 onwards.

The three scenarios adopted are:

- A. Unemployment rates 1.5 percentage points below Scenario B to June 2013, and remaining at the constant rate of 3.7 percent in out-years.
- B. Unemployment rates forecasted by The Treasury to June 2013, remaining constant at 5.2 percent thereafter.
- C. Unemployment rates 1.5 percentage points above Scenario B to June 2013, and remaining at the constant rate of 6.7 percent in out-years.

The final step required to estimate future duration to age 65 was to force people's duration on benefit to zero once they reach that age. This was done using an assumption that clients within an age group were evenly distributed across that age range. This does not hold in practice, but is unlikely to have a substantial impact on the estimates.

Step 3 – Calculate liability

For each client on benefit at the end of June 2009, we extracted the rate of benefit they were being paid at that time. The figure used was gross⁹, adjusted for an individual's income and included supplementary payments¹⁰ (principally the Accommodation Supplement and the Disability Allowance), but not the family tax credit or third-tier assistance (eg Special Needs Grants).

This figure was averaged over all clients by benefit and age group, and the figure applied to the future liability of clients based on their age in 2009, but adjusting the rate for the different types of benefit they were estimated to move onto over the period to 2013. Liability is therefore expressed in 2009 dollars, with the assumption that real average weekly payments of benefits and supplements will remain constant at June 2009 levels.

Two sets of figures are presented based on different approaches to the present value of future liability. The first figures are not discounted and as a result of the calculation used above, assume a nominal discount rate implicitly equal to inflation.

Total liability = Number of clients * \sum_t annual liability

where t = 1, 2, 3.... to age 65 for each client group.

The second set of figures use discounted rates. Discounting involves giving less weight to payments which are made further into the future than those which happen earlier. The use of discounted (present value) liability is dependent on the use which will be made of the figures. For each age group and previous duration, we calculated

Present value of total liability=

Number of clients * (\sum_t annual liability / $(1+i)^{(t-1)}$)

where i = net discount rate of 8 percent, and i = net discount rate of 6 percent.

To calculate a future liability figure from the forecast average time on benefit per year we assumed that the proportion of clients on a particular benefit in a particular benefit/age group at the end of the four-year period would continue in future years. We then extended the assumptions of constant real benefit rates into the future and calculated future liability accordingly.

⁹ If liability were to be expressed in terms of total liability to government, figures used should be net of taxation and include other government payments. We are treating liability as total liability of benefit payments.

¹⁰ In some cases, supplementary payments can be paid even if a client is not a recipient of a main benefit. For this reason, a client moving off benefit would not necessarily reduce their liability to zero.